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**CONSOLIDATED BIODIVERSITY
REPORT FOR THE WABU FOREST
RESERVE**

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By

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Summary of surveys

Two baseline flora and fauna surveys were carried out in the Wabu Forest Reserve from 16-22 November 2003 and 30 January - 10 February 2006. The 2003 survey was conducted mainly in the upper section of the reserve and the 2006 survey in the mid-lower section of the reserve.

A range of terrestrial fauna and flora classes were surveyed during the trips including birds, fish, mammals, insects, reptiles and amphibians, and various flora groups. In general, the same survey techniques were used in 2003 and 2006 for each taxonomic group however, in 2006 a long-term plant monitoring plot was established. The primary purpose of the plot was to enable the collation of data which would provide baseline information for the spatial distribution of plants in a given area, provide a better understanding of tree distribution, forest type, composition, and other vegetation dynamics.

Several endangered and many endemic species were found during the surveys. The most significant fauna discoveries were that of the long-legged warbler (*Trichocicla rufa*) last officially recorded in 1894 on Viti Levu, the endangered and endemic pink-billed parrot finch (*Erythrura kleinschmidti*) the Fiji blossom bat (*Notopterus macdonaldi*), and an unconfirmed record of the Barred Tree Skink (*Emoia trossula*, currently thought extinct on mainland Fiji). The most significant flora discoveries were three populations of *Acmopyle sahniana* a member of the relict Gondwanan family *Podocarpaceae* and an orchid of the genus *Macodes* which is a new record for Fiji.

A number of invasive species from a range of taxa were observed during the surveys including ship rats (*Rattus rattus*), Pacific rats (*Rattus exulans*), mongoose (*Herpestes javanicus*), red-vented bulbuls (*Pycnonotus cafer*), common mynahs (*Acridotheres tristis*) cane toads (*Bufo marinus*), Korster's Curse (*Clidemia hirta*), and Mile-a-minute (*Mikania micrantha*). The abundance of many of these invasive species is fairly low and mainly concentrated around the periphery of the reserve occasionally visited by the locals.

SUMMARY OF KEY BIODIVERSITY FINDINGS

Birds

Bird surveys were conducted using timed point count bird surveys in a number of sites on fine weather days and the occasional use of a mist net. Birds were surveyed on most days from first light (about 6 am) until about 10 am, the period of peak activity and maximum detectability. All birds seen or heard were noted, together with beginning and end times of observation sessions.

Thirty-seven bird species were recorded from the Wabu Forestry Reserve which represent 47% of the terrestrial land birds in Fiji (see Table 1 for detailed checklist). Thirteen of these species are endemic to Fiji (38% of total endemic land species) including three species that are endemic to Viti Levu (Pink-billed Parrotfinch, Masked Shining Parrot, Golden Dove). Twenty species are native to Fiji (67% of total natives) whilst the remaining four species are introduced, invasive species (30% of total introduced).

The abundance and diversity of birds in this area is relatively low however, there were a number of globally important species observed. Six of these species are listed under current IUCN (2006) criteria (32% of threatened birds in Fiji). These are the Red-Throated Lorikeet (CR), the Long-Legged Warbler (EN), the Pink-Billed Parrotfinch (VU), the Friendly Ground Dove (VU), the Black-Faced Shrikebill (VU), and the Masked Shining Parrot (NT).

The most important findings during these surveys were the sightings of the Long-legged Warbler and the Pink-billed Parrotfinch. Prior to the 2003 survey, the last confirmed sighting of the Long-legged Warbler was in 1894. A number of pairs and juveniles were recorded in both 2003 and 2006. In addition, the presence of all four of the Viti Levu forest species listed as Vulnerable, and the almost total absence of introduced bird species, further adds to the areas overall ornithological importance.

Based on results of these surveys, the Wabu Forest Reserve meets all the necessary qualification criteria for being listed as an IBA (Important Bird Area) of global importance and may be officially listed as such in the future.

Table 1. Combined Checklist of Bird Species Recorded in the Wabu Forest Reserve from 2003-2006.
LE = Local Endemic, E = Endemic to Fiji, N = Native, I = Introduced.

Scientific name	Common English Name	Status	IUCN Threat Status
<i>Erythrura kleinschmidti</i> ³	Pink-billed Parrotfinch	LE (Viti Levu)	VU
<i>Prosopcia personata</i> ⁴	Masked Shining Parrot	LE (Viti Levu)	NT
<i>Ptilinopus luteovirens</i>	Golden Dove	LE (Viti Levu)	
<i>Artamus mentalis</i>	Fiji Woodswallow	E	
<i>Cettia ruficapilla</i>	Fiji Bush-warbler	E	
<i>Chamosyna amabilis</i> ¹	Red-throated Lorikeet	E	CR
<i>Ducula latrans</i>	Barking Pigeon	E	
<i>Erythrura pealii</i>	Fiji Parrotfinch	E	
<i>Gymnomyza viridis</i>	Giant Forest Honeyeater	E	
<i>Mayrornis lessoni</i>	Slaty Monarch	E	
<i>Myzomela jugularis</i>	Orange-breasted Myzomela	E	
<i>Trichocichla rufa</i> ²	Long-legged warbler	E	EN
<i>Zosterops explorer</i>	Fiji White-eye	E	
<i>Aplonis tabuensis</i>	Polynesian Starling	N	
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	N	
<i>Circus approximans</i>	Pacific Harrier	N	
<i>Clytorhynchus nigrogularis</i> ³	Black-faced Shrikebill	N	VU
<i>Clytorhynchus vitiensis</i>	Lesser Shrikebill	N	
<i>Collocalia spodiopygius</i>	White-rumped Swiftlet	N	
<i>Columba vitiensis</i>	White-throated Pigeon	N	
<i>Foulehaio carunculata</i>	Wattled Honeyeater	N	
<i>Gallucolumba stairi</i> ³	Friendly Ground Dove	N	VU
<i>Lalage maculosa</i>	Polynesian Triller	N	
<i>Myiagra azureocapilla</i>	Blue-crested Broadbill	N	
<i>Myiagra vanikorensis</i>	Vanikoro Broadbill	N	
<i>Pachycephala pectoralis</i>	Golden Whistler	N	
<i>Petroica multicolor</i>	Scarlet Robin	N	
<i>Phigys solitarius</i>	Collared Lory	N	
<i>Ptilinopus perousii</i>	Many-coloured Fruit-dove	N	
<i>Rhipidura spilodera</i>	Streaked Fantail	N	
<i>Todiramphus chloris</i>	White-collared Kingfisher	N	
<i>Turdus poliocephalus</i>	Island Thrush	N	
<i>Zosterops lateralis</i>	Silvereye	N	
<i>Acridotheres fuscus</i>	Jungle Mynah	I	
<i>Acridotheres tristis</i>	Common Mynah	I	
<i>Amandava amandava</i>	Red Avadavat	I	
<i>Pycnonotus cafer</i>	Red-vented Bulbul	I	

Freshwater Macrofauna

Freshwater macrofauna surveys were conducted using a combination of techniques; electroshocking, various nets, spear guns and visual observations in the main Wabu watershed and a number of smaller tributaries. Data recorded included presence and abundance of macrofauna and a range of habitat factors (e.g. water chemistry, stream type, riparian vegetation type).

Only three species were recorded from the Wabu Forest Reserve, the freshwater eel *Anguilla marmorata*, a goby *Sicyopterus lagocephalus*, and the freshwater prawn *Camdina nudirostris*. All three species are native to Fiji. The abundance of the two fish species was low in the reserve while that of the prawns was high. There appears to be seasonal variation in the presence of the goby species as it was not recorded in November 2003 but was found in February 2006. As such there may be one or two other species that were missed during these surveys due to seasonality.

The low diversity of recorded freshwater macrofauna in the Wabu Forest Reserve can be attributed to a number of factors including (a) altitude of the site (difficult for fish to move upstream to headwaters where most of surveys were done), (b) the low water temperature associated with altitude (cold and not conducive to finned fish) and, (c) the low abundance and diversity of finned fish further downstream.

It is important to note that there were no invasive freshwater macrofauna species found during either survey.

Herpetofauna

Diurnal active surveys of 2-4hr duration were conducted along streams edges (for frogs) and in other forest habitats (for lizards) by a minimum of 3 searchers. Nocturnal surveys along the banks of streams were also conducted between 2000-2200. In addition to species presence and abundance, various habitat details were recorded including; vegetation type and dominant plant species, stream characteristics and weather conditions.

Five herpetofauna species have been confirmed from the Wabu Forest Reserve (17% of Fiji's terrestrial herpetofauna, Table 2). Two of the species are endemic to Fiji, two are native and the last *Bufo marinus* (cane toad) is introduced. The most common species are *Platymantis vitiensis*, *Emoia concolor*, *Nactus pelagicus* and *Bufo marinus*. All of the records are from the mid-low section of the reserve (no herpetofauna found in 2003).

In addition to the five species there is a single unconfirmed record of the native skink *Emoia trossula* in the lower section of the reserve. As this species was thought to be extinct from mainland Fiji it is potentially a very important record for Wabu Forest Reserve. As such it will not be confirmed as an actual record until a specimen is captured or a clear photograph is obtained (the record is a visual sighting of more than 20 minutes in duration).

The herpetofauna species list is probably incomplete as there are other species common to lowland and upland rainforests that were not recorded during surveys. These include *Gehyra oceanica*, *G. vorax*, and *Emoia campbelli*.

Table 2. Checklist of Herpetofauna found in the Wabu Forest Reserve. E = Endemic, N = Native, I = Introduced.* Unconfirmed record.

Species Name	Common Name	Status
<i>Platymantis vitiensis</i>	Fiji Tree Frog	E
<i>Emoia concolor</i>	Fiji Green Tree Skink	E
<i>E. impar</i>	Blue-tailed Skink	N
<i>E. trossula*</i>	Barred Tree Skink	N
<i>Nactus pelagicus</i>	Skink-toed Gecko	N
<i>Bufo marinus</i>	Cane Toad	I

Mammals

Mammals were surveyed using a combination of techniques including mist netting and nocturnal censuses for bats, trapping for rats and mongoose, and incidental records/observations made during other surveys.

Eleven mammal species have been recorded from the Wabu Forest Reserve, the majority of which are introduced species (Table 3). Four bat species (67% of bats in Fiji) including one endemic, the Fiji Blossom Bat (*Notopterus macdonaldi*) have been recorded from the reserve and all are listed under IUCN (2006) criteria.

Several domestic and invasive species were also observed including pigs, dogs, feral cats, mongoose, cattle and rats. Trapping work done in the reserve demonstrates that rats are common throughout while domestic animals such as cats, dogs and cattle are less common in the area (particularly cattle).

It is important that further surveys are conducted to establish the status of the bat populations in the area as well as monitor the impact of the domestic and alien species (especially rats and cats) on the native fauna of the area (particularly the birds).

Table 3. Checklist of mammal species found in the Wabu Forest Reserve. E = Endemic, N = Native, I = Introduced.

Species name	Common Name	Status	IUCN Threat Status
<i>Notopterus macdonaldi</i>	Fiji Blossom Bat	E	VU
<i>Emballonura semicaudata</i>	Polynesian Sheath-tailed Bat	N	EN
<i>Pteropus samoensis</i>	Samoan Fruit bat	N	VU
<i>Pteropus tonganus</i>	Tongan Fruit bat	N	LR
<i>Rattus exulans</i>	Pacific Rat	I	
<i>Rattus rattus</i>	Ship Rat	I	
<i>Herpestes javanicus</i>	Small Indian Mongoose	I	
<i>Sus scrofa</i>	Feral Pig	I	
<i>Bos taurus</i>	Feral Cattle	I	
<i>Canis familiaris</i>	Feral Dogs	I	
<i>Felis catus</i>	Feral Cat	I	

Insects

Insect surveys in Wabu Forest Reserve were conducted using leaf litter samples along transects, light traps in plots and opportunistic encounters. Data on vegetation, canopy cover and soil moisture content were recorded and a cable free Weather Station (Oregon Scientific, model WMR112A) was used to measure air temperature, humidity and pressure.

The most common orders/families collected from these surveys include:

1. Leaf litter ants (Family Formicidae), this family is well represented in Fiji having 66% endemism with approximately 15% of the other species being native.
2. The order Coleoptera (beetles) is very diverse and well represented in the reserve by the families Scarabidae, Carabidae, Chrysomelidae (75% endemism) and Curculionidae.
3. The order Lepidoptera (moths) is quite diverse in the suborder Microlepidoptera. Unfortunately not much is known for the Microlepidoptera of Fiji.
4. The orders Homoptera (cicadas) and Isoptera (termites) are also well represented.
5. The order Odonata (damselflies and dragonflies), are abundantly seen along the rivers and streams within the reserve. Of particular interest is the genus endemic to Fiji, the *Nesobasis* which is commonly seen in Wabu.

Apart from the great diversity of insects collected from the surveys (Table 4), some of the insects that were expected to inhabit these ecosystems were not commonly encountered. This includes the beetle family Cerambycidae (long-horned beetles), this family has the highest endemism of known insects in Fiji (94% endemism). Further surveys with greater survey effort and a wider variety of sampling techniques (Malaise traps, canopy fogging and pit fall traps) could potentially improve the chances of encountering this family (and many others) in particular the endemic and endangered *Xixuthrus* beetle. This species is difficult to find due to its wood burrowing nature. In addition, the order Phasmatodea (stick insects and leaf insects) was not found at all using the techniques employed as they are mainly foliage and canopy species which are well camouflaged.

Despite the lack of a fully comprehensive survey of the reserve, it can be assumed that with the relatively good status of the forest in this reserve, there exists a good chance that majority of insect orders still inhabit the ecosystem

Table 4. Checklist of insect families found in the Wabu Forest Reserve. %E = percent of group that is endemic to Fiji (note that these % are for Wabu and Sovi combined)

Order	Sub-order	Family	Common name
Hymenoptera	Apocrita	Formicidae (66% E)	Ants
			Wasps
Lepidoptera	Macrolepidoptera		Butterflies
	Microlepidoptera		Moths
Isoptera		Termitidae	Termites
Tricoptera			caddis fly
Diptera			Flies
Homoptera		Cicadidae	Cicada
Hemiptera			true bugs
Coleoptera		Curculionidae	Weevils
		Staphylinidae	Rove beetles
		Chrysomelidae (75% E)	Leaf beetles
		Tenebrionidae	Darkling beetles
		Carabidae	Ground beetles
		Elateridae	Click beetles
		Callirhipidae	
		Scolytidae	Bark beetles
		Eucnemidae	
		Cerambycidae (94% E)	Long horn
		Cucujidae	Cucujid beetle
		Pselaphidae (69% E)	
		Propalticidae	
		Coccinellidae	Lady bird
		Zopheridae	Zopherids
		Scydmaenidae	Ant-like stone beetle
		Scaphididae	Shinning fungus beetle
		Scirtidae	Marsh beetles
		Lampyridae	Lightening bugs
		Scarabidae	Scarabs
		Hydrophilidae	Water scavenging beetles
Odonata	Zygoptera		Damselflies
	1 genus E (<i>Nesobasis</i>)		
	Anisoptera		Dragonflies
Thysanuara			Silverfish
Orthoptera	Caelifera		Grasshopper
	Ensifera	Gryllaerididae	Cricket
Blattodea			Cockroach

Plants

Plants were surveyed in three main ways (a) quantitative assessments using belt transects, (b) quantitative assessments using plots and (c) qualitative assessments from recorded observations made whilst trekking through the forest.

The belt transects were used to measure species density, spatial distribution of species and typifying forest types. Three 60 × 6m transects, spread throughout the study area were placed in three forest types identified on ridges and slopes. Within each of these transects all trees with diameter at breast height (1.3m) of 10cm or more were measured, identified and position approximately mapped. Also, measurements of the bole height, crown height and crown width were estimated.

The methodology involved in the quantitative assessments using plots is discussed in more detail in the section “Establishment of long-term monitoring plots.”

The qualitative surveys involved the documentation of plants found growing in the reserve whilst trekking through the forest. Species that could not be identified in the field and were either flowering or fruiting were collected for later identification and as herbarium specimens.

A total of 307 plant species have been identified from Wabu Forest Reserve (Table 5) of which approximately 95% are native (including 60% endemic) to Fiji.

The abundance of cryptogams (ferns and their allies) was particularly high (around 12%) and mostly comprised of fern allies species in the genus *Selaginella*, and ferns in the *Marattia*, *Trichomanes*, *Asplenium* and *Tectaria* genera.

The diversity and abundance of palms was high in the area with three endemic species *Clinostigma exorrhizum*, *Physokentia rosea*, and *Veitchia vitiensis* and one local endemic species *Balaka longirostris* (endemic to Viti Levu) which represent 15% of all palms in Fiji.

The abundance of orchids in the reserve is fairly high at roughly 6%. The discovery of the herbaceous orchid in the genus *Macodes* is a new record for Fiji. Prior to this discovery the distribution of this genus terminated in Vanuatu.

Gymnosperms are well represented with eight (out of the ten) species found in Fiji present. A highlight of the botanical survey was the discovery of three populations of the rare and critically endangered gymnosperm *Acmopyle sahniana* – a member of the Gondwanan relict family *Podocarpaceae*. The three populations were all regenerating (presence of seedlings) with an average of about ten trees per population. The largest tree had a dbh of 14cm, bole height of

5m and crown height of 9m. The recent discovery of this population has increased the extant population distribution into two provinces for Fiji.

There are numerous large trees in the reserve, many with dbh >100cm including individuals of *Agathis macrophylla*, *Gmelina vitiensis*, *Ficus cf tinctoria*, *Hernandia olivacea*, *Endospermum macrophyllum*, *Calophyllum* sp., *Myristica castaneifolia* and *Decussocarpus imbricatus*. All these tree species are important timber tree species for Fiji and as such Wabu Forest Reserve is considered an important germplasm bank for these timber species.

Two main forest types were observed, namely upland (montane) forest restricted to areas between 700m to 850m asl, and the cloud forest (montane cloud forest) restricted to areas above 850m asl.

In the upland forest the vegetation is dominated by *Agathis macrophylla*, although other broad-leaved tree species were observed in this forest. Some of the more common tree species observed includes *Endospermum macrophyllum*, *Calophyllum vitiense*, *Myristica castaneifolia*, *Dysoxylum* sp., *Syzygium* sp., *Podocarpus neriifolius*, *Metrosideros collina* and *Garcinia myrtifolia*.

The montane cloud forest is best characterised as being comprised of stunted trees with an average height of about 6m, leaves with drip tips and stems heavily covered with bryophytes and the area having high precipitation. The area is almost always shrouded in clouds especially the ridges and mountaintops. The thick soggy layer of partially decayed organic matter on the forest floor is also a very common feature. Some of the more common species observed in the area included the shrubs/small trees like *Paphia vitiense*, *Weinmannia* sp. and the trees *Dysoxylum* sp., *Scaevola floribunda*, *Macaranga magma*, *Cyathea alata*, *Syzygium* sp and *Calophyllum* sp. Climbers observed included *Freycinetia urvilleana*, *Medinilla* sp., and *Morinda budicifolia*.

Due to the importance of the Wabu Forest Reserve in terms of plant (and animal) biodiversity, education awareness for the local resource owners with regards to the impacts of invasive flora and fauna is vital to maintain the unique biodiversity of the area. Also, alternative sources for income generation should be put into place to reduce the desire of logging and mining in the reserve. Most importantly the “true” value of Wabu’s rich and unique biological diversity should be made known to the resource owners and their neighbours.

Table 5. Annotated checklist of plants observed in Wabu Forest Reserve. Ind – Indigenous, End – Endemic, Adv – Adventitious, Nat – Naturalized, Inv – Invasive.

Family	Scientific Name	Distribution Status
Agavaceae	<i>Cordyline fruticosa</i> A.Chev.	Ind
Alangiaceae	<i>Alangium vitiense</i> (A.Gray) baill. Ex Harms	End
Anacardiaceae	<i>Buchanania attenuata</i> A.C.Sm	End
Anacardiaceae	<i>Semecarpus vitiensis</i> (A.Gray) Engl.	Ind
Annonaceae	<i>Cyathocalyx insularis</i> A.C.Sm	End
Annonaceae	<i>Polyalthia vitiensis</i> Seem	End
Annonaceae	<i>Xylopiya pacifica</i> A. C. Sm.	End
Apocynaceae	<i>Alstonia pacifica</i> (Seem.) A.C.Sm.	Ind
Apocynaceae	<i>Alstonia vitiensis</i> Seem.	End
Apocynaceae	<i>Alyxia bracteolosa</i> var. <i>bracteolosa</i> J. W. Parham	Ind
Apocynaceae	<i>Alyxia bracteolosa</i> A.Gray	Ind
Apocynaceae	<i>Cerbera manghas</i> L.	Ind
Apocynaceae	<i>Pagiantha thurstonii</i> (Horne ex baker) A.C.Sm.	End
Araceae	<i>Epipremnum pinnatum</i> (L.) Engl.	Ind
Araliaceae	<i>Schefflera costata</i> A.C.Sm.	End, rare
Araliaceae	<i>Plerandra grayi</i> Seem.	End
Araliaceae	<i>Plerandra insolita</i> A.C.Sm.	End
Araliaceae	<i>Plerandra victoriae</i> Gibbs	End
Araliaceae	<i>Plerandra vitiensis</i> (Seem.) Baill.	End
Araliaceae	<i>Polyscias corticata</i> Gibbs	End
Araliaceae	<i>Polyscias joskei</i> Gibbs	End
Araliaceae	<i>Polyscias multijuga</i> (A.Gray) Harms	End
Araliaceae	<i>Schefflera seemanniana</i> A.C.Sm.	End
Araliaceae	<i>Schefflera vitiensis</i> (A.Gray) Seem.	End
Araucariaceae	<i>Agathis macrophylla</i> (Lindley) Masters	Ind
Arecaceae	<i>Balaka longirostris</i> Becc.	End
Arecaceae	<i>Clinostigma exorrhizum</i> (H.Wendel.) Becc.	End
Arecaceae	<i>Physokentia rosea</i> H.E.Moore	End
Arecaceae	<i>Veitchia vitiensis</i> (H.Wendel.) H.E.Moore	End
Asclepiadaceae	<i>Hoya australis</i> R.Br	Ind
Asclepiadaceae	<i>Hoya diptera</i> Seem.	End
Asclepiadaceae	<i>Hoya vitiensis</i> Turill	End
Aspidiaceae	<i>Tectaria latifolia</i> (Forster) Copel.	Ind
Aspidiaceae	<i>Tectaria vitiensis</i> Brownlie	End
Aspleniaceae	<i>Asplenium amboinense</i> Willd.	Ind
Aspleniaceae	<i>Asplenium australasicum</i> Hook	Ind
Aspleniaceae	<i>Asplenium bipinnatifidum</i> Baker	Ind
Asteraceae	<i>Ageratum conyzoides</i> L.	Adv
Asteraceae	<i>Bidens pilosa</i> L.	Adv
Asteraceae	<i>Conyza bonariense</i> (L.) Cronquist	Adv
Barringtoniaceae	<i>Barringtonia edulis</i> Seem.	End
Burseraceae	<i>Canarium harveyi</i> Seem	Ind
Burseraceae	<i>Canarium vanikoroense</i> Leenh.	Ind
Burseraceae	<i>Canarium vitiense</i> A.Gray	Ind
Burseraceae	<i>Haplolobus floribundus</i> subsp. <i>salomonensis</i> (C.T.White) Leenh.	Ind
Caesalpiniaceae	<i>Kingiodendron platycarpum</i> B.L.Burt	End
Caesalpiniaceae	<i>Maniltoa grandiflora</i> (A.Gray) Scheffer	End
Casuarinaceae	<i>Gymnostoma vitiense</i> L.A.S. Johnson	End
Chrysobalanaceae	<i>Atuna racemosa</i> Raf.	Ind

Chrysobalanaceae	<i>Parinari insularum</i> A. Gray	Ind
Clusiaceae	<i>Calophyllum amblyphyllum</i> A.C.Sm	End
Clusiaceae	<i>Calophyllum neo-ebudicum</i> Guillaumin	Ind
Clusiaceae	<i>Calophyllum vitiense</i> Turrill	End
Clusiaceae	<i>Calophyllum cerasiferum</i> Vesque	End
Clusiaceae	<i>Garcinia myrtifolia</i> A.C.Sm.	Ind
Clusiaceae	<i>Garcinia pseudoguttifera</i> Seem.	Ind
Clusiaceae	<i>Garcinia sessilis</i> (Forst f.) Seem.	Ind
Connaraceae	<i>Connarus pickeringii</i> A.Gray	End
Convolvulaceae	<i>Merremia peltata</i> (L.) Merr.	Ind, inv
Cunoniaceae	<i>Geissois stipularis</i> A.C.Sm.	End
Cunoniaceae	<i>Geissois superba</i> Gillespie	End
Cunoniaceae	<i>Geissois ternate</i> A.Gray	End
Cunoniaceae	<i>Spiraeanthemum katakata</i> Seem.	End
Cunoniaceae	<i>Spiraeanthemum serratum</i> Gillespie	End
Cunoniaceae	<i>Weinmannia affinis</i> A.Gray	End
Cunoniaceae	<i>Weinmannia richii</i> A.Gray	End
Cyatheaceae	<i>Culcita straminea</i> (Labill.) Maxon	Ind
Cyatheaceae	<i>Cyathea affinis</i> (Forst.) Sw.	End
Cyatheaceae	<i>Cyathea alata</i> Copel.	Ind, rare
Cyatheaceae	<i>Cyathea hornei</i> (Baker) Copel.	Ind
Cyatheaceae	<i>Cyathea lunata</i> (Forst) Copel.	Ind
Cyperaceae	<i>Carex gibbsiae</i> Rendle	End
Cyperaceae	<i>Carex graeffeana</i> Boeck.	Ind
Cyperaceae	<i>Gahnia vitiensis</i> Rendle	End
Cyperaceae	<i>Hypolytrum nemorum</i> subsp. <i>Vitiense</i> (C.B.Clarke) T.Koyama	Ind
Cyperaceae	<i>Kyllinga polyphylla</i> Willd. Ex Kunth	Ind
Cyperaceae	<i>Scleria polycarpa</i> Boeck.	Ind
Davalliaceae	<i>Davallia fejeensis</i> Hook	End
Davalliaceae	<i>Humata botrychioides</i> Brack.	End
Degeneriaceae	<i>Degeneria vitiensis</i> I.W. Bailey & A.C.Smith	End
Dennstaedtiaceae	<i>Orthopteris ferulacea</i> (Moore) Copeland	End
Dilleniaceae	<i>Dillenia biflora</i> A.Gray) Martelli ex Dur. & Jacks.	End
Dioscoreaceae	<i>Dioscorea bulbifera</i> L.	End
Ebenaceae	<i>Diospyros elliptica</i> (J.R & G.Frost) P.S.Green	End
Elaeocarpaceae	<i>Elaeocarpus chelonimorphus</i> Gillespie	End
Epacridaceae	<i>Leucopogon septentrionalis</i> Schlechter	Ind
Ericaceae	<i>Paphia vitiensis</i> Seem.	End
Euphorbiaceae	<i>Acalypha insulana</i> Muell.	Ind
Euphorbiaceae	<i>Acalypha repanda</i> Muell.	Ind
Euphorbiaceae	<i>Acalypha rivularis</i> Seem.	End
Euphorbiaceae	<i>Baccaurea pulvinata</i> A. C. Sm	End
Euphorbiaceae	<i>Baccaurea seemannii</i> (Muell.) Muell.	Ind
Euphorbiaceae	<i>Baccaurea stylaris</i> Muell. Arg.	End
Euphorbiaceae	<i>Endospermum macrophylla</i> (Muell. Arg.) Pax & Hoffm.	End
Euphorbiaceae	<i>Glochidion anfractuosum</i> Gibbs	End
Euphorbiaceae	<i>Glochidion seemannii</i> Muell.	End
Euphorbiaceae	<i>Glochidion vitiense</i> (Muell.) Gillespie	End
Euphorbiaceae	<i>Macaranga graeffeana</i> Pax & Hoffm. var. <i>graeffeana</i> A. C. Sm.	End
Euphorbiaceae	<i>Macaranga harveyana</i> (Muell. Arg.) Muell. Arg.	Ind
Euphorbiaceae	<i>Macaranga magna</i> Turrill	End
Euphorbiaceae	<i>Macaranga vitiensis</i> Pax & Hoffm.	End
Euphorbiaceae	<i>Omalanthus nutans</i> (Forst. f.) Guillemin	Ind

Fabaceae	<i>Macuna platyphylla</i> A.Gray	Ind
Flacourtiaceae	<i>Erythrospermum acuminatissimum</i> (A.gray) A.C.Sm.	End
Flacourtiaceae	<i>Homalium pallidum</i> A.C.Sm.	End
Flagellariaceae	<i>Flagellaria gigantean</i> Hook	Ind
Flagellariaceae	<i>Flagellaria indica</i> L	Ind
Flagellariaceae	<i>Flagellaria neo-caledonica</i> Schlechter	Ind
Gesneriaceae	<i>Cyrtandra amicta</i> A.C. Smith	End
Gesneriaceae	<i>Cyrtandra chlorantha</i> A.C. Sm.	End, rare
Gesneriaceae	<i>Cyrtandra esothrix</i> A.C. Sm.	End
Gesneriaceae	<i>Cyrtandra jugalis</i> A. C. Sm.	End
Gesneriaceae	<i>Cyrtandra occulta</i> A.C. Sm.	End
Gesneriaceae	<i>Cyrtandra prattii</i> Gillespie	End, rare
Gesneriaceae	<i>Cyrtandra trichophylla</i> A.C. Sm.	End
Gesneriaceae	<i>Cyrtandra victoriae</i> Gillespie	End
Gesneriaceae	<i>Cyrtandra vitiensis</i> Seem.	End
Gleicheniaceae	<i>Dicranopteris linearis</i> (Burm.) Underwood	Ind
Gnetaceae	<i>Gnetum gnemon</i> L.	End
Gonystylaceae	<i>Gonystylus punctatus</i> A.C.Sm.	End
Goodeniaceae	<i>Scaevola floribunda</i> A.Gray	End
Polypodiaceae	<i>Dipteris conjugate</i> Reinw.	Ind
Heliconiaceae	<i>Heliconia paka</i> A.C. Sm.	Ind
Hernandiaceae	<i>Hernandia olivacea</i> Gillespie	End
Icacinaceae	<i>Citronella vitiensis</i> H.Howard	End
Icacinaceae	<i>Medusanthera vitiensis</i> Seem	End
Joinvilleaceae	<i>Joinvillea plicata</i> (Hook) Newell & Stone	Ind
Lauraceae	<i>Endiandra elaeocarpa</i> Gillespie	Ind
Lauraceae	<i>Litsea magnifolia</i> Gillespie	End
Leeaceae	<i>Leea indica</i> (Burm f.) Merr.	Ind
Liliaceae	<i>Collospermum montanum</i> (Seem.) Skottsb.	End
Lindsaeaceae	<i>Lindsaea vitiensis</i> Kramer	End
Loganiaceae	<i>Fagraea berteriana</i> A.Gray ex Benth.	Ind
Loganiaceae	<i>Fagraea gracilipes</i> A.Gray	Ind
Loganiaceae	<i>Geniostoma macrophyllum</i> Gillespie	End
Loganiaceae	<i>Neuburgia alata</i> (A.C.Sm) A.C.Sm.	End
Loganiaceae	<i>Neuburgia corynocarpa</i> (A.Gray) Leenh.	Ind
Lomariopsidaceae	<i>Elaphoglossum imthurnii</i> Krajina	End
Loranthaceae	<i>Decaisnina forsteriana</i> (J. A. & J. H. Schult.) Barlow	Ind
Lycopodiaceae	<i>Lycopodium cernuum</i> L.	Ind
Lycopodiaceae	<i>Lycopodium foliosum</i> Copel.	End
Lycopodiaceae	<i>Lycopodium magnificum</i> Brownlie	End
Lycopodiaceae	<i>Lycopodium trifoliatum</i> Copel.	End
Malvaceae	<i>Hibiscus tiliaceus</i> L.	End
Marratiaceae	<i>Angiopteris opaca</i> Copel.	End, rare
Marattiaceae	<i>Angiopteris evecta</i> (Forst.) Hoffm.	Ind
Marattiaceae	<i>Marattia smithii</i> Mett.	End
Melastomataceae	<i>Astronidium robustum</i> (Seem.) A.C.Sm.	End
Melastomataceae	<i>Clidemia hirta</i> (L.) D. Don	Ind, inv
Melastomataceae	<i>Medinilla archboldiana</i> A.C.Sm.	End
Melastomataceae	<i>Medinilla heterophylla</i> A.Gray	End
Melastomataceae	<i>Medinilla longicymosa</i> Gibbs	End
Melastomataceae	<i>Medinilla subviridis</i> A.C.Sm	End
Meliaceae	<i>Aglaiia archboldiana</i> A.C.Sm.	End
Meliaceae	<i>Aglaiia axillaries</i> A.C.Sm.	End

Meliaceae	<i>Aglaia elegans</i> Gillespie	End
Meliaceae	<i>Aglaia greenwoodii</i> A.C.Sm.	End
Meliaceae	<i>Aglaia vitiensis</i> A.C.Sm.	End
Meliaceae	<i>Aglaia vitiensis</i> var. <i>minor</i> A. C. Sm.	End
Meliaceae	<i>Dysoxylum quercifolium</i> (Seem.) A.C.Sm.	End
Meliaceae	<i>Dysoxylum richii</i> (A.Gray) C.DC.	End
Meliaceae	<i>Dysoxylum seemannii</i> Gillespie	End
Meliaceae	<i>Vavaea harveyi</i> Seem.	End
Mimosaceae	<i>Entada phaseoloides</i> (L.) Merr.	End
Monimiaceae	<i>Hedycarya dorstenioides</i> A.Gray	Ind
Moraceae	<i>Ficus bambusifolia</i> Seem.	End
Moraceae	<i>Ficus masonii</i> Horne ex Baker	End
Moraceae	<i>Ficus obliqua</i> Forst.	Ind
Moraceae	<i>Ficus pritchardii</i> Seem.	End
Moraceae	<i>Ficus storckii</i> Seem.	End
Moraceae	<i>Ficus theophrastoides</i> Seem.	Ind
Moraceae	<i>Ficus vitiensis</i> Seem.	End
Myristicaceae	<i>Myristica castaneifolia</i> A.Gray	End
Myristicaceae	<i>Myristica chartacea</i> Gillespie	End
Myristicaceae	<i>Myristica gillespieana</i> A.C.Sm	End
Myristicaceae	<i>Myristica macrantha</i> A.C.Sm	End
Myrsinaceae	<i>Maesa insularis</i> Gillespie	End
Myrsinaceae	<i>Maesa tabacifolia</i> Mez.	Ind
Myrsinaceae	<i>Tapeinosperma ampliflorum</i> A.C.Sm.	End
Myrsinaceae	<i>Tapeinosperma capitatum</i> (A.Gray) Mez	End
Myrsinaceae	<i>Tapeinosperma clavatum</i> Mez	End
Myrsinaceae	<i>Tapeinosperma megaphyllum</i> (Hemsl.) Mez	End
Myrsinaceae	<i>Tapeinosperma multiflorum</i> Gillespie) A.C.Sm	End
Myrtaceae	<i>Decaspermum vitiense</i> (A.Gray) Niedenzu	End
Myrtaceae	<i>Metrosideros collina</i> (J.R. & G.Forst) A.Gray	Ind
Myrtaceae	<i>Syzygium diffusum</i> (Turrill) Merr. & Perry	End
Myrtaceae	<i>Syzygium gracilipes</i> (A.Gray) Merr. & Perry	End
Myrtaceae	<i>Syzygium neurocalyx</i> (A.Gray) Christophersen	Ind
Myrtaceae	<i>Syzygium purpureum</i> (Perry) A. C. Sm.	End
Myrtaceae	<i>Syzygium seemannianum</i> Merr & Perry	End
Nyctaginaceae	<i>Pisonia umbellifera</i> (J.R. & G.Forst) Seem.	Ind
Orchidaceae	<i>Appendicula c.f. bracteosa</i> Reichenb.	Ind, rare
Orchidaceae	<i>Bulbophyllum quadricarinum</i> Kores	End, rare
Orchidaceae	<i>Bulbophyllum longiscapum</i> Rolf.	Ind
Orchidaceae	<i>Calanthe hololeuca</i> Reichenb.	Ind
Orchidaceae	<i>Calanthe imthurnii</i> Kores	End
Orchidaceae	<i>Calanthe ventilabrum</i> Reichenb.	Ind
Orchidaceae	<i>Dendrobium biflorum</i> (Forst. f.) Sw.	Ind
Orchidaceae	<i>Dendrobium catillare</i> Reichenb.	End
Orchidaceae	<i>Dendrobium trilobulatum</i> Kores	End
Orchidaceae	<i>Diplocaulobium tipuliferum</i> (Reichenb. F.) Kraenzl.	End
Orchidaceae	<i>Liparis elliptica</i> Wight	Ind
Orchidaceae	<i>Liparis gibbosa</i> Finet	Ind
Orchidaceae	<i>Microtatorchis smithii</i> Kores	End, rare
Orchidaceae	<i>Macodes</i> sp.	New record Fiji
Orchidaceae	<i>Oberonia heliophila</i> Reichenb.	Ind
Orchidaceae	<i>Taeniophyllum c.f. gracile</i> (Rolfe) Gray	Ind
Pandanaceae	<i>Fretcinetia urvilleana</i> Hombron & Jacquinot	Ind

Pandanaceae	<i>Freycinetia caudata</i> Hemsl.	End
Pandanaceae	<i>Freycinetia vitiensis</i> Seem.	End, rare
Pandanaceae	<i>Pandanus vitiensis</i> Martelli	End
Peperomiaceae	<i>Peperomia lasiostigma</i> C. DC. var. <i>lasiostigma</i> J. W. Parham	End
Peperomiaceae	<i>Peperomia nadarivataensis</i> Yunker	End
Peperomiaceae	<i>Peperomia purpurinodis</i> J. W. Parham	End
Philesiaceae	<i>Geitonoplesium cymosum</i> (R.Br.) A. Cunn.	Ind
Piperaceae	<i>Macropiper timothianum</i> (A.C.Sm) A.C.Sm	End
Piperaceae	<i>Macropiper vitiense</i> (A.C.Sm.) A.C.Sm.	End
Piperaceae	<i>Piper aduncum</i> L.	Ind, inv
Piperaceae	<i>Piper betle</i> L.	Ind
Piperaceae	<i>Piper insectifugum</i> C. DC	End
Pittosporaceae	<i>Pittosporum arborescens</i> Rich ex A.Gray	Ind
Pittosporaceae	<i>Pittosporum rhytidocarpum</i> A.Gray	End
Poaceae	<i>Bambusa vulgaris</i> Schrader ex Wendel.	Ind, inv
Poaceae	<i>Centosteca lappacea</i> (L.) Desv.	Ind
Poaceae	<i>Schizostachyum glaucifolium</i> (Rupr.) Munro	Ind
Podocarpaceae	<i>Acmopyle sahniana</i> Buchh. & N.E. Gray	End, Rare
Podocarpaceae	<i>Dacrycarpus imbricatus</i> de Laubenfels	Ind
Podocarpaceae	<i>Dacrydium nidulum</i> de Laubenfels	Ind
Podocarpaceae	<i>Decussocarpus vitiensis</i> (Seem.) de Laubenfels	Ind
Podocarpaceae	<i>Podocarpus affinis</i> Seem.	End, rare
Podocarpaceae	<i>Podocarpus nerifolius</i> D. Don	Ind
Podocarpaceae	<i>Retrophyllum vitiense</i> (Seem.) C. N. Page	Ind
Proteaceae	<i>Turrillia vitiensis</i> (Turrill) A.C.Sm.	End
Proteaceae	<i>Turrillia ferruginea</i> (A.C.Sm.) A.C.Sm.	Ebd
Psilotaceae	<i>Psilotum complanatum</i> Sw.	Ind, rare
Psilotaceae	<i>Psilotum nudum</i> (L.) Palisot de Beauvois	Ind
Rhamnaceae	<i>Alphitonia franguloides</i> A.Gray	End
Rhamnaceae	<i>Alphitonia zizyphoides</i> (Spreng) A.Gray	Ind
Rhamnaceae	<i>Emmenosperma micropetalum</i> (A.C.Sm) M.Johnston	End
Rhizophoraceae	<i>Crossostylis seemannii</i> (A.Gray) Schimper	End
Rosaceae	<i>Rubus moluccanus</i> L. var. <i>austropacificus</i> van Royen	Ind
Rubiaceae	<i>Calycosia petiolata</i> A.Gray	End
Rubiaceae	<i>Dolicholobium Macgregorii</i> Horne ex Baker	End
Rubiaceae	<i>Dolicholobium latifolium</i> A.Gray	End
Rubiaceae	<i>Gardenia hutchinsoniana</i> Turrill	End
Rubiaceae	<i>Gardenia storckii</i> Oliver	End
Rubiaceae	<i>Hydnophytum grandiflorum</i> Becc.	End
Rubiaceae	<i>Hydnophytum longiflorum</i> A.Gray	End
Rubiaceae	<i>Ixora carewii</i> Horne ex baker	End
Rubiaceae	<i>Ixora maxima</i> Seem.	End
Rubiaceae	<i>Morinda bucidifolia</i> A.Gray	End
Rubiaceae	<i>Mussaenda raiateensis</i> J.W.Moore	Ind
Rubiaceae	<i>Neonauclea forsteri</i> (Seem. Ex Havil.) Merr.	Ind
Rubiaceae	<i>Ophiorrhiza laxa</i> A.Gray	End
Rubiaceae	<i>Ophiorrhiza leptantha</i> A.Gray	Ind
Rubiaceae	<i>Psychotria brevicalyx</i> Forsberg	End
Rubiaceae	<i>Psychotria confertiflora</i> A.C.Sm	End
Rubiaceae	<i>Psychotria diffusiflora</i> A.C. Sm.	End
Rubiaceae	<i>Psychotria gillespieana</i> A.C. Sm.	End
Rubiaceae	<i>Psychotria parvula</i> A.Gray	End
Rubiaceae	<i>Psychotria tephrosantha</i> A. Gray	End

Rubiaceae	<i>Psychotria tomaniviensis</i> A.C. Sm.	End
Rubiaceae	<i>Psydrax odorata</i> (Forst. F.) A.C.Sm. & S.Darwin	Ind
Rubiaceae	<i>Rapanea polyantha</i> A.C. Sm.	End
Rubiaceae	<i>Readea membranacea</i> Gillespie	End
Rubiaceae	<i>Tarenna seemanniana</i> A.C.Sm. & S.Darwin	End
Rubiaceae	<i>Timonius affinis</i> A. Gray var. <i>affinis</i> J. W. Parham	End
Rubiaceae	<i>Timonius affinis</i> A.Gray	Ind
Rutaceae	<i>Melicope cucullata</i> A.C.Sm	End
Sapindaceae	<i>Elatostachys falcate</i> (A.Gray) Radlk.	Ind
Sapotaceae	<i>Palaquium hornei</i> Hartog ex Barker) Dubard	End
Saurauiceae	<i>Saurauia rubicunda</i> (A.Gray) Seem.	End
Simaroubaceae	<i>Amaroria soulameoides</i> A.Gray	End
Smilacaceae	<i>Smilax vitiensis</i> (Seem.) C. DC	Ind
Solanaceae	<i>Solanum torvum</i> Sw	Ind
Sterculiaceae	<i>Heritiera ornithocephala</i> Kostermans	End
Sterculiaceae	<i>Sterculia vitiensis</i> Seem.	Ind
Symplocaceae	<i>Symplocos leptophylla</i> (Brand) Turrill	Ind
Tiliaceae	<i>Grewia crenata</i> (J.R. & G.Forst.) Schinz & Guillaumin	End
Tiliaceae	<i>Microcos vitiensis</i> A.C.Sm.	Ind
Tiliaceae	<i>Trichospermum richii</i> (A.Gray) Seem.	End
Tiliaceae	<i>Trichospermum calyculatum</i> (Seem.) Burret	End
Trimeniaceae	<i>Trimenia weinmannifolia</i> Seem.	Ind
Ulmaceae	<i>Gironniera celtidifolia</i> Gaud.	End
Ulmaceae	<i>Parasponia andersonii</i> (Planch.) Planch.	Ind
Urticaceae	<i>Boehmeria virgata</i> (Forst. f.) Guillemain	End
Urticaceae	<i>Cypholophus macrocephalus</i> var. <i>mollis</i> (Wedd.) Wedd.	Ind
Urticaceae	<i>Dendrocide harveyi</i> (Seem.) Chew	End
Urticaceae	<i>Elatostema australe</i> (Wedd.) Hall.	End
Urticaceae	<i>Elatostema insulare</i> A.C.Sm	End
Urticaceae	<i>Elatostema nemorosum</i> Seem.	End
Urticaceae	<i>Elatostema tenellum</i> A.C.Sm	End
Urticaceae	<i>Elatostema vitiense</i> (Wedd.) A.C.Sm.	Ind
Urticaceae	<i>Pipturus argenteus</i> var. <i>larnosus</i> Skottsb.	End
Urticaceae	<i>Procris archboldiana</i> A.C.Sm.	Ind
Urticaceae	<i>Procris pedunculata</i> (J.R & G.Forst) Wedd.	End
Verbenaceae	<i>Faradaya ovalifolia</i> (A.Gray) Seem.	End
Verbenaceae	<i>Gmelina vitiensis</i> (Seem.) A.C.Sm.	End
Verbenaceae	<i>Premna serratifolia</i> L.	End
Verbenaceae	<i>Viticipremna vitilevuensis</i> Munir	End
Vitaceae	<i>Cayratia acuminata</i> (A.Gray) A.C.Sm.	End
Vitaceae	<i>Tetrastigma vitiense</i> (A.Gray) A.C.Sm.	End
Zingiberaceae	<i>Alpinia vitiensis</i> Seem.	End
Zingiberaceae	<i>Alpinia boia</i> Seem.	End
Zingiberaceae	<i>Alpinia macrocephala</i> K.Schum.	End
Zingiberaceae	<i>Alpinia parksii</i> Gillespie) A.C.Sm.	Nat, inv
Zingiberaceae	<i>Heydychium flavescens</i> Konig	Nat
Zingiberaceae	<i>Zingiber zerumbet</i> (L.) Sm.	

Establishment of long-term monitoring plots

In 2006 a long-term monitoring plot was established in the Wabu Forest Reserve. The primary purpose of the plot was to enable the collation of data which would provide the basis to develop baseline information for the spatial distribution of plants in a given area, provide a better understanding of tree distribution, forest type, composition, densities and diversity and other vegetation dynamics. It would also allow the monitoring of changes in species composition over time.

A detailed description of the methodology used for the site selection of the monitoring plots, the selection for the establishment of the subplots, and the alignment of gridlines for the miniplots within each subplot can be found in the report "Baseline Flora and Fauna Survey and Establishment of Long-term Monitoring Plots in Wabu Forest Reserve, Naitasiri, 30th January-10th February, 2006."

The first step in this process was to determine the site for the establishment of the plot. This was done based on a number of criteria including accessibility and representativeness. A 1:25000 topographic map was used to select the location of the monitoring plot using the selection criteria. The plot size was restricted to an area of 1km² or a perimeter of 4km. A brief surveillance survey was then carried out to locate the exact placement for the four 50m X 50m subplots within the plot. Each subplot identified was numbered 1, 2, 3 or 4. Subplot 1 was established in a creek flat area, Subplot 2 on a steep slope extending up to a ridgetop, Subplot 3 on a flat ridgetop and Subplot 4 on a long gentle slope.

A corner of each subplot (designated "A") was established as the reference point the subplot and its coordinates marked using multiple GPS readings. The coordinates of the other corners (B, C, D) were also recorded using the GPS.

Once the subplots were identified a compass was used to establish the perimeter of the plot (50m x 50m). The subplot was then divided into 25 "mini-plots" which were each 10m x 10m and numbered 1-25.

In each miniplot detailed assessment of all trees with diameter at breast height (dbh) (1.3m above ground) above 10cm was carried out. For each tree either its scientific or local name was recorded, dbh measured to the nearest millimetre, crown width measured and, its health and phenology assessed. The bole height and total tree height were calculated automatically when the clinometer angle and the distance of the observer to the tree was entered into the (PDA). Other variables such as rooting substrate, topography of the plot, time and site area, recorder name, and tree spotter name were also recorded.

For each tree assessed, an aluminium tag with its botanical name (or local name if botanical name unknown) was attached to the tree or the tree next to it at breast height.

Also, in each mini-plot the Braun-Blanquet scale was used to estimate the percentage ground cover of the following plant groups – ground ferns, tree ferns, woody dicots, woody monocots, herbaceous plants and bryophytes. A checklist of plants with dbh <10cm was compiled. The number of palms (seedlings and adults) and tree ferns were also noted.

Preliminary results indicated a total of 82 tree taxa (some were based on Fijian names) recorded in the four subplots. The dominant tree was *Agathis macrophyllum* with a number of trees with dbh >100cm found in the four subplots.

Gironniera celtidifolia was the most common tree species found in all the subplots. This was followed by trees in the *Syzygium* and *Endiandra* genera. In total, 869 trees with diameters greater than 10cm were tagged and recorded.

Overall the ground ferns and their allies comprised the greatest percentage of ground cover throughout the four (50m x 50m) sub-plots. These mostly comprised fern ally species in the genus *Selaginella*, and ferns in the *Marattia*, *Trichomanes*, *Asplenium* and *Tectaria* genera which made up to 45% of the ground cover. Woody dicots were the next most abundant group followed by woody monocots and bryophytes. Herbs including orchids were the least common group in the plots.

The accurate and permanent grid system established in the subplots allows the precise mapping (and easy relocating) of trees and other plants forms in the plots enabling the long-term monitoring of individual plants as well as overall community structure.

Future maintenance work in the plot involves replacing the temporary wooden stakes currently used to mark out the boundary line of the subplots and miniplots with permanent PVC stakes. This will be carried out within the next 12 months as further delay may result in the total loss of these wooden stakes due to decay.

Invasive plant species

Invasive plants were surveyed using both quantitative and qualitative methods. The qualitative method involved recording all invasive species found whilst trekking through the reserve.

The quantitative method involved the set up and monitoring of a 1 km long belt transect along the mid section of the Wabu Creek. The transect comprised a series of 50m x 10m strips or sections of the stream (19 in total) placed alternately on opposite sides of the creek. The first 200m of the belt transect was placed outside the reserve boundary and the remaining 800m inside the reserve. Flagging tapes, and orange spray paint were used to mark the 50m points along the transect. Cover abundances of invasive species encountered along the 1km transect were recorded using a BRAUN-BLANQUET scale. Weeds and any recently introduced ornamentals encountered during the survey were also recorded.

Six known invasive plant species and nine recognized weeds have been recorded in the Wabu Forest Reserve (Table 6). The most common species were *Clidemia hirta*, *Merremia peltata*, *Hedychium flavescens*, *Piper aduncum* and *Mikania micrantha*.

Several of the invasive species; *H. flavescens*, *C. hirta*, *P. aduncum* and *M. micrantha* have already established themselves and are possibly out-competing the native species (particularly riparian species). This also includes the weeds *Impatiens biflora* and *Paspalum conjugatum*.

Invasive species were usually found the flat sections of creeks and riverbanks and were rarely found along the steep banks and cliffs with the exception of *C. hirta*, a noxious weedy shrub, which out-competes the saplings of native trees and is most likely to be more of a threat to the ridge-top vegetation.

There is potential for an invasive species control programme in the Wabu Forest Reserve. It may be possible to prevent the spread of *H. flavescens* and *I. biflora* upstream by manually removing them, and monitoring their spread along the 1km transect. If an eradication program is to be conducted along the 1km transect, it will have to be done slowly and in several phases, as a mass eradication may have negative effects along the river system, through flooding and massive soil erosion.

The spread of *Clidemia hirta* and *Piper aduncum* into the areas adjacent to plots in the 1km can only be monitored. Frequent visits into the area by villagers from Nabalasere, Navai, and Nasoqo are inevitable however; a fixed route can be established. The villagers need to be informed of the consequences of regular visits and unnecessary deforestation around their

campsites and within the forest. An awareness programme on introduced invasive plants and their impacts on native forest and livelihood (ecological and cultural consequences), with the aim of preventing the spread of other invasive species (*P. guajava*, *A. conyzoides* and *S. campanulata*) into the reserve should be carried out in these villages.

Table 6. Invasive plant and weed species recorded from Wabu Forest Reserve. * Species included in the list of 100 of the World's Worst Invasive Alien Species (ISSG).

Scientific Name	Status	Present in	Present outside
		Forest Reserve	
<i>Ageratum conyzoides</i>	weed	X	X
<i>Bambusa vulgaris</i>	weed		X
<i>Clidemia hirta</i> *	invasive	X	X
<i>Cuphea carthagenesis</i>	weed	X	X
<i>Eucalyptus sp.</i>	exotic tree		X
<i>Hedychium flavescens</i>	invasive	X	X
<i>Hyptis pectinata</i>	weed	X	X
<i>Impatiens biflora</i>	ornamental	X	X
<i>Kyllinga polyphylla</i>	weed	X	X
<i>Lythrum maritimum</i>	weed	X	X
<i>Merremia peltata</i> *	invasive	X	X
<i>Mikania micrantha</i> *	invasive	X	X
<i>Paspalum conjugatum</i>	weed	X	X
<i>Piper aduncum</i> *	invasive	X	X
<i>Psidium guajava</i>	weed		X
<i>Solanum torvum</i>	weed	X	X
<i>Spathodea campanulata</i> *	invasive		X

Key Biodiversity Areas – Hotspot(s)

To date the Wabu Forest Reserve is Fiji's most unique forest in terms of its intactness, botanical and faunal (especially birds) significance. It has the highest native flora component (90% or 270 taxa) out of which 60% (145 taxa) are only unique to Fiji (i.e. endemic). This is the highest ever recorded for a flora of any area the size of Wabu or larger.

Some of the world's most rare and Critically Endangered plants and animals are found here and it includes the endemic Podocarp *Acropyle sahniana* and the equally rare (thought to be now extinct) Red-Throated Lorikeet, only sighted once in the past 6 years despite the recent extensive search for it.

Of the thirteen rare and threatened plants recorded, nine are endemic. The local distribution of some of these plants were studied in detail. This was carried out for *A. sahniana*, the two *Cyrtandra* species, and the orchid *Macodes* sp. It was noticed that these plants had a very limited distribution i.e. each plant was distributed over an area less than 1 sq. km.

For the other plants they are most likely to be more widely distributed throughout the reserve especially the epiphytic orchids. The latter is also true for the Red-throated Lorikeet, Long-legged Warbler, Friendly Ground Dove, Pink-billed Parrot Finch and the Black-faced Shrikebill.

Thus given the current size of the Wabu Forest Reserve (818 ha) the whole reserve should be given the highest criterion for its biological sensitivity and importance (See Figure 1). To try to split it up into smaller units or hotspots will be unrealistic because data related to the distribution of most of these species is incomplete and most important the actual location for where these plants and animals are found at is best kept out of the public domain and be only used for management purposes.

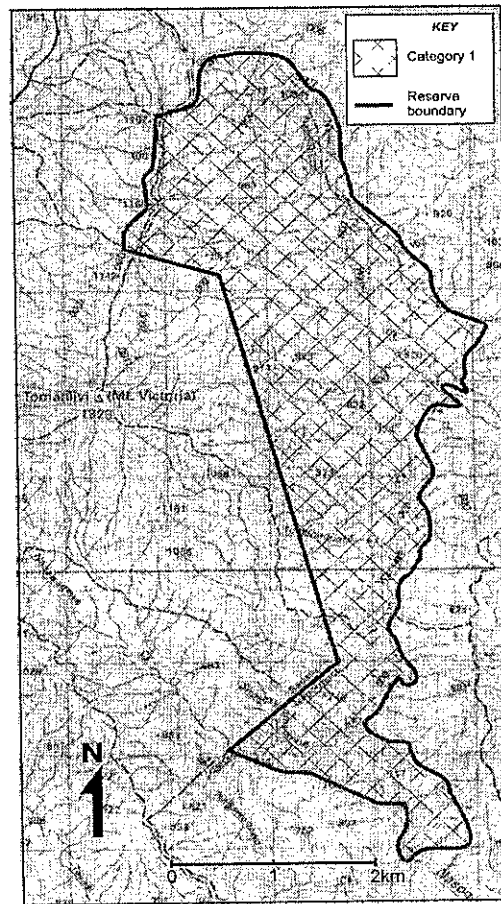


Figure 1.For the Wabu Forest Reserve the Key Biodiversity Areas or Biodiversity Hotspots is indicated by the double hatch (Category 1) marks.

Priority should also be given to extending the current Wabu Forest Reserve boundaries to include the Mt Tomanivi Forest Reserve to the west and eastward towards the Ra province. The increased size of the reserve would not only allow ample buffer for some of the known range distribution of sensitive plants and animals found in the current reserve boundary but also allow for the protection of the Primary Forest (and pristine) that is found adjacent to the current reserve. Such primary forests is rarely found on Viti Levu..