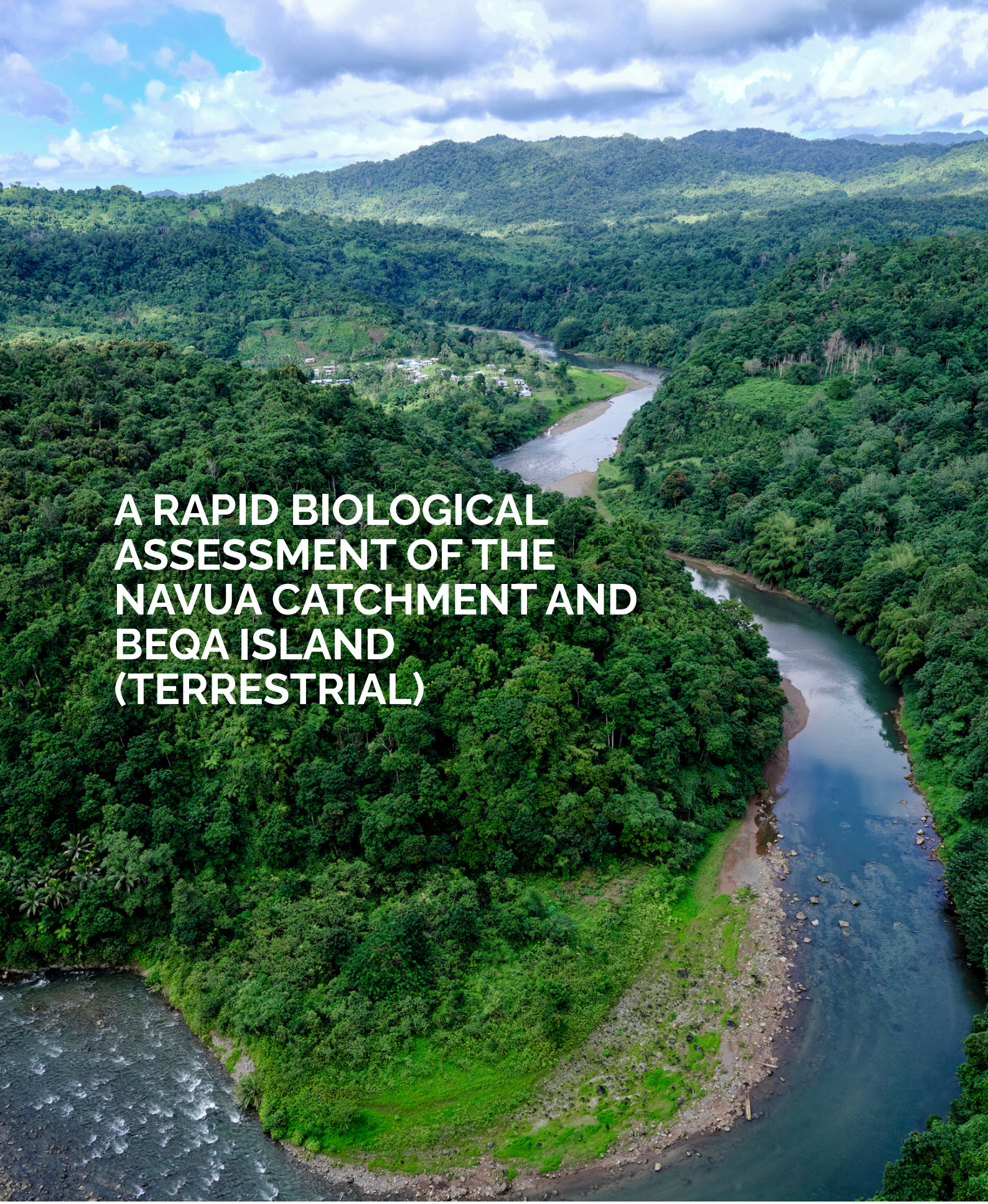

A RAPID BIOLOGICAL ASSESSMENT OF THE NAVUA CATCHMENT AND BEQA ISLAND (TERRESTRIAL)

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Disclaimer

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A Rapid Biodiversity Assessment of the Navua River catchment and Beqa Island (Terrestrial)

Authors: Baravi Thaman, Susan Nuske, Nunia Thomas-Moko, Isaac Rounds, Panapasa Tubuitamana, Vilikesa Masibalavu, Semaema Vakaciriwaqa, Jone Niukula, Hilda Waqa-Sakiti, Lusiana Tuvou and Tokasaya Cakacaka

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ABBREVIATIONS

BIEM	By-catch and Integrated Ecosystem Management
BioRap	Rapid Biological Assessment
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature
NTF	National Trust of Fiji
NFMV	NatureFiji-MareqetiViti
PEUMP	Pacific-European Union Marine Partnership
RAD	Rapid Ascent and Descent
SPREP	Secretariat of the Pacific Regional Environment Programme
DBH	Diameter at Breast Height
cm	Centimetre
km	Kilometre
m	Metre

EXECUTIVE SUMMARY

The BioRap survey was conducted by NatureFiji-MareqetiViti (NFMV), under the SPREP-led By-catch and Integrated Ecosystem Management (BIEM) Initiative of the Pacific-European Union Marine Partnership Programme funded by the European-Union and the Government of Sweden. The BioRap aims to enhance ecosystem resilience and conservation efforts in Fiji. Focused on the Navua catchment and Beqa lagoon, the survey collected baseline data on flora and fauna through rapid biodiversity assessments. The Navua catchment, Fiji's third-largest river system, encompasses five sub-catchments and holds vital importance for ecosystem health. Logging activities in surrounding areas underscore the urgency of conservation efforts. The interdisciplinary survey teams assessed various taxa and habitats, aiming to understand biodiversity and its implications for coastal ecosystems. The survey's findings will inform the region's conservation strategies and ecosystem management.

The flora study in the Navua catchment utilised quantitative surveys to assess both undisturbed and disturbed lowland rainforest areas. A rapid survey of flora was also conducted in lowland rainforest of Beqa Island. In Navua catchment, undisturbed plots exhibited greater tree species diversity and larger trees, while disturbed plots showed reduced numbers and sizes due to past logging activities. Common flora species included *damanu* (*Calophyllum vitiense*) and lillypillies (*Syzygium* spp.). Notable findings include the International Union for Conservation of Nature (IUCN) Red Listed Endangered sago palm (*Metroxylon vitiense*). Recommendations include further surveys across multiple sites, extended survey durations, prioritisation of unsurveyed areas and protection of vulnerable regions from logging.

The bird assessment in the Nabukelevu area of the catchment aimed to evaluate avian diversity, particularly focusing on rare species such as the red-throated lorikeet (*Vini amabilis*) and long-legged warbler (*Cincloramphus rufus*). The methodology involved point-counts along logging and river roads, resulting in 38 species sightings, including 15 endemics. Common species included the Fiji bush warbler (*Horornis ruficapilla*) and giant forest honeyeater (*Gymnomyza brunneirostris*). Logging activities pose threats to habitat and bird populations, with some rare species absent and others, like the pink-billed parrotfinch (*Erythrura kleinschmidti*), showing signs of decline. Recommendations include increased community involvement in conservation and further exploration for missing species like the long-legged warbler.

The bat survey in the Upper Navua catchment aimed to validate the presence of native bat species, focusing on roost assessment and general observations. Three confirmed bat species were recorded, including the Pacific flying fox (*Pteropus tonganus*), Samoan flying fox (*Pteropus samoensis*) and the Fijian blossom bat (*Notopteris macdonaldi*). Additionally, white-rumped swiftlets (*Aerodramus spodiopygius*) were observed co-existing in Matalima Cave. The survey highlights the importance of further research and community engagement to comprehensively assess and conserve bat populations and their habitats within the area. Recommendations include expanding survey efforts, continuous monitoring of bat populations and community education initiatives to promote conservation efforts. Matalima Cave was visited for a cave assessment of the Fijian blossom bat colony after 4 years while Pacific flying fox and Samoan flying fox were recorded within the scheduled survey area at the time. More survey days are needed to identify and confirm potential roosting sites and monitor the presence of other bat species in the area.

The herpetofauna survey in the Navua catchment aimed to assess reptile and amphibian diversity, employing both sticky-trap surveys and visual encounter surveys across three locations: Naceva Village on Beqa and near-by Moturiki Island and Nabukelevu Village in Serua. Despite heavy rainfall preceding the survey, which may have affected animal behaviour and survey effectiveness, several species were recorded. The survey identified two skink species, four gecko species, the Fiji tree frog (*Cornufer vitiensis*) and the invasive cane toad (*Chaunus marinus*). Limited captures were made, with only two native geckos caught in sticky traps. Additionally, anecdotal information from local communities provided valuable insights into species encounters. The survey highlights the need for further research, including canopy surveys using advanced techniques and exploration of methods to detect elusive species like iguanas and burrowing snakes. The intact nature of the Nabukelevu area suggests its significance for biodiversity and warrants extended survey efforts.

Entomological surveys conducted in the Upper Navua catchment area aimed to assess insect diversity and habitat integrity. Various sampling methods were employed across different habitat types, including leaf litter surveys, light traps and malaise traps. The results revealed a rich diversity of insects, particularly beetles, with notable findings of rare and endemic species, such as the *Polyura camphonitis* butterfly and *Nesobasis* damselflies. The intact forest systems of the area, especially in the Mosimosi region, exhibited higher insect diversity compared to logged sites, emphasising the importance of forest conservation. Recommendations include further research to study rare and endemic species and continued monitoring to ensure the conservation of these valuable ecosystems.

INTRODUCTION

The Secretariat of the Pacific Regional Environment Programme (SPREP) implements the By-catch and Integrated Ecosystem Management (BIEM) Initiative of the Pacific-European Union Marine Partnership (PEUMP) Programme funded by the European Union and the Government of Sweden. Specifically, the BIEM Initiative's Fiji component focuses on the Navua catchment (Figure 1) and Beqa lagoon, aiming to reinforce ongoing efforts to enhance the resilience of critical ecosystems and support conservation priorities in Fiji. To facilitate these objectives, baseline data on flora and vegetation were collected through rapid biodiversity surveys conducted within the upper Nabukelevu forest and Beqa Island (Figure 1).

Located in south-eastern Viti Levu, the main island of Fiji, the Navua catchment stretches across the Serua Province, with a smaller portion in the Namosi Province. It ranks as Fiji's third-largest river system, covering a drainage area of 1070 km^2, with the river extending over 91 km. The catchment's highest point reaches 1084 m above sea level and comprises five sub-catchments: Veinuqa, Wainamoli, Wainikoroiluva, Wainikovu and, the smallest, Volasa. Nabukelevu village, located approximately 13.5 km inland from the southern coast of Viti Levu in the Serua Province, is bordered by mahogany plantations to the south, presently undergoing logging activities (Figure 2). Furthermore, the logging of indigenous forests is currently expanding towards the north (Figure 1). The island of Beqa is located approximately 10-15 km offshore to the south of the Navua River mouth on the southeastern coast of Viti Levu.

A five-day BioRap survey, organised by NatureFiji-MareqetiViti (NFMV), was conducted on Beqa island on 21 and 22 December, 2023 and in Nabukelevu forest in Serua from 2 to 5 January, 2024. The interdisciplinary teams involved in the survey included experts in plants, birds, bats, herpetofauna and entomology. The primary objective of the BioRap survey was to assess and document the rich biodiversity within the upper catchment of the Navua River and its implications for the coastal ecosystems along the Navua areas, including Beqa Island and its surrounding lagoons and coastal regions. The upper Navua catchment, particularly the Nabukelevu forest (Figure 3), holds immense significance as it serves as a pivotal catchment system that profoundly influences the health and integrity of numerous interconnected ecosystems within the region. The BioRap assessment was designed to document the species present and evaluate the condition of their respective habitats.

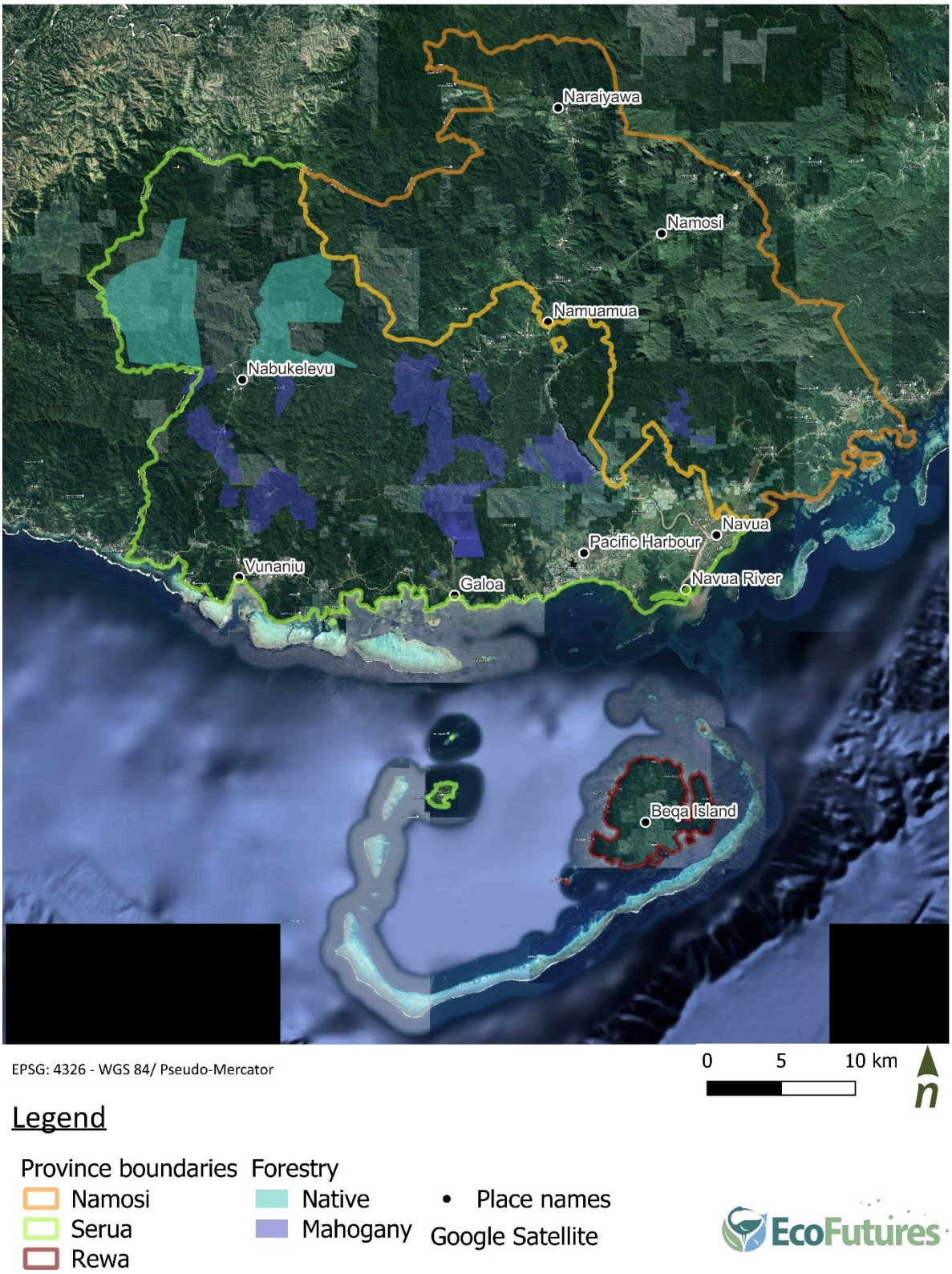

Figure 1 Map of the Navua catchment and Beqa lagoon

Figure 2 Logging activity towards the north of Nabukelevu village

Figure 3 Native forest of the upper Navua catchment

1 FLORA

Isaac Rounds and Panapasa Tubuitamana

The methodology employed in this study aimed to conduct quantitative surveys to assess vegetation in both undisturbed and disturbed lowland rainforest areas within the Navua catchment and Beqa lagoon of Fiji.

1.1 Methodology

Two survey methodologies were employed to gather data on the flora of the catchment. A one-day opportunistic survey was conducted on the island of Beqa on 23 December 2023. The survey was restricted to observing the dominant vegetation around the island from a boat due to time constraints and the prevailing weather conditions at the time of the survey. This method has been done for rapid coastal forest vegetation assessments in these situations (albeit not for flora; Atherton et al. 2014).

More detailed quantitative surveys were conducted in the upper part of the Navua catchment from 2-4 January 2024. The quantitative surveys utilised four 10 m wide vegetation transects, each spanning 100 m in length. Two of these transects were in undisturbed and two in disturbed lowland rainforest, covering a total area of 4000 m^2 (~0.4 hectares; Table 1). Trees with a diameter at breast height (DBH) exceeding 10 cm were identified and measured using DBH tapes. Percent relative frequency and relative dominance were then tabulated based on the total basal area for each tree species derived from the DBH data. Additionally, non-tree vegetation such as sedges, herbs and vines were identified and recorded both along these transects and opportunistically across the area.

Undisturbed plots were established in unlogged forest areas currently under boundary dispute involving two landowning units from Nabukelevu Village. In contrast, disturbed plots were situated in forested regions subject to logging between 2000–2002. All plots were located in tropical lowland rainforest along a ridge accessible via a logging road approximately 30 minutes from Nabukelevu Village.

Exhaustive desktop literature reviews were conducted to supplement the limited field survey time, encompassing past and current flora and vegetation studies within the Navua catchment and Beqa lagoon. Primary literature sources for this study included works by Smith (1979, 1981, 1985, 1988, 1991), Brownlie (1977), Tuiwawa et al. (2013) and Mueller-Dombois and Fosberg (1998).

Table 1 Coordinates for the flora surveys

	Start	End
Undisturbed	18^{0}05'48.6 S	18^{0}05'44.9" S
	177^{0}53'49.5"E	177^{0}53'48.1"E
Undisturbed	18^{0}05'38.6"S	18^{0}05'36.9"S
	177^{0}53"50.0"E	177^{0}53'42.9"E
Disturbed	18,06'57.8"S	18^{0}06'55.3"S
	177^{0}52'22.6"E	177^{0}52'28.0"E
Disturbed	18^{0}07'02.9"S	18^{0}07'01.9"S
	177^{0}52'25.3"E	177^{0}52'29.4'E

1.2 Results and Discussion

Beqa Island

The rapid assessment around Beqa Island yielded 67 species of plants: 51 Angiosperms-dicotyledons, 11 Angiosperms-monocotyledons, 5 ferns and fern allies. No gymnosperms were observed. Of these species, 43 were native, 7 endemic and 17 introduced (Table 2; Table 3).

Table 2 Summary of species observed in Beqa Island on 22 – 23 December 2023.

	NATIVE	ENDEMIC	INTRODUCED	TOTAL
ANGIOSPERMS-DICOTYLEDONS	31	6	14	51
ANGIOSPERMS-MONOCOTYLEDONS	7	1	3	11
FERN AND FERN ALLIES	5			5
OVERALL	43	7	17	67

Upper Navua catchment BioRap

In total, 66 species of plants were recorded in the Upper Navua catchment around Nabukelevu: 11 species from disturbed plot, 25 from undisturbed and 30 shared in both (Table 3). This is only a small fraction that has been recorded from Navua catchment collectively from past surveys (712 species), of which just under half are endemic to Fiji (301 species). This makes Navua catchment an important flora biodiversity hotspot. Raw data from these surveys, including biomass and relative frequency of species are included in Appendix 1 (Table 11, Table 12, Table 13,

Table 14, Table 15).

Table 3. Breakdown of the flora species listed in the Navua catchment. Data includes literature records and the current BioRap (all species records), BioRap only and Beqa Island.

Plant origin	All species records	BioRap			Beqa Island
		Disturbed	Undisturbed	Both	
Endemic to Fiji	301	6	13	13	7
Endemic to Serua	1 *(Excoecaria confertiflora)*				
Indigenous species	324	5	12	17	43
Introduced	84				17
Unknown	2				
Total	712	11	25	30	67

The undisturbed plots exhibited a higher number of recorded trees, with plots 1 and 2 registering over 200 trees compared to just over 100 trees in disturbed plots. More trees exceeding 15 and 35 cm DBH, were in undisturbed plots compared to disturbed plots. There were more species encountered only in undisturbed plots (25) compared to only in disturbed plots (11), which both plots sharing 30 species (Table 3). Commonly observed species across all surveyed plots included *damanu* (*Calophyllum vitiense*), *yasiyasi* (*Syzygium* spp.), *dakua makadre* (*Agathis macrophylla*), *kaudamu* (*Myristica castaneifolia*) and *bula yalewa* (*Garcinia myrtifolia*). In undisturbed plots, the largest trees recorded were three *A. macrophylla* specimens ranging from 90 to 95 cm DBH, while in disturbed plots, notable large trees included *Sa* (*Parinari insularum*) and *Calophylluin vitiense* with DBH measurements of 47 cm and 47.5 cm respectively.

Undisturbed plots displayed greater tree species diversity and larger trees exceeding 35 cm DBH compared to disturbed plots. The reduced number of trees and their smaller sizes in disturbed plots can be attributed to past logging activities, which targeted loggable tree species exceeding 35 cm DBH. Species recorded in the plots are indicative of lowland tropical rainforest ecosystems, featuring characteristic species such as *Calophyllum vitiense, kauvula* (*Endospermum macrophyllum*), *bau* (*Palaquium hornei*), *M. castaneifolia, P. insularum, kaunicina* (*Canarium vitiense*) and *rosarosa* (*Heritiera ornithocephala*). Previous studies by Mueller-Dombois and Fosberg (1998), Keppel et al. (2011) and Tuiwawa et al. (2013) have documented spatial variations within the lowland rainforest vegetation type. Due to time and accessibility constraints, the survey team focused solely on ridge-top

forest systems within this primary forest type. Species recorded during this study closely mirrored those documented in the Emalu forest by Tuiwawa et al. (2013), with *G. myrtifolia* and *Calophylluin vitiense* emerging as the most prevalent species.

Notable flora species recorded during the survey included:

- *Metroxylon vitiense* (H.Wendl.) Hook - an endemic palm species, currently listed as Endangered on the IUCN Red List. It is found throughout the Navua catchment, with large monotypic stands documented within the Upper Navua Conservation Area.

1.3 Conclusions and Recommendations

The survey primarily targeted the lower portions of the upper Nabukelevu area, representing a small fraction of the Navua catchment. It is imperative to conduct additional surveys across multiple sites to ensure a comprehensive representation of the flora and vegetation within the Navua catchment.

The allocated three days for the survey proved insufficient for an area of this scale. Extended field surveys, ideally spanning a minimum of 10 days, are warranted to adequately cover the unsurveyed portions of the Navua catchment.

Previous surveys from the Navua catchment's Navosa side have documented several rare plant species and range extensions for certain plant populations, such as the endemic and critically endangered[1] *Acmopyle sahniana* (Table 11). Future surveys should prioritise the upper Nabukelevu region, adjacent to Navosa province, to ascertain whether these rare plant species extend into the Navua sub-catchment.

Efforts should be made to protect the upper portion of the Navua catchment from logging activities, with consideration given to extending the Emalu protected area to encompass these regions.

[1] Keppel, G. & Thomas, N. 2023. *Acmopyle sahniana*. *The IUCN Red List of Threatened Species* 2023: e.T31052A99514723. https://dx.doi.org/10.2305/IUCN.UK.2023-1.RLTS.T31052A99514723.en. Accessed on 13 August 2024.

2 BIRDS

Vilikesa Masibalavu and Eparama Navale

The methodology employed in this bird assessment aimed to survey avian diversity within the Nabukelevu area of Fiji over two days. The specific focus of the survey was to assess the avian population within the Nabukelevu forest, with particular emphasis on identifying trigger species, notably rare birds such as the red-throated lorikeet (*Charmosyna amabilis*), long-legged warbler (*Trichocichla rufa*) and pink-billed parrotfinch (*Erythrura kleinschmidti*) (Figure 4). These species were of particular interest due to their rarity and potential importance as indicators of ecosystem health and biodiversity within the area. The Nabukelevu forest area falls under the Southern Viti Highlands Important Bird Area (IBA), FJ10 (Masibalavu and Dutson 2006) and the above-mentioned species are the trigger species for this IBA (Tuamoto 2015).

Long-legged Warbler* (*Trichocichla rufa*) - Endangered *(Photo by Robert Morris)

Black-faced Shrikebill (*Clytorhynchus nigrogularis*) – Near Threatened *(Photo by Robert Morris)*

Pink-billed Parrotfinch* (*Erythrura kleinschmidti*) - Vulnerable *(Photo by Keith Barnes)

Friendly-ground Dove (*Gallicolumba stairi*) - Vulnerable *(Photo by Robert Morris)*

Figure 4 Some threatened Fijian birds

2.1 Methodology

During the two-day bird assessment, the teams employed the main logging road (disturbed) and the Rivers Fiji road (relatively undisturbed) as transects (Appendix 2; Table 16, Figure 18). Point-counts were conducted at 200 m intervals along these roads. At each designated point, all bird species observed or heard within a five-minute period were meticulously recorded. To estimate the number of individuals for each species, observers took into account variations in the distance and direction of the calls. A total of 20 points (approximately 4 km) were conducted along transect 1 walking back to the village. On the 4th of January, the team conducted a total of 10

points (approximately 2 km) along the Rivers Fiji road, aiming to target the *C. rufus*. All point-counts were conducted along the main road.

The utilisation of a brief, five-minute period for each point-count served to minimise the likelihood of individual birds relocating from one singing post to another within the survey duration. However, this abbreviated time-frame may result in some birds present at the site not being recorded, particularly if they do not vocalize within the allotted time-frame. Nonetheless, it is assumed that the extensive number of point-counts conducted at each site will sufficiently capture a representative estimate of the bird species assemblage present, thereby providing valuable insights into the relative frequency of birds at each location.

An inherent limitation of this method is the disregard for information available between the point-counts, as surveyors traverse from one point to another. To address this, a comprehensive species list is maintained for each site, amalgamating birds recorded during point-counts with other species encountered during transit.

It is important to note that the estimates of bird numbers per point-count cannot be directly compared between species due to differences in detectability. However, these estimates can be compared between sites, as the habitat similarity ensures that the detectability of individual species is unlikely to vary significantly across locations.

2.2 Results and Discussion

The recording of encountered species during the survey was conducted in two distinct manners. Firstly, species were noted during the designated point-counts, during which a total of 30 species were observed. Secondly, species encountered outside the point-count sessions were also documented. An additional eight species were encountered during these instances, resulting in a cumulative total of 38 species recorded throughout the survey period (refer to Appendix 3 for details).

Among the recorded species, six were notably prevalent, being encountered in more than half (>15 points) of the total point-count sessions, which amounted to 30 points in total. These species include the Fiji bush warbler (*Cettia ruficapilla*), giant forest honeyeater (*Gymnomyza viridis*), wattled honeyeater (*Foulehaio carunculate*), Polynesian triller (*Lalage maculosa*), Fiji white eye (*Zosterops explorator*) and masked shining parrot (*Prosopeia personata*). However, in terms of sheer numbers recorded, the ranking shifts slightly, with *Z. explorator* leading, followed by *F. carunculate, G. viridis*, *C. ruficapilla, L. maculosa* and *P. personata*. The abundance of small birds foraging in the remaining forest contrasts with the scarcity of larger birds such as the *P. personata* and pigeons, whose nesting sites and food sources predominantly consist of the large trees being logged.

During the survey, a total of 15 endemic species were encountered, underscoring the area's significance for biodiversity conservation. However, the detrimental effects of nearly three decades of logging, still ongoing and expanding, were evident. Logging tracks crisscrossed the surveyed area and the majority of large trees had been felled. Disturbingly, there were reports of cassava plantations being raided and consumed by *P. personata* in recent months, indicating habitat disturbance or destruction due to logging activities.

Remarkably, only six species were conspicuously absent from the survey, including the metallic pigeon (*Columba vitiensis*), *Charmosyna amabilis*, *T. rufa,* Pacific robin (*Petroica pusilla*), Silvereye (*Z. lateralis*) and peregrine falcon (*Falco peregrinus*). Previous BirdLife surveys conducted in 2003 recorded sightings of *Columba vitiensis, Petroica pusilla* and *Z. lateralis* at this site, suggesting that these species could potentially be sighted with additional survey time. However, the absence of the *Charmosyna amabilis* and *T. rufa*, both classified as threatened species in Fiji, is concerning.

Encounters with the pink-billed parrotfinch (*E. kleinschmidti*), another threatened species, were noteworthy, with two sightings recorded over the two days of survey. One encounter occurred along the logging road, while the other took place along the Rivers Fiji road. A BirdLife survey data conducted in 2003 categorised this species as uncommon (relative abundance score of 1.2), and our score was 2.8 (still uncommon) (Appendix 4; Table 18). This may suggest some positive developments.

Interestingly, three species were recorded along the river, including the Pacific black duck (*Anas superciliosa*), eastern reef heron (*Egretta scara*) and wandering tattler (*Tringa incana*). Despite expectations, no sightings of *Trichocichla rufa* were made during the survey period, despite the presence of suitable habitat along small creeks with dense undergrowth and small waterfalls.

The survey also documented sightings of introduced bird species (Appendix 3; Table 17), with the red-vented bulbul (*Pycnonotus cafer*) and jungle mynah (*Acridotheres fuscus*) observed during point-count sessions, while the remainder were sighted within the village vicinity. Notably, *Pycnonotus cafer* and common mynahs

(*Acridotheres tristis*) were observed further away from the village along the logging road, whereas the rest were predominantly seen around the village.

2.3 Conclusions and Recommendations

During the intensive two-day bird survey, a total of 30 point-counts were conducted, resulting in the sighting of 38 bird species. Notably, only six species were not observed, including two of Fiji's rare species: *Charmosyna amabilis* (Critically Endangered; IUCN Red List) and *Trichocichla rufa* (Endangered; IUCN Red List). Conversely, sightings of the *Erythrura kleinschmidti*, another IUCN Red Listed species (Vulnerable), were recorded during the survey. Among the avian community, six species emerged as particularly common, being observed in more than half of the total point-counts. These species include the *Cettia ruficapilla*, *Gymnomyza viridis, Foulehaio carunculate*, *Lalage maculosa, Zosterops explorator* and *Prosopeia personata.* All point-count assessments were conducted along the logging road and Rivers Fiji road.

The documented presence of 15 out of the total 17 bird species endemic to Viti Levu within the Nabukelevu area underscores its significant importance for birdlife and biodiversity in general. However, the extensive network of logging roads weaving through these indigenous forests and the resultant environmental degradation stemming from logging activities pose significant threats to this ecological richness.

Despite efforts by the villagers of Nabukelevu to engage in eco-tourism and conservation initiatives in collaboration with Rivers Fiji, there is a pressing need for heightened awareness and community involvement to ensure the sustainable management of resources beyond the conservation boundaries. Such efforts must consider the broader and long-term impacts of development, such as logging, on the surrounding areas while simultaneously exploring alternative avenues for income generation for the villagers.

Community-level awareness initiatives are urgently required in Nabukelevu and similar villages, with all stakeholders actively participating in the planning and implementation processes. This is crucial, given that the ultimate decision regarding any development on Native land, which comprises 87% of the country's total land area, rests with the local communities. Without robust community engagement, the vulnerability of our remaining virgin forests and the biodiversity they harbour, including endemic bird species, will persist.

Further exploration is warranted to search for *Trichocichla rufa*. Despite the prevalent presence of suitable habitat for this species, additional searches are necessary to confirm their absence or presence within the area.

3 BATS

Semaema Vakaciriwaqa and Semisi Lagivala

Bats hold a unique status in Fiji as the country's only native mammals, boasting a diversity of six bat species. Alarmingly, five out of these six species find themselves listed on the IUCN Red List of Threatened Species, underscoring the critical need to monitor and conserve these valuable members of Fiji's biodiversity. This report endeavours to shed light on native bat species within the Upper Navua catchment area.

Previous research efforts concerning bats in the area have been instrumental in identifying, confirming and documenting the presence of Fijian blossom bats (*Notopteris macdonaldi*) within Matalima Cave. This work was spearheaded by Joanne Malotaux and Kelera Macedru, as detailed in an unpublished report by NatureFiji-MareqetiViti in 2012. The last re-assessment of Matalima Cave took place in 2019, conducted by the bat team from NatureFiji-MareqetiViti, before the onset of the COVID-19 pandemic in Fiji.

The primary objective of the current survey is to validate the presence of native bat species within the Upper Navua catchment area while also shedding light on the status of endangered species and the condition of their habitats. By identifying and documenting these species and their habitats, this survey aims to contribute valuable insights towards the conservation and management of Fiji's bat populations and their ecosystems.

3.1 Methodology

The survey of bat fauna within the Upper Navua catchment employed two main methods: roost assessment of Matalima Cave and general observations.

The roost assessment of Matalima Cave involved a rigorous hike lasting approximately one and a half hours from the drop-off point to reach the cave site. The primary objective was to evaluate the status of *Notopteris macdonaldi* and assess the condition of its habitat. This assessment was conducted during daylight hours, with particular attention paid to selecting a clear day for the endeavour. The choice of weather conditions was crucial to ensure the safety of the survey team, as muddy and slippery access tracks could present significant health hazards.

In contrast, the general observation method involved the survey team making continuous observations while traversing through and around the survey areas during both daytime and dusk. This method allowed for the recording of various bat species, particularly fruit bats such as *Pteropus tonganus* and *Pteropus samoensis*. At dusk, while stationed on the existing logging road (18°08'43"S 177°50'24"E) for four hours, we observed and counted flying foxes' overhead flight.

These methods provided insights into the representative bat fauna present within the Upper Navua catchment. By systematically assessing both specific roost sites and the general habitat, the survey aimed to gather comprehensive data to inform conservation efforts and management strategies for Fiji's bat populations and their habitats.

3.2 Results and Discussion

During the scheduled survey period, only three out of the six bat species known to inhabit the Upper Navua catchment were observed and recorded. Observing the bats in flight we noted that majority were flying in the north-south direction. The bats' observed north-south flight pattern may indicate that they are traveling between their roosts and known feeding locations. One species was confirmed through roost assessment, while the other two were noted based on direct observations. Table 4 presents the checklist of bat fauna found in the Upper Navua catchment area during the survey period, providing valuable insights into the species encountered, their conservation status, the number of individuals recorded, and whether they were seen or heard during the survey.

Matalima bat cave sits in a slightly disturbed forest because of the observed changes in the forest stands and a farm is located about 400 m from the cave mouth (Figure 5, picture on the left of cave mouth).

Table 4 Checklist of bat fauna found in the Upper Navua catchment area during the survey period.

Common Name	*Scientific Name*	IUCN Red List 2007	No. recorded	Seen or heard	Remarks
† ∞ + Pacific flying fox	*Pteropus tonganus*	Least Concern	89	Seen and heard	Common and known to exist in the area according to earlier expeditions.
† ∞ + Samoan flying fox	*Pteropus samoensis*	Near Threatened	1	Seen and heard	Known to exist in the area according to earlier expeditions. This species was observed to be hanging on a *Plerandra pickeringii* tree.
† ∞ + Fijian blossom bat	*Notopteris macdonaldi*	Endangered	2,000-3,000	Seen and heard	Known to exist in the area according to earlier expeditions. This species was recorded in thousands inside Matalima Cave. White-rumped swiftlets (*Aerodramus spodiopygius*) were also recorded inside the cave and co-exist with the blossom bats.

† Denotes species observed during the expedition

∞ Denotes species reported to be present by the local guides.

\+ Denotes species recorded in literature

*Pacific flying fox (*Pteropus tonganus*)*

Among the observed species, the *Pteropus tonganus* was the most frequently sighted and documented within the survey area. This species, known for its widespread distribution across the Pacific, tends to form large colonies on large canopy trees and primarily feeds on fruits and nuts. Its frequent sightings in the Upper Navua catchment suggest the availability of abundant food sources nearby, including crops in cultivated areas, fruit trees and trees in secondary forests. While its presence indicates a healthy ecosystem, the likelihood of a roost existing in the area remains high, given that only a small portion of the catchment was surveyed.

The bat was observed flying over both disturbed and undisturbed forest, concurring with previous studies that show that in Fiji, this species can be found in large colonies roosting in disturbed (urban, peri-urban) areas and undisturbed forests (Palmeirim et al. 2005; Scanlon et al. 2014).

*Samoan flying fox (*Pteropus samoensis)

Pteropus samoensis is found in Fiji, Samoa and American Samoa, preferring small colonies or can even be found to be solitary. Large canopy trees, with fruits and nuts are their preferred diet. *Pteropus samoensis*, although notoriously rare, was observed, heard and recorded during the survey hanging on a *Plerandra pickeringii* tree near the access road. While only one individual was recorded, the species' presence suggests suitable foraging habitats within the survey area, including primary and secondary forests, as well as agroforest areas. However, it could also indicate that forest health is potentially deteriorating. Given, such a small area of the Upper Navua catchment was studied, further research is required to confirm their presence and habitat.

*Fijian blossom bat (*Notopteris macdonaldi)

Notopteris macdonaldi was confirmed to inhabit Matalima Cave (Figure 5), with an estimated population ranging from 2,000-3,000 individuals roosting within its high ceilings. This species, endemic to Vanuatu and Fiji, feeds on nectar and pollen while residing in caves. Its presence underscores the significance of good forest habitats for foraging, with cultivated areas providing supplemental food sources. Four other known key priority locations on Viti Levu are home to this species (NatureFiji-MareqetiViti, 2012). Accessing Matalima Cave for future studies requires caution, particularly during wet or rainy conditions.

*White-rumped swiftlets (*Aerodramus spodiopygius*)*

The presence of white-rumped swiftlets (*Aerodramus spodiopygius*) within the cave, co-existing with *Notopteris macdonaldi*, was also noted. While not bat species, these birds share cave habitats with bats and were observed in significant numbers. However, some birds were found injured on the cave floor, likely from mid-air collisions during flight.

Figure 5 Matalima Cave southern entrance (left) and interior looking towards the northern entrance (right)

3.3 Conclusions and Recommendations

Scanlon et al. 2014 show that 96% of the Fiji plant species serviced by bat species are valued by humans for economic, medicinal and cultural uses. Five of Fiji's bat species are listed as threatened to critically endangered on the IUCN Red List, conservation of all species is critical (Lavery et al. 2020, McCutchan 2021, Waldien et al. 2019).

In conclusion, the survey provided valuable insights into the bat fauna of the Upper Navua catchment, shedding light on the presence of three confirmed species, two of which are classified as Near Threatened and Endangered. However, the limited scope of the survey indicates the need for further research to comprehensively assess bat populations and their habitats within the area.

Past and recent population monitoring studies in Fiji have identified a decrease in roosting sites and other possible threats to the Fijian bat population (Flannery 1995;,Malotaux 2012, McCutchan 2021, Palmeirim et al. 2005, Palmeirim et al. 2007, Scanlon, Petit & Bottroff 2014, Scanlon & Petit 2015).

Future studies should prioritise expanding survey efforts to cover a larger portion of the catchment, aiming to identify potential roost sites and foraging habitats in greater detail. Specifically, the search for extant roosts and bat colonies, particularly flying fox roosts, is imperative. Additionally, efforts should be made to ascertain the existence of other bat species within the catchment, ensuring a thorough understanding of the bat biodiversity present.

To address these research needs, additional surveys throughout the Upper Navua catchment area should be conducted, focusing on locating extant roosts and bat colonies. Continuous monitoring of the *Notopteris macdonaldi* in Matalima Cave, as well as other bat species that forage in the area, is essential for conservation efforts.

Furthermore, community involvement through awareness and education programmes is crucial. By engaging residents, they can gain an understanding of the importance of different bat species, their ecological roles and the threats they face. Often, bats are misunderstood and perceived solely as nuisances, highlighting the need for education on their significance in maintaining ecosystem balance.

In summary, further research, expanded surveys and community engagement are key to safeguarding the habitats and populations of threatened bat species in the Upper Navua catchment. These efforts are vital for promoting conservation and ensuring the long-term survival of Fiji's bat fauna.

4 HERPETOFAUNA

Jone Niukula, Baravi Thaman and Suliasi Levatia

The geographic isolation of Fiji has played a significant role in shaping its herpetofauna. The archipelago's isolation and unique habitat types have allowed for the evolution of distinct species found nowhere else in the world. However, like many other island ecosystems, Fiji faces threats to its terrestrial herpetofauna due to habitat loss, invasive species and climate change.

The known terrestrial herpetofauna of Fiji consists of 33 species: 3 amphibians; 5 iguanas; 3 snakes; 10 geckos; and 12 skinks, 40% of which are endemic to Fiji (Morrison 2003). Many of these species have undergone severe population declines or reductions in their geographic ranges due to habitat degradation and introduced predators such as cats and mongoose.

Conservation efforts in Fiji aim to protect and preserve the unique herpetofauna. This includes habitat restoration projects, captive breeding programmes and public awareness campaigns to promote the importance of these species and their ecosystems.

Overall, the terrestrial herpetofauna of Fiji showcases the remarkable diversity of reptiles and amphibians found in this Pacific island archipelago. Conservation efforts are crucial to ensure the long-term survival of these unique species and their habitats.

There have been several biodiversity surveys carried out within the Navua catchment area that offer information on survey techniques and preliminary data for species to look out for during the surveys. Watling (1989) documents herpetological fauna at the Garrick Reserve in Navua as part of the Reserve's management plan. Masibalavu (2003) reports herpetofauna encountered during a Birdlife International survey for Nabukelevu Forests. Tuiwawa et al. (2013) reports herpetofauna from Emalu at the headwaters of the watershed. Ryan (1988) reports Fijian burrowing snakes in the 1990s from Saliadrau, in the Wainikoroiluva catchment. Lovich et al. (2015) reports the herpetofauna diversity in the based on a targeted tree-climbing expedition in the Nabukelevu forest where logging was active in 2015.

4.1 Methodology

The Navua Watershed Herpetofauna survey was carried out in two locations:

- Naceva Village on Beqa Island (disturbed) and near-by Moturiki Island (relatively undisturbed) in Beqa lagoon, which lies off the mouth of the Navua River on 22-23 December 2023.
- The land surrounding Nabukelevu Village at the headwaters of the Navua from 2-4 January 2024.

Several accepted methods for herpetofauna surveys generally fall under two categories: opportunistic diurnal and nocturnal searches and trapping and standardised nocturnal and diurnal searches and trapping.

Long-term monitoring transects that exist for Fiji are restricted to frogs (Sovi Basin Conservation Area and Wabu Forest Reserve) and crested iguanas (Yadua Taba Iguana Sanctuary and Monuriki Island). Because of the cryptic and heliophilic nature of Fiji's reptiles and climate, visual surveys and trap methods used to document the presence/absence of herpetofauna are limited by weather conditions.

For the Navua catchment, covering areas as far inland as the yavusa Burenitu lands around Nabukelevu Village in the Serua Province, and impacting the adjacent coastlines and the offshore island of Beqa, data was collected along transects through (a) standardised diurnal and nocturnal sticky-trap surveys and (b) opportunistic fixed effort diurnal and nocturnal visual encounters surveys on a range of habitats. Data collected included the presence/absence of herpetofauna species, habitat and microhabitat types. A total of 5 transects were surveyed, 2 for Beqa and 3 for Nabukelevu.

Previous surveys in Fiji have employed the use of sticky traps in two ways:

- *Targeted field surveys:* Because of the low capture rates of herpetofauna within high island rainforests, sticky traps have been placed opportunistically at identified ideal habitats e.g. ridge tops and along riverbanks and riparian vegetation.
- *Standardised sticky traps* have been placed along a 1 km transect at 50 m intervals.

Sticky-traps

Standardised sticky-trap (Masterline) surveys focused on areas within intact forest areas. Only two transects were set due to limited availability of traps; one for Beqa and the second at Nabukelevu. The Nabukelevu trapping was hampered by a heavy evening downpour. Sticky-trap stations were laid at 50 m intervals along each transect line. Each station had a designated station number with a cluster of three traps per station being placed in different microhabitats at each station (tree, log and ground) to capture terrestrial and arboreal herpetofauna. Sticky traps were left out for up to 18 hours before collection, to allow for the capture of nocturnal and diurnal species, however, limited to the short time allowed for this particular field survey.

Visual Encounters

Nocturnal visual encounter surveys were used to search for iguanas (which are more visible at night) and nocturnal herpetofauna such as frogs, geckos and snakes (active and more visible at night). A total of 12 people surveyed on 3 nights for just over 2 hours each night.

Based on discussions with the Ministry of Forestry, we were informed of the degraded status of Beqa's forest. With the priority to survey for indicator species, Moturiki Island was prioritised as it was less disturbed and looked ideal for banded iguanas. The first night survey was conducted with 6 people, on 20-hectare Moturiki Island, just off the village of Dakuni in Beqa. The island is well covered with tropical dry forests and beach forests that have preferred food plants for iguanas. The northern end accommodates a cemetery that is currently being used by Dakuni Village. The survey was conducted on the southern coast of the island which is also accessible by walking across at low tides from the northern end. This access is also used by both stray and wild pigs and may also be exploited by stray dogs and wild cats and is categorised as a disturbed site.

In Nabukelevu, the search prioritised disturbed areas for better detectability of herpetofauna because of time constraints and prevailing weather conditions. Four people searched on the first night in Nabukelevu following the sticky-trap survey. The patch of forest surveyed was logged in the ~1970s. The second night was hampered by heavy rain downpours which restricted the survey to a two-person team which surveyed from a slow-moving vehicle, stopping at times to confirm sightings.

More time was spent on opportunistic diurnal visual encounter surveys, surveying along transects that incorporate logging roads, stream and creek banks, logged and unlogged forest patches, guava woodland, plantations, and dissecting ant plants and dead logs. This survey included a 3 km meandering route transect near Nabukelevu that entered a 200 m bat cave (at Matalima) and a historic hill fort village (Figure 6; Figure 7).

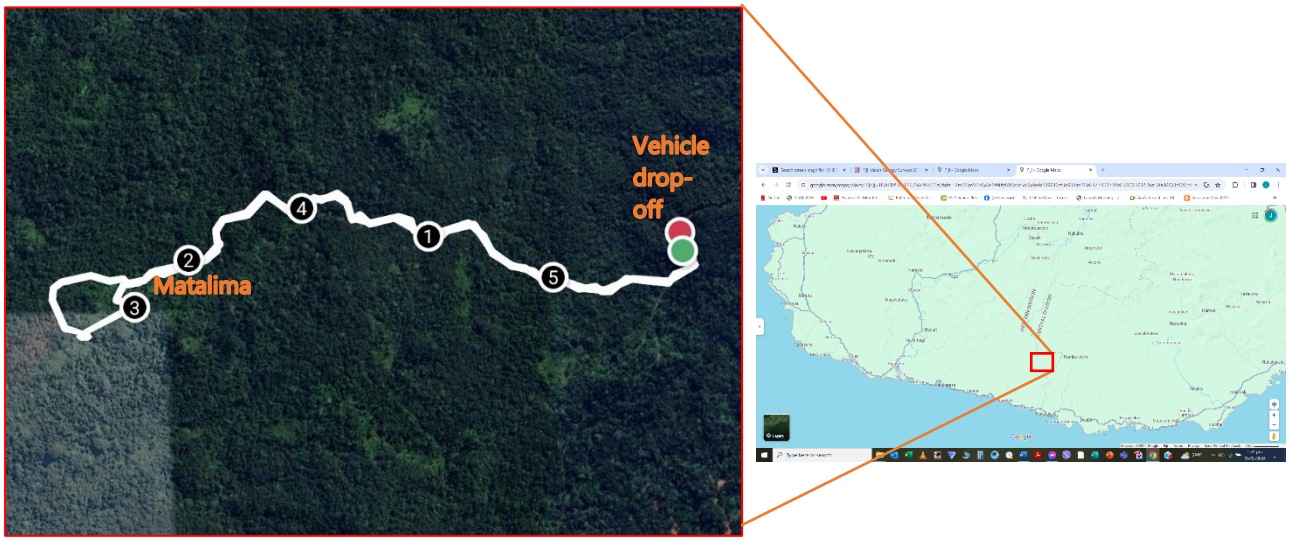

Figure 6. The Nabukelevu herpetofaunal transect

Figure 7 Matalima historic hillfort village foundations

Anecdotal Information

Local communities are very much connected to their natural resources and are mostly aware of the associated animal species that exist on their land. Anecdotal information was also obtained from villagers who have encountered herpetofauna species. This was only carried out due to the low observation and capture rate from the above methods and also considering the impacts that may arise from the wet conditions that preceded the surveys. Species illustrations from Morrison (2003) were shown to knowledgeable informants to confirm past sightings and at times of confusion between two similar species.

4.2 Results and Discussion

Both surveys were preceded by heavy downpours that caused flooding in the Southeastern region of mainland Viti Levu. This may have caused the ineffectiveness of these survey methods of capturing by sticky traps and general visual observations, as compared to drier conditions.

Beqa Island

Three species of herpetofauna were observed on Beqa Island and Moturiki Island: two native (of which one is endemic) and one introduced. The only two captured herpetofauna individuals were from stations behind Naceva Village in Beqa. The most common native species encountered was the endemic Fijian snake-eyed skink (*Cryptoblepherus eximius*) which was numerous along the beaches on Beqa Island.

Nabukelevu

Species observed in the Nabukelevu area included one skink species: *Emoia concolor;* four geckos: *Nactus pelagicus, Gehyra oceanica, Lepidodactylus lugubris* and *Hemidactylus frenatus*; the Fiji tree frog (*Cornufer vitiensis*) (Figure 8); and the introduced and invasive *Cane toad* (*Chaunus marinus*). Of these, four are native (2 endemic), three introduced (one invasive).

Figure 8 Fiji tree frog, Cornufer vitiensis from nocturnal surveys

As with forested areas throughout Viti Levu, mongoose and feral cats were observed occasionally during the survey. Mongoose and feral cats have decimated the native ground herpetofauna including the banded iguana (*Brachylophus bulabula*) (Figure 9), which descend to the ground to lay their eggs. Skinks such as *Emoia concolor, E. parkeri* and *E. cyanura* are quite common but are not conspicuous. While the iguana and the Pacific boa (*Candoia bibronii*) were not observed, they are reported occasionally in the past two decades, but at very low abundances. The Viti Levu endemic Fijian burrowing snake (*Ogmodon vitiensis*) was not found or reported from Nabukelevu but is sometimes reported from villages in the Namosi Province that sit within the Wainikoroiluva river catchment, a sub-catchment of the Navua River.

Figure 9 (LEFT) A banded iguana brought to the village in 2003 (Photo: Vilikesa Masibalavu)
Figure 10 (RIGHT) Tree climbing at Nabukelevu. Iguanas are more frequently encountered in this village due to the prevalence of selective logging (Photo: Matareti Mataitoga)

The endemic Mann's forest gecko (*Lepidodactylus manni*), which was captured in 2015 from treetop epiphytes, was not found. Treetop epiphytes were inaccessible on this survey due to a lack of climbing equipment. 2015 surveys utilised the single rope climbing technique on the Rapid Ascent and Descent (RAD) (Figure 10) system to access the canopy (Lovich et al. 2015).

Table 5 Summary of herpetofauna species observed during the survey compared with earlier literature for the Navua Watershed. Note: LC – Least concern, NT – Near Threatened, VU – Vulnerable, EN – Endangered

Common name	Species	IUCN Red List	Dec. 23 & Jan 24			Literature			Anecdotal (Date & Location)
			Sticky Traps	Visual	(Ryan 1988)	(Watling 1989)	(Masibalavu et al. 2003)	(Tuiwawa et al. 2013)	
Pacific slender-toed gecko	*Nactus pelagicus* (Native)	LC	√			√		√	
Oceania gecko	*Gehyra oceanica* (Native)	LC	√			√			
Mourning gecko	*Lepidodactylus lugubris* (Native)			√		√			
Fiji scaly-toed gecko	*Lepidodactylus manni* (Vulnerable)					√			
Common house gecko	*Hemidactylus frenatus* (Introduced)	LC		√					
Pygmy snake-eyed skink	*Cryptoblepharus eximius* (Endemic)			√					
Indo-Pacific slender gecko	*Hemiphyllodactylus typus* (Native)					√			
Moth skink	*Lipinia noctua* (Native)					√			
Copper-tailed skink	*Emoia cyanura* (Native)					√			
Fiji green emo skink	*Emoia concolor* (Endemic)	NT		√		√		√	
Parker's emo skink	*Emoia parkeri* (Endemic)	VU				√		√	
Voracious four clawed gecko	*Gehyra vorax* (Native)							√	2023 Nabukelevu (Figure 11)
Fiji snake	*Ogmodon vitianus* (Endemic)	LC							(Niukula, 2018)
Fiji tree frog	*Cornufer vitiensis* (Endemic)	NT		√				√	
Cane toad	*Chaunus marinus* (introduced)	LC		√				√	
Fiji banded iguana	*Brachylophus bulabula* (Native)	EN			√	√	√	√	2021 Nabukelevu
Bibron's bevel-nosed boa	*Candoia bibroni* (Native)	LC							2023 Nabukelevu

Figure 11. A giant forest gecko, *Gehyra vorax*, accidentally killed by a farmer at Nabukelevu just before the field visit.

Sticky-traps

A total of 960 hours of sticky-traps were invested, where only 2 native geckos were recorded: oceanic gecko (*Gehyra oceanica*) and skink-toed gecko (*Nactus pelagicus*). Rat fur was observed on four traps indicating the presence of rodents, which are proven invasive predators of herpetofauna species worldwide.

Visual Encounters

Nocturnal search yielded the two amphibian species; the Fijian tree frogs were heard and also observed at night at Nabukelevu while cane toads were encountered throughout the two sites that represent the extreme ends of the Navua watershed, from the headwaters to the receiving end of the flush of the Navua River at Beqa.

Six species were encountered during the day through this search technique: two skinks – *Cryptoblepharus eximius* and *Emoia concolor;* three geckos – *Gehyra oceanica* and *Lepidodactylus lugubris* and the house gecko *(Hemidactylus frenatus)*. The sixth is the cane toad (*Rhinella marina*), which occurs in all life stages and sizes and is recorded from all transects. Tadpoles were also observed in creeks and streams. No animal was captured as the individuals were easily identified and are not current targets for DNA sampling.

Anecdotal Information

There were many stories gathered on villagers encountering banded iguana and Pacific boa in the plantations and at times seeing them being carried around by villagers. On one occasion, Birdlife International researchers were conducting bird surveys in Nabukelevu in 2003 when a banded iguana was captured and taken around the village by a pig hunter. In 2021, a captured iguana was reported to NFMV from Nabukelevu. NFMV's Nunia Thomas and National Trust of Fiji's (NTF) Jone Niukula, attended to the report, where measurements were recorded, and a tail tip sample was extracted for DNA analysis. Finally, a farmer reported that he cleared a forested area for planting about five years ago and encountered several boas in the area located close to the bat cave at Matalima.

Literature Review

Within the past 10 years, the NTF surveys targeting herpetological fauna have been canopy survey trials at Nabukelevu and surveys at the Garrick Reserve in Navua, the villages of Saliadrau and Naqarawai in the Wainikoroiluva sub-watershed, which is the last sub-watershed that contributes to the Navua River. The Garrick Reserve is completely forested but has been disturbed by logging and road building. Only very small areas within the Reserve, specifically in the north, might prove to be pristine, somewhat similar to the yavusa Burenitu land in Nabukelevu. The Reserve was surveyed before 1989 in preparation for the formulation of the Reserve's management plan.

Earlier reports of surveys within the larger Navua watershed include the 1989 NTF Management Plan for Garrick Reserve, which lists fauna and flora recorded from previous surveys, and the 2003 Birdlife International survey reports for Nabukelevu Forests. A major survey was also carried out on Emalu land further up the watershed as part of the Fiji REDD+ Programme Finally, biologist and renowned wildlife photographer Paddy Ryan reported on his webpage that he was offered 12 Fijian burrowing snakes in the 1990s by the people of Saliadrau, in the Wainikoroiluva watershed, after letting them know of his team's quest to capture the snake for research purposes.

4.3 Conclusions and Recommendations

The heavy rainfall period before the survey weeks may have affected the behaviour of the reptiles in the wet conditions. There was low activity both at night and during the day, which resulted in the lack of sightings and success for the stick traps. Rain also affected the surveyors' ability to search during nocturnal surveys and while hiking the transects during the day.

Logging activity in the Nabukelevu lands has opened up pathways for the introduction of invasive animals and plants that may have an impact on the native species. Native species are no longer naïve to their presence and are bound to change their behaviour to ensure their survival from predators or pushed away to other areas.

Despite the pressure of logging that is being carried out, the Nabukelevu area is still very intact and may certainly offer more unique and significant findings if studied well. The site deserves at least a week for proper herpetofauna surveys.

The single rope climbing technique on the RAD system (Lovich et al. 2015) must be utilised to access the canopy in this forest system. Acquiring them may be costly but obtaining new findings as proven in the 2015 survey will shed light on some knowledge gaps that have been gathering over the years.

We intend to continue exploring ways to detect iguanas and burrowing snakes in primary forest systems on mainland Viti Levu and Vanua Levu. Training dogs to find iguana eggs and nests, and burrowing snake activity to at least confirm their presence in forest patches.

5 ENTOMOLOGY

Hilda Waqa-Sakiti, Lusiana Tuvou and Tokasaya Cakacaka

Invertebrates are widely regarded as powerful monitoring tools in environmental management because of their great abundance, diversity and functional importance, their sensitivity to perturbations and the ease with which they can be sampled (McGeoch 1998, Andersen et al. 2004).

5.1 Methodology

Site selection and habitat considerations

To maximise the likelihood of encountering focal species and to adequately sample insect diversity, key habitat types within river flats and ridges were surveyed within selected vegetation plots. The precise locations of each survey site and a map of sampling points are detailed in Table 6 Entomology sampling locations within the Upper Navua catchment area Table 6.

Table 6 Entomology sampling locations within the Upper Navua catchment area

Sampling Technique	Site/ Plot	Latitude (N)	Longitude (E)	Elevation (m asl)	Habitat Type
Leaf Litter Sampling	Mosimosi/ Plot 1	18.096862	177.897122	334	Ridge (Intact/ Unlogged)
	Mosimosi/ Plot 2	18.094461	177.897179	337	Ridge Flat (Intact/ Unlogged)
	Waiwai/ Plot 3	18.089618	178.467479	88	River Flat (Impacted/ Logged)
	Waiwai/ Plot 4	18.089463	178.467515	90	River Flat (Impacted/ Logged)
Malaise Trap	Mosimosi/ MT1	18.09751	177.897598	369	Ridge (Intact/ Unlogged)
Light Trap	Mosimosi/ Light Trap 1	18.096774	177.897044	338	Ridge (Intact/ Unlogged)
Opportunistic Encounters	Wainasese Creek	18.100631	177.892559	252	

Leaf litter surveys

Leaf litter surveys targeted various habitat types, including river flats and ridges. Quadrats of 1 m^2 were sampled at 10 m intervals along a 100 m transect within each vegetation subplot. Leaf litter from each quadrat was sieved through 12 mm mesh sieves and transferred into Winkler bags (Figure 12). These bags were left out for at least 48 hours to allow for the drying of the leaf litter, after which insect specimens were stored in ethanol for further sorting and identification. This sampling technique specifically targeted insects dwelling in leaf litter, which play vital ecological roles in decomposition, nutrient cycling and predation.

Figure 12. (left) Leaf litter sampling utilising Winkler bags and (right) bags hung for 48hrs.

Light Traps

Nocturnal surveys targeting night-active insects were conducted using light traps (Figure 13). These traps operated from 6pm to10 pm for one night per sampled location. Insects attracted to the light were actively collected into labelled vials with 80% ethanol for further sorting and identification in the laboratory. A single light trap was deployed at Mosimosi within an intact, unlogged forest system at an elevation of 338 m asl within a ridge habitat type system.

Malaise Traps

Low-flying insects were passively sampled using Malaise traps (Figure 14). These traps target free-flying insects and are effective in sampling Diptera, Hymenoptera and Coleoptera. Erected on the ground, the trap intercepts insects along a vertical hanging 'mid-vein.' Insects walk up the tent netting towards the light, eventually falling into a collecting jar containing 80% ethanol as a preservative. A single Malaise trap was set up at Mosimosi within an intact, unlogged forest system at an elevation of 369 m asl with a ridge forest system. The trap was left for two days in the field to allow for a representative diversity of insects to be sampled, after which specimens were washed in 80% ethanol before sorting to various Coleopteran families and insect orders.

Figure 13 Light traps targeting nocturnal insects

Figure 14 Setting up of the Malaise trap

Opportunistic Encounters

These encounters were conducted while traversing the forest, along streams and within vegetation plots, mainly targeting insect Orders Coleoptera (beetles), Lepidoptera (butterflies), Phasmida (stick insects) and Odonata (dragonflies and damselflies), among others.

Identification and Curation

Specimens were identified with the aid of available taxonomic references for each of the main groups, including ants (Sarnat 2012), butterflies (Robinson 1975, Prasad and Waqa-Sakiti 2007), dragonflies and damselflies (Marinov and Waqa-Sakiti 2013) and beetles (Lawrence and Britton 1994).

5.2 Results and Discussion

Insect Diversity

The below tables (Table 7; Table 8; Table 9; Table 10) present the outcomes of insect surveys conducted at respective sites, categorised by the employed sampling techniques. A total of 751 insects were collected across the four sampling methods within the vegetation plots.

The most prevalent taxa, identified through leaf litter, malaise trap and light trap techniques, belonged to the insect Order Coleoptera (beetles), with 15 families recorded within the assessment areas. The abundance of Coleopteran families in the sampled sites at the Upper Navua catchment area indicates the forest's favourable condition. Notably, leaf litter sampling revealed Staphylinidae (rove beetles) and Curculionidae (weevil beetles) as the most frequently encountered beetle families. Staphylinids play significant ecological roles primarily as predators and scavengers, contributing to detritus consumption. Curculionids, or weevils, in litter communities of tropical forests, provide vital ecological services as decomposers of organic matter, aiding in forest health assessment and evaluating the impacts of forest management or damage to ecosystems (Maioglio et al. 2022).

Analysis of the sites at Mosimosi, specifically Plots 1 & 2 within undisturbed, intact areas, indicates the forest's integrity. Indeed, a higher number of unique taxa and higher abundance were observed in undisturbed forest compared to disturbed (

Figure 15). These areas exhibited higher diversity and abundance of Coleoptera, serving as a reliable indicator of forest health and supporting ecosystem services such as soil processing, herbivory, decomposition and seed dispersal within leaf litter and soil habitats. Rare beetle families Lathrididae and Pselaphidae were exclusively found within Plots 1 & 2, highlighting their presence in intact, unlogged areas. Additionally, the presence of Cerambycidae (long-horned beetles) sampled via light traps further emphasises the integrity of the forest ecosystem in these plots. This is because long-horned beetles spend up to 12 years in larval stage in rotting wood and their presence is indicative of its support for forest ecological functioning (Waqa-Sakiti 2016; Waqa-Sakiti et al 2018).

Table 7 Leaf litter data sampled from four vegetation plots. Plots 1 & 2 (unlogged) vs Plots 3 & 4 (logged)

Order	Family	Plot 1	Plot 2	Plot 3	Plot 4	Total
Coleoptera	Staphylinidae	19	14	11		44
	Scolytidae	5	11		9	25
	Curculionidae	18	23	12	16	69
	Tenebrionidae	5	3	2	4	14
	Chrysomelidae	13	14		3	30
	Carabidae	14	3	4	3	24
	Lathrididae	1	3			4
	Pselaphidae	9	5			14
	Mordellidae	9	5	2	3	19
	Gyrinidae		1	3	5	9
	Anthribidae			11	10	21

Order	Family	Plot 1	Plot 2	Plot 3	Plot 4	Total
	Nitidulidae			1		1
Acari		11	5	5	6	27
Aranea		8	9			17
Opiliones		7	6			13
Orthoptera	Acrididae		1			1
Hemiptera			13			13
Hymenoptera	Formicidae	84	108	32	86	310
TOTAL		203	224	83	145	655

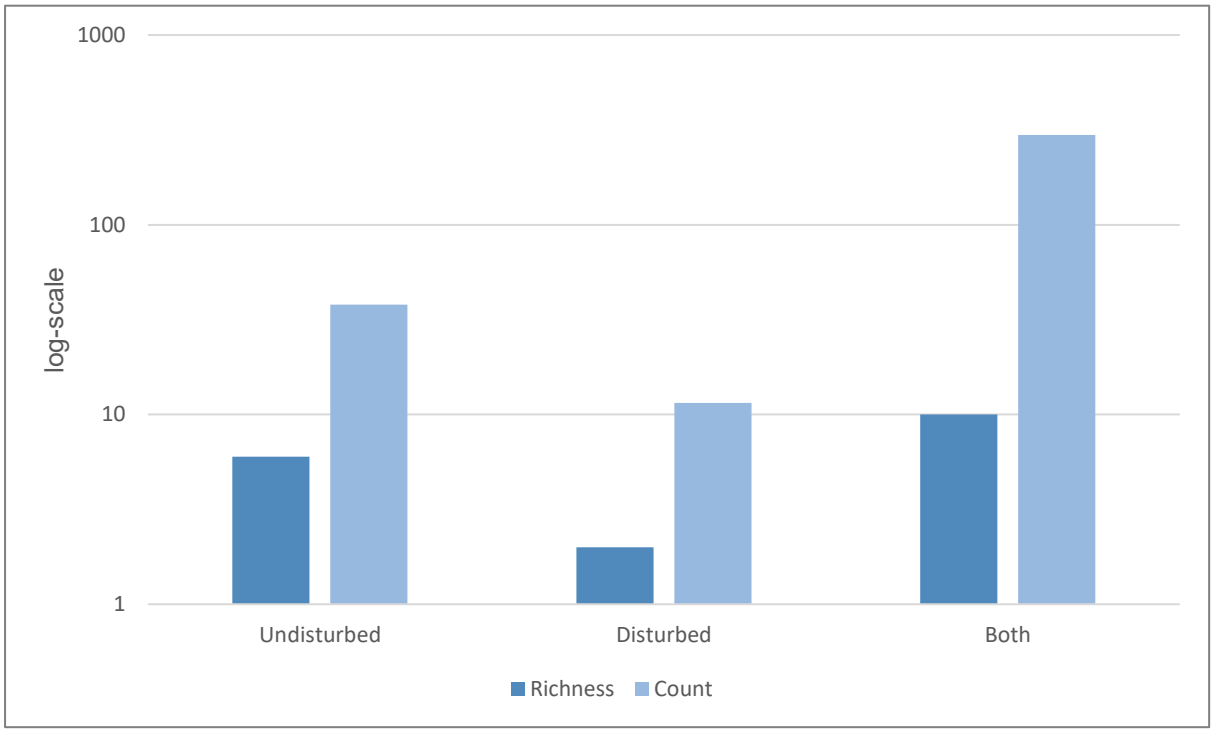

Figure 15 Invertebrate litter trap richness and counts (in log-10 scale) for taxa observed in disturbed, undisturbed and both transects.

Table 8 Malaise Trap data from Mosimosi (unlogged area)

Order	Family	Abundance
Coleoptera	Curculionidae	1
	Elateridae	1
	Mordellidae	2
	Staphylinidae	
Orthoptera		11
Diptera		23
Lepidoptera		12
Hemiptera		2

Order	Family	Abundance
TOTAL		52

Table 9 Light trap data from Mosimosi, unlogged area

Order	Family	LT_1	TOTAL
Coleoptera	Scarabaeidae	4	2
	Cerambycidae	1	1
Lepidoptera		10	10
TOTAL			35

Table 10 Opportunistic Survey along Wainisese Creek (Unlogged area)

Site	*Order*	*Family*	*Abundance*
Wainasese creek	Zygoptera	Coenagrionidae	6
	Anisoptera	Libellulidae	1
	Lepidoptera		2
Total			9

Focal Taxa

Polyura camphonitis, a species belonging to the Lepidoptera order, is endemic and rare in Fiji, typically found in undisturbed forested regions (Figure 16). This species was discovered along Wainisese Creek, an unlogged area, marking its first recorded presence in the Upper Navua catchment area.

Figure 16 *Polyura camponitis* butterfly, endemic to Fiji.

In the order Odonata, *Nesobasis angolicolis* and *N. erythrops*, both belonging to the genus *Nesobasis,* are endemic to Fiji. These species have previously only been documented on Viti Levu (Marinov and Sakiti Waqa

2013) and represent the first observation within the Upper Navua catchment area. They were sampled along Wainisese Creek at an elevation of 252 m asl in an unlogged area.

Additionally, in the Diplopoda order, the family Gonibregmatidae, commonly referred to as the Fijian giant millipede (Figure 16), was collected along the Wainisese Creek at an elevation of 251 m asl in an unlogged area. Soil millipedes play a vital ecological role in leaf litter decomposition and nutrient cycling within the soil.

Figure 17 Fijian giant millipede

Logged vs Unlogged sites

Data from this survey indicates that insect diversity within unlogged sites (Plots 1 & 2) in the Mosimosi area was notably richer and abundant compared to Plots 3 & 4, which were logged (16 versus 12 taxa, respectively). Among the focal taxa, specifically the Order Coleoptera (beetles), families such as Staphylinidae (rove beetles), Curculionidae (weevils) and Chrysomelidae (leaf beetles) were prevalent in leaf litter samples from Plots 1 & 2 (unlogged) compared to Plots 3 & 4 (logged). The dominance of these taxa within leaf litter samples suggests that essential processes like leaf litter breakdown, decomposition, seed dispersal and predation within the forest floor's litter structure remain intact. Additionally, the rare beetle families Lathrididae and Pselaphidae were exclusively found in Plots 1 & 2 and were not recorded in Plots 3 & 4. Opportunistic encounters across both logged and unlogged areas revealed that certain species within the focal taxa were only observed in unlogged areas. These species include *Polyura camponitis* (endemic butterfly), *Nesobasis angolicolis* and *N. rufostigma* (endemic *Nesobasis* genus) and the Fijian giant millipede. The presence of endemic *Nesobasis* damselflies and the rare butterfly *P. camphonitis,* known to inhabit intact ecosystems, further supports the integrity of the unlogged areas within Mosimosi.

5.3 Conclusions and Recommendations

The Upper Navua catchment area holds significant conservation value, particularly evident through entomological surveys conducted within the Mosimosi region (Plots 1 & 2). The intact forest systems of the upper Navua catchment area are underscored by several key observations:

- A notable diversity of Coleoptera families (15) was recorded, highlighting their crucial role in driving forest ecosystem functions, especially within the upland intact forest systems.
- Rare beetle families, including Lathrididae, Pselaphidae and Cerambycidae, were exclusively sampled from Plots 1 & 2.
- Significant findings include the discovery of Fiji's endemic and rare insects, such as the endemic butterfly *Polyura camphonitis* and Fiji's endemic damselfly genus, *Nesobasis*, with some new records for the Upper Navua catchment area.

In summary, the entomological assessments conducted as part of the Biodiversity Assessment of the Upper Navua catchment area represent a crucial step towards enhancing our understanding of forest biodiversity and informing conservation initiatives. Continued monitoring and research efforts will be essential to ensure the long-term sustainability and resilience of these valuable ecosystems.

Recommendations for conservation and future work include:

- Further studies to assess the population, distribution and ecology of the *Polyura camphonitis* butterfly, which is rare and endemic to Fiji.
- Monitoring the periodic emergence of Fiji's endemic Cicada, *Raiateana knowlesi*, locally known as the *Nanai*, which has an emergence cycle of 8 years. Its next emergence is expected in 2025. A revisit to the study site in 2025 is recommended to assess its presence within the study area, considering previous records from the Garrick Forest Reserve, Navua.

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APPENDICES

Appendix 1 – Plant List for the Navua catchment

Table 11 Plant list for the Navua catchment. The following data are from the current BioRap: D1: Disturbed Forest Plot 1; D2: Disturbed Forest Plot 2; UD1: Undisturbed Forest Plot 1; UD2: Undisturbed Forest Plot 2; BI: Beqa Island. The following data are from past surveys: FVN: Flora Vitiensis Nova (Smith A.C., 1979, 1981, 1985, 1988, 1991, 1996); ER: Emalu RAP (Tuiwawa et al. 2013); UNC: Upper Navua Conservation 2011.

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Angiosperms-Dicotyledons											
Acanthaceae	*Poikilacanthus glandulosus* (Nees) Ariza		Introduced						✓		
Acanthaceae	*Pseuderanthemum laxiflorum* (A. Gray) Hubbard		Endemic						✓		
Acanthaceae	*Ruellia brevifolia* (Pohl) C.Ezcurra		Introduced						✓		
Achariaceae	*Erythrospermum acuminatissimum* (A.Gray) A.C.Sm.	Mavida	Indigenous						✓		
Actinidiaceae	*Saurauia rubicunda* (A. Gray) Seem	Mimila	Endemic	✓	✓	✓	✓		✓	✓	
Amaranthaceae	*Alternanthera sessilis* (L.) R. Br		Indigenous						✓		
Anacardiaceae	*Buchanania attenuata* A.C.Smith	Kaukaro	Endemic	✓	✓		✓		✓	✓	
Anacardiaceae	*Buchanania vitiensis* Engl.	Maqo ni veikau	Endemic						✓	✓	
Anacardiaceae	*Dracontomelon vitiense* Engl.	Tarawau	Indigenous					✓	✓	✓	
Anacardiaceae	*Mangifera indica* L.	Maqo, Mango	Introduced					✓	✓		
Anacardiaceae	*Pleiogynium timoriense* (DC.) Leenh.	manawi	Endemic						✓	✓	
Anacardiaceae	*Rhus simarubifolia* A.Gray		Indigenous							✓	
Anacardiaceae	*Semecarpus vitiensis* (A, Gray) En	Kaukaro	Indigenous to Fiji and Tonga	✓	✓	✓	✓		✓	✓	
Anacardiaceae	*Spondias dulcis* Parkinson	Wi	Indigenous						✓		
Annonaceae	*Annona glabra* L	Bullocks heart	Introduced					✓	✓		
Annonaceae	*Cananga odorata* (Lam.) Hook. f. & Thoms	Makosoi	Indigenous						✓	✓	
Annonaceae	*Cyathocalyx insularis* A. C. Sm	Makosoi ni veikau	Endemic						✓	✓	
Annonaceae	*Cyathocalyx sp.*		Indigenous	✓	✓	✓					

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Annonaceae	*Discocalyx crinita* A. C. Sm		Endemic						✓		
Annonaceae	*Discocalyx fusca* Gibbs	Vutuvutu	Endemic						✓		
Annonaceae	*Polyalthia habrotricha* A. C. Sm		Endemic						✓		
Annonaceae	*Polyalthia laddiana* A.C.Smith		Endemic							✓	
Annonaceae	*Polyalthia vitiensis* Seem		Endemic						✓		
Annonaceae	*Richella monosperma* A. Gray	Makosoi ni veikau	Endemic						✓		
Annonaceae	*Xylopia degeneri* A. C. Sm		Endemic						✓		
Annonaceae	*Xylopia pacifica* A. C. S	Dulewa	Endemic						✓		
Annonaceae	*Xylopia sp.*		-	✓			✓				
Apiaceae	*Centella asiatica* (L.) Urb		Introduced							✓	
Apocynaceae	*Alstonia montana* Turrill	Sorua	Endemic						✓	✓	
Apocynaceae	*Alstonia pacifica* (Seem.) A. C. Sm	Sorua	Indigenous			✓			✓	✓	
Apocynaceae	*Alstonia vitiensis* Seem.	Sorua	Endemic	✓	✓				✓	✓	✓
Apocynaceae	*Alyxia bracteolosa* Rich. ex A.Gray	Vono	Indigenous						✓		
Apocynaceae	*Carruthersia latifolia* Gillespie		Endemic						✓		
Apocynaceae	*Carruthersia scandens* (Seem.) Seem.	Wa rerega	Endemic						✓		
Apocynaceae	*Cascabela thevetia* (L.) Lippold	Yellow oleander	Introduced						✓		
Apocynaceae	*Cerbera manghas* L	Vasa rewa, vasavasa	Indigenous	✓	✓		✓		✓	✓	
Apocynaceae	*Hoya australis* R. Br		Indigenous						✓		
Apocynaceae	*Hoya diptera* Seem		Endemic						✓		
Apocynaceae	*Hoya vitiensis* Turrill	Wa tabua	Endemic						✓		
Apocynaceae	*Melodinus vitiensis* Rolfe	Wa motu, wa masi	Indigenous						✓		
Apocynaceae	*Neisosperma oppositifolium* (Lam.) Fosberg & Sachet	Vao	Indigenous						✓		
Apocynaceae	*Nerium oleander* L	Oleander	Introduced						✓		
Apocynaceae	*Ochrosia vitiensis* (Markgraf) Pichon	Dogodogo	Indigenous to Fiji and Tonga						✓		
Apocynaceae	*Parsonsia laevis* (A. Gray) Markgraf		Indigenous						✓		

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Apocynaceae	*Tabernaemontana pandacaqui* Poir.		Indigenous						✓		
Apocynaceae	*Tabernaemontana thurstonii* Horne ex Baker (Syn: *Pagiantha thurstonii*)	Tadalo	Endemic	✓	✓	✓	✓		✓		
Araceae	*Epipremnum pinnatum* (L.) Engl.	Yalua	Indigenous						✓		
Araliaceae	*Plerandra grayi* Seem	Sole	Endemic						✓		
Araliaceae	*Plerandra insolita* A. C. Sm	Sole	Endemic						✓		
Araliaceae	*Plerandra pickeringii* A. Gray	Sole dina	Endemic			✓	✓		✓	✓	
Araliaceae	*Plerandra seemanniana* A. C. Sm	Sole	Endemic						✓	✓	
Araliaceae	*Polyscias joskei* Gibbs	Sole	Endemic							✓	
Araliaceae	*Polyscias multijuga* (A. Gray) Harms	Danidani	Indigenous					✓	✓	✓	
Araliaceae	*Schefflera euthytricha* A. C. Sm	Sole tagane	Endemic						✓		
Araliaceae	*Schefflera vitiensis* (A. Gray)	Sole	Endemic						✓		
Asparagaceae	*Cordyline fruticosa* (L.) A.Chev.		Indigenous						✓		
Asteraceae	*Acmella uliginosa* (Sw.) Cass,	Botebotekoto	Indigenous						✓	✓	✓
Asteraceae	*Ageratum conyzoides* L	Suguvanua	Introduced						✓		
Asteraceae	*Cyanthillium cinereum (L.) H.Rob.*		Indigenous						✓		✓
Asteraceae	*Elephantopus mollis* H. B. K.	Tobaco weed	Introduced						✓		
Asteraceae	*Erechtites valerianifolius* (Link ex Spreng.) DC.	Ceylon thistle	Introduced						✓		
Asteraceae	*Mikania micrantha* H. B. K	Wabosucu	Introduced						✓	✓	✓
Asteraceae	*Sphagneticola trilobata* (L.) Pruski	Trailing daisy	Introduced					✓			✓
Asteraceae	*Synedrella nodiflora* (L.) Gaertn.		Introduced						✓		
Asteraceae	*Tridax procumbens* L	Wild daisy	Introduced						✓		
Asteraceae	*Wollastonia biflora* (L.	Kovekove	Indigenous						✓		
Asteraceae	*Youngia japonica* (L.) DC.		Introduced								✓
Balanopaceae	*Balanops pedicellata* (Guillaumin) Hjelmqvist		Indigenous						✓		
Boraginaceae	*Cordia subcordata* Lam. Tab)	Nawanawa	Indigenous					✓	✓		
Boraginaceae	*Symphytum asperum* Lepechin		Introduced						✓		

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Boraginacee	*Heliotropium arboreum* (Blanco) Mabb.	Vevedu	Indigenous						✓		
Burseraceae	*Canarium harveyi* Seem.	Kaunicina	Indigenous	✓	✓				✓	✓	
Burseraceae	*Canarium vitiense A. Gray*		Indigenous			✓	✓				
Campanulaceae	*Hippobroma longiflora* (L.)G. Don	Star of Bethlehem	Introduced						✓		
Campanulaceae	*Lobelia zeylanica* L		Introduced						✓		
Cannabaceae	*Celtis harperi* Horne ex Baker	Mala ni vanua	Indigenous						✓		
Cannabaceae	*Gironniera celtidifolia* Gaud. Voy. Bonite,	Sisisi	Indigenous			✓	✓		✓		✓
Cannabaceae	*Trema cannabina* Lour.	Driu	Indigenous						✓		
Celastraceae	*Elaeodendron vitiense A.C.Sm.*	Kau loa	Endemic						✓		
Celastraceae	*Gymnosporia crenata* (G.Forst.) Seem.	Matadra	Indigenous						✓		
Ceratophyllaceae	*Ceratophyllum demersum* L	Hornwot	Indigenous						✓		
Chrysobalanaceae	*Atuna racemosa* Raf. Sylva	Makita	Indigenous	✓					✓		
Chrysobalanaceae	*Chrysobalanus icaco* L		Introduced						✓		
Chrysobalanaceae	*Parinari insularum* A. Gray	Sea, sa	Indigenous	✓	✓	✓	✓		✓	✓	
Clusiaceae	*Calophylluin vitiense* Turrill	Damanu dilo	Endemic	✓	✓	✓	✓		✓	✓	
Clusiaceae	*Calophyllum amblyphyllum* A. C. Sm. & S. Darwin	Damanu	Endemic						✓	✓	
Clusiaceae	*Calophyllum cerasiferum* Vesque, Epharmosis	Damanu draulailai	Endemic						✓	✓	
Clusiaceae	*Calophyllum inophyllum* L.	Dilo	Indigenous					✓			
Clusiaceae	*Calophyllum leptocladum* A. C. Sm. & S. Darwin	Damanu draulailai	Endemic						✓	✓	
Clusiaceae	*Garcinia adinantha* A. C. Sm. & S. Darwin	Bulu yalewa	Endemic						✓	✓	
Clusiaceae	*Garcinia myrtifolia* A. C. S	Bula yalewa	Indigenous	✓	✓	✓	✓		✓	✓	
Clusiaceae	*Garcinia pseudoguttifera* Seem.		Indigenous			✓	✓		✓	✓	
Clusiaceae	*Garcinia sessilis* (Forst.f.) Seem	Laubu	Indigenous						✓	✓	
Clusiaceae	*Garcinia vitiensis* (A. Gray) Seem.	Bulu	Indigenous						✓	✓	
Combretaceae	*Barringtonia asiatica*(L.) Kurz	Vutu gaga	Indigenous					✓	✓		
Combretaceae	*Lumnitzera littorea* (Jack) Voigt,	Sagale	Indigenous						✓		

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Combretaceae	*Terminalia catappa* L	Tavola	Indigenous					✓	✓	✓	
Combretaceae	*Terminalia litoralis* Seem.	Tavola	Indigenous					✓	✓		
Combretaceae	*Terminalia pterocarpa* Melville & P. Green	Tivi	Endemic						✓		
Combretaceae	*Terminalia sp.*		-	✓							
Combretaceae	*Terminalia vitiensis* A. C. Sm		Endemic						✓		
Connaraceae	*Connarus pickeringii* A. Gray,	Wa vutu	Endemic						✓		✓
Convolvulaceae	*Decalobanthus peltatus* (L.) A.R.Simões & Staples	Wa damu	Indigenous					✓	✓		✓
Convolvulaceae	*Ipomoea aquatica* Forssk. Fl. Aegypt	Morning glory	Indigenous						✓		
Convolvulaceae	*Ipomoea batatas* (L.) Lam.	Kumala	Indigenous						✓		
Convolvulaceae	*Ipomoea littoralis* Bl. Bijdr.	Tokatolu	Indigenous						✓		
Convolvulaceae	*Ipomoea pes-caprae* (L.) R. Br.	Beach morning glory	Indigenous						✓		
Cornaceae	*Alangium vitiense* (A. Gray) Baill. ex Harms		Endemic	✓	✓		✓		✓	✓	
Cuniniaceae	*Pterophylla richii (A.Gray)* Pillon & H.C.Hopkins		Endemic						✓		
Cunnoniaceae	*Geissois stipularis* A. C. Sm	Vure	Endemic						✓		
Cunnoniaceae	*Geissois superba* Gillespie	Vure	Endemic						✓		
Cunnoniaceae	*Geissois ternata* A.Gray	Vure	Endemic							✓	✓
Cunoniaceae	*Spiraeanthemum graeffei* Seem.	Katakata	Endemic						✓		
Cunoniaceae	*Weinmannia vitiensis* Seem.		Endemic							✓	
Degeneriaceae	*Degeneria vitiensis* I. W. Bailey & A. C. S	Masiratu	Endemic			✓	✓		✓	✓	
Dichapetalaceae	*Dichapetalum vitiense* (Seem.) Engl.		Indigenous							✓	
Dilleniaceae	*Dillenia biflora* (A. Gray) Martelli ex Dur. & Jacks. Ind	Kuluva	Indigenous	✓	✓	✓			✓		
Dilleniaceae	*Hibbertia lucens* Brongn. & Gris ex Sebert & Pancher		Indigenous						✓		
Ebenaceae	*Diospyros foliosa (Rich. ex A.Gray) Bakh.*	Kau loa	Indigenous						✓	✓	
Ebenaceae	*Diospyros gillespiei* (Fosberg) Kostermans	Kau loa	Endemic						✓		
Ebenaceae	*Diospyros vitiensis* Gillespie		Endemic						✓		
Elaeocarpaceae	*Acalypha repanda* Müll.Arg.	Kalabuci ni veikau	Indigenous							✓	

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Elaeocarpaceae	*Acalypha rivularis* Seem	Kalabuci ni wai	Endemic							✓	✓
Elaeocarpaceae	*Acalypha wilkesiana* Müll.Arg.		Introduced					✓			
Elaeocarpaceae	*Elaeocarpus chelonimorphus* Gillespie	Kabi	Endemic						✓	✓	
Elaeocarpaceae	*Elaeocarpus chionanthus* A. C. Sm	Kabi	Endemic						✓		
Elaeocarpaceae	*Elaeocarpus kambi* Gibbs.		Endemic							✓	
Elaeocarpaceae	Elaeocarpus sp.		Indigenous				✓				
Elaeocarpaceae	*Elaeocarpus storckii* Seem,	Kabi	Endemic					✓	✓		
Elaeocarpaceae	*Elaeocarpus vitiensis* Gillespie	Tabadamu	Endemic						✓		
Euphorbiaceae	*Aleurites moluccana* (L.) Willd.	Lauci	Indigenous					✓	✓	✓	
Euphorbiaceae	*Claoxylon fallax* Muell. Arg		Indigenous to Fiji and Tonga						✓		
Euphorbiaceae	*Claoxylon vitiense* Gillespie	Malenivia, molea	Endemic						✓		
Euphorbiaceae	*Codiaeum variegatum* (L.) Rumph. ex A.Juss.		Indigenous						✓	✓	
Euphorbiaceae	Codiaeum variegatum (L.) Rumph. ex A.Juss.		Introduced					✓			
Euphorbiaceae	*Croton heterotrichus* Muell. Arg.	Nokanoka	Endemic						✓		
Euphorbiaceae	*Croton microtiglium* Burkill in	Sobusobu	Indigenous to Fiji and Tonga						✓	✓	
Euphorbiaceae	*Endospermum macrophyllum* (Muell. Arg.) Pax & Hoffm.	Kauvula	Endemic	✓			✓		✓	✓	✓
Euphorbiaceae	*Euphorbia atoto* G.Forst.		Indigenous						✓		
Euphorbiaceae	*Euphorbia hirta* L.	Deniose	Introduced						✓		
Euphorbiaceae	*Excoecaria acuminata* Gillespie		Endemic					✓			
Euphorbiaceae	*Excoecaria confertiflora* A. C. Sm		Endemic to Serua						✓		
Euphorbiaceae	*Hevea brasiliensis* (Willd. ex A. H. L. Juss.) Muell. Arg.	Rubber Tree	Introduced						✓		
Euphorbiaceae	*Homalanthus nutans* (Forst. f.) Guillemin	Tautau	Indigenous						✓	✓	
Euphorbiaceae	*Macaranga caesariata* A. C. Sm	Davo, mavo	Endemic						✓		

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Euphorbiaceae	*Macaranga graeffeana* Pax & Hoffm	Gadoa	Endemic				✓	✓	✓	✓	
Euphorbiaceae	*Macaranga harveyana* (Muell. Arg.) Muell. Arg.	Gadoa, mavu	Indigenous		✓				✓	✓	
Euphorbiaceae	*Macaranga secunda* Muell. Arg	Lutulutu, ovotu, rote	Endemic						✓		
Euphorbiaceae	*Macaranga seemannii* (Muell. Arg.) Muell. Arg	Davo, venua	Indigenous						✓	✓	
Euphorbiaceae	*Macaranga vitiensis* Pax & Hoffm.	Gadoa	Endemic						✓		
Euphorbiaceae	*Machaerina falcata* (Nees) T. Koyama		Indigenous						✓		
Euphorbiaceae	*Ricinus communis* L.	Castor bean plant	Indigenous						✓		✓
Euphorbiaceae	*Stillingia lineata subsp. pacifica* (Müll.Arg.) Steenis	Kawa	Indigenous						✓		
Fabaceae	*Acacia richii* A. Gray	Qumu	Endemic						✓	✓	
Fabaceae	*Albizia lebbeck* (L.) Benth	Vaivai	Introduced						✓		
Fabaceae	*Cajanus scarabaeoides* (L.) Thouars	Peanut grass	Introduced						✓		
Fabaceae	*Canavalia rosea* (Sw.) DC	Drau tolu	Indigenous						✓		
Fabaceae	*Cassia roxburghii* DC		Introduced						✓		
Fabaceae	*Clitoria ternatea* L		Indigenous						✓		
Fabaceae	*Crotalaria pallida* Ait		Introduced							✓	
Fabaceae	*Delonix regia* (Bojer ex Hook.) Raf.		Introduced					✓			
Fabaceae	*Derris trifoliata* Lour.	Duva Kalou	Indigenous						✓	✓	
Fabaceae	*Entada phaseoloides* (L.) Merr.	Wa lai, wa qiri	Indigenous						✓		
Fabaceae	*Grona adscendens (Sw.) H.Ohashi & K.Ohashi*		Indigenous						✓		
Fabaceae	*Grona adscendens (Sw.) H.Ohashi & K.Ohashi*		Introduced						✓		
Fabaceae	*Grona heterophylla (Willd.)* H.Ohashi & K.Ohashi	Blue grass	Indigenous						✓		
Fabaceae	*Indigofera suffruticosa* Mill	Indigo plant	Introduced						✓		
Fabaceae	*Inocarpus fagifer* (Parkinson) Fosberg	Ivi	Indigenous						✓	✓	
Fabaceae	*Intsia bijuga* (Colebr.) Kuntze	Vesi	Indigenous					✓	✓	✓	
Fabaceae	*Leucaena leucocephala* (Lam.) de Wit	Vaivai mocemoce	Introduced					✓			
Fabaceae	*Maniltoa floribunda* A. C. Sm	cibicibi, moivi	Endemic						✓		

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Fabaceae	*Maniltoa minor* A. C. Sm	Moivi, namo	Endemic						✓		
Fabaceae	*Maniltoa vestita* A. C. S	cibicibi, moivi	Endemic						✓		
Fabaceae	*Mucuna gigantea* (Willd.) DC.		Indigenous							✓	
Fabaceae	*Pongamia pinnata* (L.) Pierre	vesiwai	Indigenous					✓	✓	✓	✓
Fabaceae	*Prioria platycarpa* (B.L.Burtt) Breteler (Syn: *Kingiodendron platycarpum*)	Moivi	Endemic	✓	✓	✓	✓		✓		
Fabaceae	*Pueraria montana var. lobata* (Willd.) Maesen & S.M.Almeida ex Sanjappa & Predeep	Wa yaka	Indigenous						✓		
Fabaceae	*Serianthes melanesica* Fosberg	Vaivai ni veikau	Endemic						✓		✓
Fabaceae	*Sophora tomentosa* L		Indigenous						✓		
Fabaceae	*Storckiella vitiensis*		Endemic	✓			✓				
Fabaceae	*Strongylodon lucidus* (Forst. f.) Seem		Indigenous			✓			✓		
Fabaceae	*Vigna marina* (Burm.) Merr.		Indigenous					✓	✓		
Gentianaceae	*Fagraea berteroana* A. Gray ex Benth.	Bua ni veikau	Indigenous						✓		✓
Gentianaceae	*Fagraea gracilipes* A. Gray	Buabua	Indigenous						✓		
Gesneriaceae	*Cyrtandra aloisiana* A. C. Sm	Makamakadora	Endemic						✓		
Gesneriaceae	*Cyrtandra anthropophagorum* Seem	Makamakadora	Endemic						✓		
Gesneriaceae	*Cyrtandra involucrata* Seem	Tagotagi	Endemic						✓		
Gesneriaceae	*Cyrtandra milnei* Seem, ex A. Gray	Beta	Endemic						✓		
Gesneriaceae	*Cyrtandra multiseptata* Gillespie		Endemic						✓		
Gesneriaceae	*Cyrtandra muskarimba* A. C. Sm	Masikariba	Endemic						✓		
Gesneriaceae	*Cyrtandra pritchardii* Seem		Endemic						✓		
Gesneriaceae	*Cyrtandra trichophylla* A. C. Sm		Endemic						✓		
Gesneriaceae	*Cyrtandra vitiensis* Seem		Endemic						✓		
Gnetaceae	*Gnetum gnemon* L. Mant. P	Sukau, bele sukau	Indigenous		✓				✓	✓	
Goodeniaceae	*Scaevola floribunda* A. Gray	Vevedu	Endemic						✓		
Goodeniaceae	*Scaevola taccada* Vahl,	Vevedu	Indigenous					✓	✓		

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Hernandiaceae	Gyrocarpus americanus Jacq.	Nawanawa	Indigenous					✓			
Hernandiaceae	*Hernandia nymphaeifolia* (Presl) Kubitzki	Evuevu	Indigenous						✓		
Hernandiaceae	*Hernandia olivacea* Gillespie	Duvula	Endemic						✓		
Joinvilleaceae	*Joinvillea plicata* (Hook, f.) Newell & Sto	Gasau ni veikau	Indigenous						✓		
Lamiaceae	*Clerodendrum chinense* (Osbeck) Mabberley		Introduced						✓		
Lamiaceae	*Clerodendrum inerme* (L.) Gaertn.	Verevere	Indigenous						✓		
Lamiaceae	*Mesosphaerum pectinatum* (L.) Kuntze		Introduced					✓			
Lamiaceae	*Oxera amicorum* (Seem.) Gâteblé & Barrabé	Wa vudi	Endemic						✓		
Lamiaceae	*Oxera amicorum* (Seem.) Gâteblé & Barrabé	Wavudi	Indigenous							✓	
Lamiaceae	*Premna serratifolia* L.	Yaro	Indigenous					✓			
Lamiaceae	*Vitex trifolia* L	Dralakaka	Indigenous						✓		
Lamiaceae	*Vitex vitilevuensis* Munir	Yarokasawa, Bosawa	Endemic						✓		
Lauraceae	*Cassytha filiformis* L	Wa lutu mai lagi	Indigenous						✓		
Lauraceae	*Cryptocarya fusca* Gillespie		Endemic						✓		
Lauraceae	*Cryptocarya hornei* Gillespie		Indigenous to Fiji and Tonga						✓		
Lauraceae	*Cryptocarya turbinata* Gillespie	Lidi	Indigenous to Fiji and Tonga						✓		
Lauraceae	*Cryptocarya turrilliana*		Indigenous			✓					
Lauraceae	*Endiandra elaeocarpa* Gillespie		Indigenous to Fiji and Tonga				✓		✓	✓	
Lauraceae	*Endiandra gillespiei* A.C.Sm.		Endemic			✓	✓			✓	
Lauraceae	*Endiandra luteola* A. C. Sm	Tabadamu	Endemic						✓		
Lauraceae	*Endiandra monticola* A. C. Sm		Endemic						✓	✓	
Lauraceae	*Litsea magnifolia* Gillespie	Vavaloa	Endemic						✓		

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Lauraceae	*Litsea palmatinervia* (Mcisn.) Benth. & Hook		Endemic						✓	✓	
Lauraceae	*Litsea sp.*		Indigenous	✓	✓	✓	✓				
Lecythidaceae	*Barringtonia edulis* Seem.	Vutu kana	Indigenous	✓				✓	✓		✓
Linaceae	*Hugonia vitiensis (Stapf) Byng & Christenh*		Endemic						✓		
Linderniaceae	*Bonnaya antipoda* (L.) Druce		Introduced						✓		
Linderniaceae	*Craterostigma nummulariifolium* (D.Don) Eb.Fisch., Schäferh. & Kai Müll.		Introduced						✓		
Loganiaceae	*Geitonoplesium cymosum* (R. Br.) A. Cunn. ex Hook,		Indigenous						✓		
Loganiaceae	*Geniostoma confertiflorum* A. C. Sm. & Stone		Endemic						✓		
Loganiaceae	*Geniostoma macrophyllum* Gillespie		Endemic						✓	✓	
Loganiaceae	*Geniostoma microphyllum* A. Gray		Endemic						✓		
Loganiaceae	*Geniostoma rupestre* J. R. & G. Forst.		Indigenous						✓	✓	
Loganiaceae	*Geniostoma stipulare* A. C. Sm. & St		Endemic						✓		
Loganiaceae	*Geniostoma uninervium* A. C. Sm. & Stone		Endemic						✓		
Loganiaceae	*Geniostoma vitiense* Gilg & Benedict		Indigenous						✓	✓	
Loganiaceae	*Neuburgia corynocarpa* (A. Gray) Leenh.	Bo, bo loa	Endemic	✓	✓				✓	✓	
Loganiaceae	*Neuburgia macrocarpa* (A. C. Sm.) A. C. Sm	Bo, bo loa	Endemic						✓		
Loganiaceae	*Strychnos vitiensis* A. W. Hill	Saucibucibu, wa masi	Endemic						✓		
Loranthaceae	*Decaisnina forsteriana* (J. A. & J. H. Schultes) Barlow	Sibiriko	Indigenous						✓		
Lythraceae	*Cuphea carthagenensis* (Jacq.) Macbr.		Introduced						✓		
Malpighiaceae	*Gmelina vitiensis* (Seem.) A. C. Sm	Rosawa	Endemic						✓		
Malpighiaceae	*Hiptage myrtifolia* A. Gray	Wa tabua	Endemic						✓		
Malvaceae	*Firmiana diversifolia*		Endemic			✓					
Malvaceae	*Grewia prunifolia* A.Gray	Siti	Indigenous						✓		
Malvaceae	*Grewia vitiensis* Turrill	Siti	Endemic						✓		
Malvaceae	*Heritiera littoralis* Ait. Hort	Kedra ivi na yalewa kalou	Indigenous						✓		
Malvaceae	*Heritiera ornithocephala* Kostermans	Rosarosa	Indigenous	✓	✓	✓	✓		✓	✓	✓

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Malvaceae	*Hibiscus tiliaceus*	Vau	Indigenous					✓	✓	✓	✓
Malvaceae	*Melochia degeneriana* A. C. Sm		Endemic						✓		
Malvaceae	*Microcos vitiensis* A. C. S		Endemic						✓		
Malvaceae	*Sida acuta* Burm.f.Fl.		Indigenous							✓	
Malvaceae	*Sida rhombifolia* L	Broom weed	Indigenous						✓	✓	
Malvaceae	*Thespesia populnea* (L.) Solander ex Correa	Mulomulo	Indigenous						✓		
Malvaceae	*Trichospermum calyculatum* (Seem.) Burret	Mako loa	Endemic						✓	✓	
Malvaceae	*Trichospermum richii* (A. Gray) Seem	Mako	Indigenous to Fij and Samoa	✓	✓		✓		✓	✓	
Malvaceae	*Triumfetta procumbens* Forst		Indigenous						✓		
Malvaceae	*Triumfetta rhomboidea* Jacq.		Indigenous						✓		
Malvaceae	*Urena lobata*L.	Qatima	Introduced						✓		
Melastomataceae	*Astronidium confertiflorum* (A.Gray) Markgraf		Endemic							✓	
Melastomataceae	*Astronidium degeneri* A.C.Sm.		Endemic							✓	
Melastomataceae	*Astronidium inflatum* (A.C.Smith) A.C.Smith		Endemic							✓	
Melastomataceae	*Astronidium macranthum* (A.C.Smith) A.C.Smith		Endemic							✓	
Melastomataceae	*Astronidium pallidinorum* A. C. Sm		Endemic						✓		
Melastomataceae	*Astronidium parviflorum* A.Gray		Endemic							✓	
Melastomataceae	*Astronidium robustum* (Seem.) A. C. Sm		Endemic						✓		
Melastomataceae	*Astronidium robustum* (Seem.) A.C.Smith		Endemic							✓	
Melastomataceae	*Astronidium sessile* (A.C.Smith) A.C.Smith		Endemic							✓	
Melastomataceae	*Astronidium victoriae* (Gillespie) A. C. S	Tavo	Endemic						✓		
Melastomataceae	*Medinilla decora* A. C. S		Endemic						✓		
Melastomataceae	*Medinilla longicymosa* Gibbs	Wa kula	Endemic						✓		
Melastomataceae	*Medinilla ovalifolia* (A. Gray) A. C. Sm		Endemic						✓		
Melastomataceae	*Medinilla subviridis* A. C. Sm		Endemic						✓		

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Melastomataceae	*Melastoma denticulatum* Labill.	Kaunisiga	Indigenous						✓	✓	
Melastomataceae	*Memecylon vitiense* A. Gray		Indigenous						✓		✓
Melastomataceae	*Miconia crenata* (Vahl) Michelang.	Kau sovusovu	Introduced					✓	✓		✓
Meliaceae	*Aglaia archboldiana* A. C. Sm	Sasawira	Endemic						✓	✓	
Meliaceae	*Aglaia axillaris* A. C. Sm	Sasawira	Endemic						✓		
Meliaceae	*Aglaia elegans* Gillespie	Kautoa	Endemic						✓	✓	
Meliaceae	*Aglaia gracilis* A. C. Sm		Endemic						✓		
Meliaceae	*Aglaia greenwoodii* A. C. Sm		Endemic						✓		
Meliaceae	*Aglaia parksii* A. C. Sm		Endemic						✓		
Meliaceae	*Aglaia sp.*		Indigenous	✓	✓	✓	✓				
Meliaceae	*Aglaia vitiensis* A. C. Sm		Endemic						✓	✓	
Meliaceae	*Didymocheton alliaceus* (G.Forst.) Mabb		Indigenous							✓	
Meliaceae	*Dysoxylum gillespieanum* A. C. Sm	Mala	Endemic						✓		
Meliaceae	*Dysoxylum hornei* Gillespie	Kau toa	Endemic						✓		
Meliaceae	*Dysoxylum lenticellare* Gillespie	Kau toa	Endemic						✓	✓	
Meliaceae	*Dysoxylum richii* (A. Gray)	Sasawira	Endemic					✓	✓	✓	✓
Meliaceae	*Dysoxylum sp.*		Indigenous	✓	✓		✓				
Meliaceae	*Dysoxylum sp. 1*		Indigenous			✓					
Meliaceae	*Dysoxylum sp. 2*		Indigenous			✓					
Meliaceae	*Vavaea amicorum* Benth.	Cevua	Indigenous to Fiji and Tonga					✓	✓	✓	
Meliaceae	*Vavaea degeneri* A. C. Sm	Cevua	Endemic						✓	✓	
Meliaceae	*Vavaea harveyi* Seem.	Cevua	Endemic						✓	✓	
Meliaceae	*Vavaea megaphylla* C. H. Wright	Cevua	Endemic						✓	✓	
Meliaceae	*Xylocarpus granatum* J.Koenig	Dabi	Indigenous					✓	✓		
Monimiaceae	*Hedycarya dorstenioides* A. Gray	Mavida	Indigenous to Fiji and Tonga						✓		

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Moraceae	*Artocarpus altilis* (Parkinson) Fosberg	Uto; breadfruit	Indigenous					✓	✓	✓	✓
Moraceae	*Ficus bambusifolia* Seem	Losilosi ni wai	Endemic						✓		✓
Moraceae	*Ficus barclayana* (Miq.) Summerhayes	Losilosi	Endemic			✓			✓	✓	
Moraceae	*Ficus elastica* Roxb. ex Hornem.		Introduced					✓			
Moraceae	*Ficus fulvopilosa* Summerh		Endemic							✓	
Moraceae	*Ficus greenwoodii* Summerhayes	Losilosi	Endemic						✓	✓	
Moraceae	*Ficus masonii* Home ex Baker	Nunu	Endemic						✓	✓	
Moraceae	*Ficus obliqua* Forst.f.Fl		Indigenous					✓		✓	
Moraceae	*Ficus pritchardii* Seem	Masi	Endemic						✓	✓	✓
Moraceae	*Ficus prolixa* G.Forst.	Baka	Indigenous					✓			
Moraceae	*Ficus smithii* Home ex Baker	Baka	Indigenous						✓	✓	
Moraceae	*Ficus storckii* Seem.	Nunu	Indigenous	✓		✓	✓		✓	✓	
Moraceae	*Ficus vitiensis* Seem.	Lolo	Endemic						✓	✓	✓
Moraceae	*Paratrophis anthropophagorum* (Seem.) Warb		Indigenous						✓		
Moraceae	*Paratrophis pendulina* (Endl.) E.M.Gardner		Indigenous						✓		
Myristicaceae	*Myristica castaneifolia* A. Gray,	Kau damua	Endemic	✓	✓	✓	✓		✓	✓	
Myristicaceae	*Myristica chartacea* Gillespie		Endemic			✓				✓	
Myristicaceae	*Myristica gillespieana* A. C. Sm	male	Endemic						✓	✓	
Myristicaceae	*Myristica grandifolia* A.DC		Endemic							✓	
Myristicaceae	*Myristica macarantha* A.C.Smith		Endemic							✓	
Myrtaceae	*Decaspermum vitiense* (A. Gray) Niedenzu	Nuqanuqa	Endemic						✓		
Myrtaceae	*Eucalyptus torelliana F*		Introduced						✓		
Myrtaceae	*Metrosideros collina* (J. R. & G. Forst.) A. Gray	Vuga	Indigenous						✓		
Myrtaceae	*Pimenta racemosa* (Mill.) J. W. Moore	Bay rum tree	Introduced						✓		
Myrtaceae	*Psidium cattleianum* Sabine	strawberry guava	Introduced					✓	✓		
Myrtaceae	*Psidium guajava* L		Introduced					✓	✓	✓	

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Myrtaceae	*Syzygium amicorum* (A.Gray) Müll.Stuttg.		Endemic							✓	
Myrtaceae	*Syzygium amplifolium* Perry		Endemic						✓		
Myrtaceae	*Syzygium brackenridgei* (A. Gray) C. Muell.	Yasiyasi	Indigenous						✓		
Myrtaceae	*Syzygium confertiflorum* (A.Gray) Müll.Stuttg	Yasiyasi	Endemic							✓	
Myrtaceae	*Syzygium corynocarpum* (A. Gray) C. Muell.	Yasiyasi	Indigenous						✓	✓	
Myrtaceae	S*yzygium curvistylum* (Gillespie) Merr. & Perry	Yasi wai	Indigenous						✓	✓	
Myrtaceae	*Syzygium diffusum* (Turrill) Merr. & L.M.Perry	Yasi wai	Endemic							✓	
Myrtaceae	*Syzygium dubium* (L.M.Perry) A.C.Sm	Yasi wai	Endemic							✓	
Myrtaceae	*Syzygium effusum* (A. Gray) C. Muell.	Yasi wai	Indigenous						✓	✓	
Myrtaceae	*Syzygium fijiense* Perry	Yasiyasi	Endemic							✓	
Myrtaceae	*Syzygium gillespiei* Merr. & L.M.Perry	Yasiyasi	Endemic							✓	
Myrtaceae	*Syzygium gracilipes* (A. Gray) Merr. & Perry	Yasiyasi	Endemic						✓	✓	
Myrtaceae	*Syzygium grayi* (Seem.) Merr. & Perry	Yasiyasi	Endemic						✓	✓	
Myrtaceae	Syzygium jambos (L.) Alston	Yasiyasi	Introduced							✓	
Myrtaceae	*Syzygium leucanthum* Perry	Yasiyasi	Endemic						✓	✓	
Myrtaceae	*Syzygium longiflorus* (A. C. Sm.) Merr. &Perry	Yasiyasi	Endemic						✓		
Myrtaceae	*Syzygium malaccense* (L.) Merr. & Perry	Kavika	Indigenous					✓	✓		
Myrtaceae	*Syzygium minus* A.C.Sm.		Endemic							✓	
Myrtaceae	*Syzygium neurocalyx* (A. Gray) Christophersen	Leba	Indigenous					✓	✓	✓	
Myrtaceae	*Syzygium nidie* Guillaumin	Yasiyasi	Indigenous						✓	✓	
Myrtaceae	*Syzygium phaeophyllum* Merr. & L.M.Perry	Yasiyasi	Endemic							✓	
Myrtaceae	*Syzygium purpureum* (Perry) A. C. Sm	Yasiyasi	Endemic						✓	✓	
Myrtaceae	*Syzygium quadrangulatum* (A. Gray) Merr. & Perry	Yasiyasi	Indigenous						✓	✓	
Myrtaceae	*Syzygium seemannianum* Merr. & Per	Yasi wai	Endemic						✓	✓	✓
Myrtaceae	*Syzygium seemannii* (A. Gray) Merr. & Per	Yasiyasi	Endemic						✓		
Myrtaceae	*Syzygium spp.*		Indigenous	✓	✓	✓	✓				

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Myrtaceae	*Syzygium tetrapleurum* L.M.Perry	Yasiyasi	Endemic							✓	
Myrtaceae	*Syzygium wolfii* (Gillespie) Merr. & L.M.Perry	Yasiyasi	Endemic							✓	
Nyctaginaceae	*Ceodes umbellifera* J.R.Forst. & G.Forst.		Indigenous							✓	
Nyctaginaceae	*Mirabilis jalapa* L		Intorduced						✓		
Ochnaceae	*Brackenridgea nitida* A. Gray	Belebele	Endemic						✓		
Olacaceae	*Anacolosa lutea* Gillespie		Indigenous		✓	✓	✓		✓	✓	
Oleaceae	*Chionanthus vitiensis* (Seem.) A. C. Sm		Indigenous						✓		
Oleaceae	*Jasminum betchei* F. v. Muell.	Wa vatu	Indigenous						✓		
Oleaceae	*Jasminum didymum* For	Wa vula	Indigenous						✓	✓	
Oleaceae	*Jasminum simplicifolium* Forst.	Wa vatu	Indigenous						✓	✓	
Onagraceae	*Ludwigia octovalvis* (Jacq.) P.H.Raven		Indigenous						✓	✓	
Passifloraceae	*Passiflora suberosa* L	wild passion fruit	Indigenous						✓		
Phyllanthaceae	*Baccaurea pulvinata* A. C. Sm.	Midra	Endemic						✓	✓	
Phyllanthaceae	*Baccaurea seemannii* (Muell. Arg.) Muell. Arg.	Kutu, mono	Indigenous to Fiji and Nue						✓		
Phyllanthaceae	*Baccaurea stylaris* Muell. Ar	Midra	Endemic						✓		
Phyllanthaceae	*Bischofia javanica* Bl. Bijdr.	Koka	Indigenous					✓	✓	✓	✓
Phyllanthaceae	*Breynia disticha* J. R. & G. Forst.	Snowbush	Introduced						✓		
Phyllanthaceae	*Cleistanthus micranthus* Croizat		Endemic						✓		
Phyllanthaceae	*Glochidion anfractuosum* Gibbs	Dacia	Endemic						✓	✓	✓
Phyllanthaceae	*Glochidion atrovirens* A. C. S		Endemic						✓		
Phyllanthaceae	*Glochidion bracteatum* Gillespie		Endemic						✓		
Phyllanthaceae	*Glochidion concolor* Muell. Arg	Molau	Indigenous to Fiji and Tonga						✓	✓	✓
Phyllanthaceae	*Glochidion cordatum* Seem	Molau yalewa	Endemic						✓		

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Phyllanthaceae	*Glochidion seemannii* Muell. Ar	Molau	Endemic					✓	✓		
Phyllanthaceae	*Glochidion vitiense* (Muell. Arg.) Gillespie	Molau tagane	Endemic						✓	✓	
Phyllanthaceae	*Phyllanthus amarus* Schumach& Thonn.		Introduced								
Phyllanthaceae	*Phyllanthus amarus* Schumacher & Thonning		Introduced						✓		
Phyllanthaceae	*Phyllanthus urinaria* L.		Introduced								
Piperaceae	*Peperomia lasiostigma var. carnosa* C.DC		Endemic							✓	
Piperaceae	*Peperomia subroseispica* C.DC		Endemic							✓	
Piperaceae	*Peperomia vitilevuensis* Yuncker		Endemic						✓		
Piperaceae	*Piper aduncum* L.		Introduced						✓	✓	
Piperaceae	*Piper insectifugum* C.DC. ex Seem.		Indigenous							✓	
Piperaceae	*Piper oxycarpum C.DC.*	Yaqoyaqona	Endemic						✓		
Piperaceae	*Piper puberulum* (Benth.) Seem.		Indigenous						✓		
Piperaceae	*Piper stipulare* A. C. Sm		Endemic						✓		
Pittosporaceae	*Pittosporum arborescens* Rich ex A. Gray	Duva Kalou	Indigenous					✓	✓	✓	
Pittosporaceae	*Pittosporum pickeringii* A.Gray		Endemic							✓	
Pittosporaceae	*Pittosporum rhytidocarpum* A. Gray,	Duva Kalou	Endemic	✓			✓		✓	✓	
Polygalaceae	*Polygala paniculata* L		Indigenous						✓	✓	✓
Primulaceae	*Ardisia brackenridgei* (A. Gray) Mez		Endemic						✓		
Primulaceae	*Maesa insularis* Gillespie		Endemic						✓		✓
Primulaceae	*Maesa persicifolia* A. Gray	Kutu, kutumerase	Endemic						✓		
Primulaceae	*Maesa vitiensis* Seem.	Rogo	Endemic						✓		
Primulaceae	*Myrsine hadrocarpa* (A.C.Sm.) Ricketson & Pipoly		Endemic						✓		
Primulaceae	*Myrsine myricifolia A.Gray*	Dasia	Indigenous						✓		
Primulaceae	*Tapeinosperma ampliflorum* A. C. S		Endemic						✓		
Primulaceae	*Tapeinosperma capitatum* (A. Gray) Mez		Endemic						✓		
Primulaceae	*Tapeinosperma clavatum* Mez	Dasia	Endemic						✓		

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Primulaceae	*Tapeinosperma hornei* Mez	Dasia levu	Endemic	✓	✓				✓	✓	
Primulaceae	*Tapeinosperma megaphyllum* (Hemsl.) Mez	Dasia	Endemic						✓		
Proteaceae	*Kermadecia ferruginea* (A. C. Sm.) A. C. S (Syn: *Turrilla ferruginea*)	Kauceuti	Endemic				✓		✓	✓	
Proteaceae	*Kermadecia vitiensis* (Turrill) A. C. Sm	Kauceuti	Endemic						✓	✓	
Putranjivaceae	*Drypetes vitiensis* Croizat		Indigenous							✓	
Rhamnaceae	*Alphitonia franguloides* A.Gray	Doi damu	Endemic							✓	
Rhamnaceae	*Alphitonia zizyphoides* (Spreng.) A. Gray	Doi	Indigenous						✓	✓	
Rhamnaceae	*Colubrina asiatica* (L.) Brongn. Mem.	Vere	Indigenous						✓		
Rhamnaceae	*Commersonia bartramia* (L.) Merr.	Sama	Indigenous						✓	✓	
Rhamnaceae	*Emmenosperma micropetalum* (A. C. Sm.) M. Johnston	Tomanu	Endemic			✓	✓		✓		
Rhamnaceae	*Smythea lanceata* (Tul.) Summerhayes	Deni mana, vuso	Indigenous						✓		
Rhamnaceae	*Ventilago vitiensis* A. Gray	Vere	Indigenous						✓		
Rhizophoraceae	*Bruguiera gymnorrhiza* (L.) Lam. Tabl.	Dogo	Indigenous					✓	✓		
Rhizophoraceae	*Crossostylis harveyi* Benth.	Tiri Vanua	Endemic						✓		
Rhizophoraceae	*Crossostylis pedunculata* A.C.Sm.	Tiri Vanua	Endemic						✓		
Rhizophoraceae	*Crossostylis richii* (A. Gray) A. C. Sm	Tiri Vanua	Endemic						✓		
Rhizophoraceae	*Crossostylis seemannii* (A. Gray) Schimper	Tiri Vanua	Endemic			✓	✓		✓		✓
Rhizophoraceae	*Rhizophora samoensis* (Hochr.) Salvoza	Tiri	Indigenous					✓	✓		
Rhizophoraceae	*Rhizophora stylosa* Griffith	Tiri	Indigenous					✓	✓		
Rosaceae	*Rubus moluccanus* L	Wa vuka	Indigenous						✓		
Rubiaceaee	*Achilleanthus smithii* (Fosberg) J.G.Chavez (Syn: *Antirhea smithii*)	Dodolala	Endemic				✓		✓		
Rubiaceaee	*Airosperma trichotomum* (Gillespie) A. C. Sm	Masakawa	Endemic						✓		
Rubiaceaee	*Augusta vitiensis* (Seem.) J.H.Kirkbr.	Bore wai	Endemic						✓		
Rubiaceaee	*Calycosia macrocyatha* Fosberg	Lera ni veikau	Endemic						✓		
Rubiaceaee	*Cyclophyllum barbatum* (Forst. f.) A. C. Sm. & S. Darwin	Ola	Indigenous						✓		

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Rubiaceaee	*Dolicholobium latifolium* A. Gray	Soso ni Ura	Endemic					✓	✓	✓	
Rubiaceaee	*Dolicholobium macgregorii* Home ex Baker	Soso ni Ura	Endemic						✓	✓	
Rubiaceaee	*Dolicholobium oblongifolium* A. Gray	Soso ni Ura	Endemic						✓	✓	✓
Rubiaceaee	*Exallage lapeyrousei* (DC.) Neupane & N.Wikstr.		Indigenous						✓		
Rubiaceaee	*Gardenia gordonii* Baker	Drega	Endemic						✓		
Rubiaceaee	*Gardenia taitensis* DC.		Indigenous							✓	
Rubiaceaee	*Geophila repens* (L.) I. M. Johnston	Totodro	Indigenous						✓		
Rubiaceaee	*Guettarda speciosa L*	Bua ni baravi	Indigenous						✓		
Rubiaceaee	*Gynochthodes bucidifolia* (A.Gray) Razafim. & B.Bremer		Endemic						✓		
Rubiaceaee	*Gynochthodes epiphytica* (Rech.) A.C.Sm. & S.P.Darwin		Indigenous						✓		
Rubiaceaee	*Gynochthodes grayi* (Seem.) Razafim. & B.Breme		Endemic						✓		
Rubiaceaee	*Gynochthodes myrtifolia* (A.Gray) Razafim. & B.Bremer		Indigenous							✓	
Rubiaceaee	*Ixora arestantha* A. C. S	Sinu	Endemic						✓		
Rubiaceaee	*Ixora elegans* Gillespie	Sinu	Endemic						✓		
Rubiaceaee	*Ixora foetida (L.f.) Fosberg*	Sinu	Indigenous						✓		✓
Rubiaceaee	*Ixora longshanensis* Tao Chen	Sinu	Endemic						✓		
Rubiaceaee	*Ixora pelagica* Seem.	Sinu	Endemic						✓		
Rubiaceaee	*Mastixiodendron robustum* A. C.	Duvula	Endemic						✓		
Rubiaceaee	*Mitracarpus hirtus* (L.) DC.		Introduced						✓		
Rubiaceaee	*Morinda citrifolia* L	Noni, Kura	Indigenous						✓	✓	
Rubiaceaee	*Mussaenda raiateensis* J. W. Moore	Bovo	Indigenous						✓	✓	
Rubiaceaee	*Ophiorrhiza laxa* A. Gray		Endemic						✓		
Rubiaceaee	*Ophiorrhiza leptantha* A. Gray		Indigenous						✓		
Rubiaceaee	*Ophiorrhiza peploides* A. Gray	Lera damu	Endemic						✓	✓	✓
Rubiaceaee	*Psychotria archboldiana* Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria argantha* A.C.Sm		Endemic							✓	

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Rubiaceaee	*Psychotria brackenridgei* A. Gray		Endemic						✓		
Rubiaceaee	*Psychotria brevicalyx* Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria bullata* Seem		Endemic						✓		
Rubiaceaee	*Psychotria carnea* (Forst. f.) A. C. Sm.		Endemic						✓		
Rubiaceaee	*Psychotria confertiloba* A. C. Sm	Dava	Endemic						✓	✓	
Rubiaceaee	*Psychotria crassiflora* Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria eumorphanthus* Fosberg		Endemic								
Rubiaceaee	*Psychotria filipes* A. Gra		Endemic						✓		
Rubiaceaee	*Psychotria forsteriana* A. Gray		Indigenous						✓		
Rubiaceaee	*Psychotria furcans* Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria glabra* (Turrill) Fosberg		Endemic						✓	✓	
Rubiaceaee	*Psychotria gracilior* A.C.Sm.		Endemic							✓	
Rubiaceaee	*Psychotria impercepta* A. C. Sm. & S. Darwin		Endemic						✓		
Rubiaceaee	*Psychotria koroiveibaui* A. C. Sm		Endemic						✓		
Rubiaceaee	*Psychotria leptantha* A.C.Sm.		Endemic							✓	
Rubiaceaee	*Psychotria nandarivatensis* A. C. Sm.		Endemic						✓		
Rubiaceaee	*Psychotria oncocarpa* K. Schum.		Indigenous						✓		
Rubiaceaee	*Psychotria pickeringii* A. Gray		Endemic						✓		
Rubiaceaee	*Psychotria pittosporifolia* Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria platycocca* A. Gray		Endemic						✓		
Rubiaceaee	*Psychotria pubiflora* (A. Gray) Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria roseata* (Fosberg) A.C.Sm.		Endemic							✓	
Rubiaceaee	*Psychotria st.-johnii* Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria storckii* Seem.		Endemic						✓		
Rubiaceaee	*Psychotria tephrosantha* A. Gray		Endemic						✓		
Rubiaceaee	*Psychotria tetragonoides* Fosberg		Endemic						✓		

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Rubiaceaee	*Psychotria timonioides* Fosberg		Endemic						✓		
Rubiaceaee	*Psychotria turbinata* A. Gray		Endemic						✓	✓	
Rubiaceaee	*Psychotria vitiensis* Fosberg		Endemic							✓	
Rubiaceaee	*Psydrax odorata* (Forst. f.) A. C. Sm. & S. Darwin		Indigenous						✓	✓	
Rubiaceaee	*Spermacoce remota Lam*		Introduced						✓		
Rubiaceaee	*Tarenna sambucina* (Forst. f.) Durand ex Drake	Vakaruba ni Davui	Indigenous						✓	✓	
Rubiaceaee	*Tarenna seemanniana* A. C. Sm. & S. Darwin,		Endemic						✓		
Rubiaceaee	*Timonius affinis* A. Gray	Dogo ni Vanua	Indigenous						✓	✓	
Rubiaceaee	*Xanthophytum calycinum* (A.Gray) Benth. & Hook.f. ex		Indigenous						✓		
Rutaceae	*Citrus grandis* (L.) Osbeck		Introduced							✓	
Rutaceae	*Citrus maxima* (Burm.) Merr.	Moli kania	Introduced						✓	✓	
Rutaceae	*Euodia hortensis* J.R.Forst. & G.Forst.	Uci	Indigenous					✓			
Rutaceae	*Melicope capillacea* (Gillespie) A. C. S		Endemic						✓		
Rutaceae	*Melicope cucullata* (Gillespie) A.C.Sm.		Endemic							✓	
Rutaceae	*Micromelum minutum* (Forst. f.)	Qiqila	Indigenous						✓	✓	
Salicaceae	*Casearia longifoli*a A. C. Sm		Endemic						✓		
Salicaceae	*Casearia parhami*i A.C. Sm		Endemic						✓		
Salicaceae	*Casearia richii* A. Gray	Galo	Endemic						✓		
Salicaceae	*Flacourtia subintegra* A. C. Sm		Endemic						✓		
Salicaceae	*Flacourtia vitiensis* (Seem.) A. C. Sm		Endemic						✓		
Salicaceae	*Homalium nitens* Turrill	Molaca damu	Endemic						✓		
Salicaceae	*Homalium pallidum* A.C.Smith		Endemic	✓	✓					✓	
Salicaceae	*Homalium vitiense* Benth.	Molaca	Endemic						✓	✓	✓
Santalaceae	*Santalum yasi* Seem	Yasi	Indigenous						✓		
Sapindaceae	*Agatea violaris* A. Gray	Wa dregadrega	Endemic						✓		
Sapindaceae	*Allophylus timoriensis* (DC.)		Indigenous						✓		

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Sapindaceae	*Cardiospermum halicacabum* L		Indigenous							✓	
Sapindaceae	*Cupaniopsis vitiensis* Radlk.		Endemic						✓		
Sapindaceae	*Dodonaea viscosa* (L.) Jacq.		Indigenous							✓	
Sapindaceae	*Elattostachys apetala* (Labill.) Radlk.		Indigenous							✓	
Sapindaceae	*Elattostachys falcata* (A. Gray) Radlk.	Marasa	Indigenous						✓		
Sapindaceae	*Elattostachys venosa* A. C. Sm		Endemic						✓	✓	
Sapindaceae	*Guioa chrysea* A. C. Sm		Endemic						✓		
Sapindaceae	*Guioa rhoifolia* (A. Gray) Radlk.	Masa	Indigenous						✓		
Sapindaceae	*Koelreuteria elegans* (Seem.) A.C.Smith		Endemic							✓	
Sapindaceae	*Pometia pinnata* J.R. Forst. & G. Forst.		Indigenous					✓		✓	
Sapindaceae	*Sapindus vitiensis* A.Gray		Indigenous							✓	
Sapotaceae	*Burckella fijiensis* (Hemsl.) A. C. Sm. & S. Darwin		Endemic			✓			✓	✓	
Sapotaceae	*Burckella parvifolia* A. C. Sm. & S. Darwin		Endemic						✓		
Sapotaceae	*Burckella richii* (A.Gray) H.J.Lam		Indigenous			✓	✓			✓	
Sapotaceae	*Manilkara dissecta* (L. f.) Dubard	Bau sagali	Indigenous						✓		
Sapotaceae	*Manilkara smithiana* Lam& MaasGeester.	Bau bulu	Endemic						✓		
Sapotaceae	*Palaquium fidjiense* Pierre ex Dubard	Bau, bau vudi	Endemic	✓	✓				✓	✓	
Sapotaceae	*Palaquium hornei* (Hartog ex Baker) Dubard	Sacau	Endemic		✓		✓		✓	✓	
Sapotaceae	*Palaquium porphyreum* A. C. Sm. & S. Darwin	Bau vudi	Endemic						✓	✓	
Sapotaceae	*Palaquium vitilevuense* Gilly ex van Royen	Bau vudi	Endemic						✓		
Sapotaceae	*Planchonella membranacea* Lam	Sarosaro	Indigenous to Fiji and Tonga						✓		
Sapotaceae	*Planchonella smithii* (van Royen) A. C. Sm	Bau loa	Endemic						✓		
Sapotaceae	*Planchonella tahitensis* (Nadeaud) Pierre ex Dubard		Indigenous							✓	✓
Sapotaceae	*Planchonella vitiensis* Gillespie	Bau bulu	Endemic						✓	✓	

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Simaroubaceae	*Soulamea soulameoides* (A.Gray) Noot. (Syn: *Amaroria soulameoides*)	Vasa ni veikau	Endemic	✓	✓				✓	✓	✓
Smilacaceae	*Smilax vitiensis* (Seem.) A. DC. in DC. Monogr. Phan		Indigenous						✓	✓	
Solanaceae	*Cestrum nocturnum* L	Caucau ni bogi	Introduced						✓		
Solanaceae	*Physalis angulata* L	Kosipeli; Wild physallis	Introduced						✓		
Solanaceae	*Solanum americanum* Mill. Gard. D	Boro	Introduced						✓		
Solanaceae	*Solanum inamoenum* Benth.		Indigenous						✓		
Solanaceae	*Solanum torvum* Sw.	Prickly solanum	Introduced					✓	✓	✓	
Solanaceae	*Solanum vitiense* Seem,		Indigenous						✓		
Stemonuraceae	*Medusanthera vitiensis* Seem	lere, duvu	Endemic						✓	✓	
Symplocaceae	*Symplocos acuminata* (Blume) Miq.		Indigenous						✓		
Thymelaeaceae	*Gonystylus punctatus* A. C. Sm.	Mavota	Endemic	✓	✓	✓	✓		✓		
Thymelaeaceae	*Phaleria glabra* (Turrill) Domke		Indigenous to Fiji and Tonga						✓		
Thymelaeaceae	*Phaleria ixoroides* Fosberg	Tarutaru	Endemic						✓		
Urticaceae	*Elatostema tenellum* A. C. Sm		Introduced						✓		
Urticaceae	*Maoutia australis* Wedd.	Gala	Indigenous						✓		
Urticaceae	*Pilea microphylla* (L.) Liebm	gunpowder plant	Introduced						✓		
Urticaeae	*Cypholophus macrocephalus* var. *heterophyllus* Wedd.		Indigenous								✓
Urticaeae	*Dendrocnide harveyi* (Seem.) Chew	Salato	Indigenous						✓	✓	
Urticaeae	*Dendrocnide vitiensis* (Seem.) Chew	Salato	Indigenous						✓		
Urticaeae	*Elatostema seemannianum* A.C.Sm.	Beta	Endemic						✓		
Urticaeae	*Elatostema tenellum* A.C.Sm.		Endemic						✓	✓	
Urticaeae	*Elatostema vitiense* (Wedd.) A. C. Sm		Endemic						✓		✓
Urticaeae	*Elatostematoides australis* (Wedd.) Yu Hsin Tseng, A.K.Monro, Y.G.Wei & J.M.Hu		Endemic						✓		✓
Urticaeae	*Elatostematoides filicoides* (Seem.) Yu Hsin Tseng, A.K.Monro, Y.G.Wei & J.M.Hu		Endemic						✓		

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Urticaeae	*Leucosyke corymbulosa* (Wedd.) Wedd.		Indigenous						✓	✓	
Urticaeae	*Pipturus platyphyllus* Wedd.	tagica, rema and gala	Endemic						✓		
Urticaeae	*Procris goepeliana* (A. C. Sm.) A. C. Sm.		Endemic						✓		
Urticaeae	*Procris pedunculata* (J. R. & G. Forst.) Wedd	Tokai	Indigenous						✓		
Verbenaceae	*Lantana camara* L	Lanitana	Introduced						✓	✓	
Verbenaceae	*Premna protrusa* A. C. Sm. & S. Darwin	Yaro	Endemic			✓			✓	✓	
Verbenaceae	*Premna serratifolia* L	Yaro	Indigenous						✓	✓	
Verbenaceae	*Stachytarpheta urticifolia* (Salisb.) Sims	Blue rat's tail	Introduced						✓	✓	
Verbenaceae	*Stachytarpheta urticifolia* Sims		Introduced					✓			
Verbenaceae	*Vitex trifolia* L.	Yaro	Indigenous								✓
Angiosperms-Monocotyledons											
Agavaceae	*Cordyline fruticosa* (L.) Kunth	Vasili, Ti tree	Indigenous								✓
Amaryllidaceae	*Crinum asiaticum* L.		Indigenous					✓			
Araceae	*Alocasia macrorrhiza* (L.) Schott	Dalo ni tana	Introduced								✓
Araceae	*Colocasia esculenta* L.	Dalo ni tana	Introduced								✓
Araceae	*Epipremnum pinnatum* (L.) Engl.	Yalu	Indigenous								✓
Arecaceae	*Chrysalidocarpus lutescens* H. Wendl.	Golden cane plam	Introduced						✓		
Arecaceae	*Cyphosperma spp*	Undescribed taqa	Endemic						✓		
Arecaceae	*Cyphosperma tanga* (H.E. Moore) H.E. Moore	Taqa	Endemic						✓	✓	
Arecaceae	*Heterospathe phillipsii*	Niuniu; Navua Palm	Endemic	✓	✓	✓	✓				
Arecaceae	*Metroxylon vitiense* (H. Wendl.) H. Wendl. ex Hook. f	Fiji sago palm	Endemic					✓	✓	✓	✓
Arecaceae	*Veitchia joannis* H.Wendl.		Indigenous					✓			
Cyperaceae	*Carex graeffeana* Boeckeler		Indigenous						✓		
Cyperaceae	*Carex indica var. indica*		Indigenous						✓		
Cyperaceae	*Cyperus difformis* L.		Indigenous						✓		
Cyperaceae	*Cyperus iria* L.		Indigenous						✓		

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Cyperaceae	*Cyperus pilosus* Vahl		Indigenous						✓		
Cyperaceae	*Eleocharis dulcis (Burm.f.)* Trin. ex Hensch.		Indigenous						✓		
Cyperaceae	*Hypolytrum nemorum subsp. vitiense*(C.B. Clarke) T. Koyama		Indigenous						✓		
Cyperaceae	*Rhynchospora corymbosa* (L.) Britton		Indigenous						✓		
Cyperaceae	*Schoenoplectiella juncoides (Roxb.) Lye*		Indigenous						✓		
Cyperaceae	*Scirpodendron ghaeri* (Gaertn.) Merr.		Indigenous						✓		
Cyperaceae	*Scleria polycarpa* Boeck.		Indigenous						✓		
Flagellariaceae	*Flagellaria gigantea* Hook.		Indigenous						✓		✓
Flagellariaceae	*Flagellaria indica* L.		Indigenous					✓	✓		
Musaceae	*Musa sp.*		Introduced								
Orchidaceae	*Appendicula pendula* Bl. Bijdr.		Indigenous						✓		
Orchidaceae	*Bulbophyllum hassallii* Kores		Endemic						✓		
Orchidaceae	*Bulbophyllum hexarhopalos* Schlechter		Indigenous						✓		
Orchidaceae	*Calanthe hololeuca* Reichenb.		Indigenous						✓		
Orchidaceae	*Calanthe triplicata* (Willemet) Ames		Indigenous						✓		
Orchidaceae	*Cynorkis fastigiata* Thou.		Indigenous						✓		
Orchidaceae	*Dendrobium bifloruin* (Forst. f.)		Indigenous						✓		
Orchidaceae	*Dendrobium macrophyllum* A. Rich		Indigenous						✓		
Orchidaceae	*Dendrobium purpureum* Roxb. Fl.		Indigenous						✓		
Orchidaceae	*Dendrobium tokai* Reichenb. f. ex Seem.		Indigenous								
Orchidaceae	*Dendrolobium umbellatum* (L.) Benth.		Indigenous						✓		✓
Orchidaceae	*Eria rostrinora* Reichenb.		Indigenous						✓		
Orchidaceae	*Erythrodes parvula* Kores		Indigenous						✓		
Orchidaceae	*Eulophia megistophylla* Rchb.f.		Indigenous						✓		
Orchidaceae	*Glomera emarginata* Kores		Endemic						✓		
Orchidaceae	*Graptophyllum insularum* (A. Gray) A. C. Sm		Indigenous						✓		

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Orchidaceae	*Malaxis brevidentata* C. Schweinf.		Indigenous						✓		
Orchidaceae	*Malaxis imthurnii* (Rolfe) L. O. Williams		Endemic						✓		
Orchidaceae	*Malaxis longifolia* (Rolfe) L. O. WilliamsVicinity of Galoa		Endemic						✓		
Orchidaceae	*Malaxis resupinata* (Forst. f.) Kuntze		Indigenous						✓		
Orchidaceae	*Nervilia aragoana* Gaud. Voy		Indigenous						✓		
Orchidaceae	*Oberonia equitans* (Forst. f.) Mutel		Indigenous						✓		
Orchidaceae	*Phaius amboinensis Blume*		Indigenous						✓		
Orchidaceae	*Pseuderia smithiana* C. Schweinf.		Endemic						✓		
Orchidaceae	*Pseudovanilla anomala* (Ames & L. O. Williams) Garay		Endemic						✓		
Orchidaceae	*Robiquetia bertholdii* (Reichenb. f.) Schlechter		Indigenous						✓		
Orchidaceae	*Spathoglottis pacifica* Reichenb. f.		Indigenous								✓
Orchidaceae	*Taeniophyllum fasciola* (Forst. f.) Seem,		Indigenous						✓		
Orchidaceae	*Tropidia effusa* Reichenb.		Indigenous						✓		
Orchidaceae	*Vanilla planifolia* Jackson		Introduced						✓		
Pandanaceae	*Freycinetia caudata* Hemsl.	Wa me	Endemic						✓		
Pandanaceae	*Freycinetia demissa* Benn		Indigenous					✓			
Pandanaceae	*Freycinetia hombronii* Martelli	Wa me	Indigenous						✓		
Pandanaceae	*Freycinetia storckii* Seem.	Wa me	Indigenous						✓		✓
Pandanaceae	*Pandanus tectorius* Parkinson		Indigenous					✓			
Pandanaceae	*Pandanus whitmeeanus* Martelli	Vadra	Indigenous						✓		
Poaceae	*Arundo donax* L	Gasai ni valagi	Introduced					✓	✓	✓	✓
Poaceae	*Bambusa vulgaris* Schrader ex Wendl. Collect.	Bitu ni valagi	Introduced					✓	✓	✓	✓
Poaceae	*Cenchrus americanus* (L.) Morrone	Pearl Millet	Introduced						✓		
Poaceae	Cenchrus echinatus L.		Introduced					✓			
Poaceae	*Centosteca lappacea* (L.) Desv.		Introduced								✓
Poaceae	*Cyperus brevifolius* (Rottb.) Hassk.		Indigenous						✓		

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Poaceae	*Cyperus melanospermus* (Nees) Valck.Sur.		Introduced						✓		
Poaceae	*Cyperus mindorensis* (Steud.) Huygh		Indigenous						✓		
Poaceae	*Dichanthium caricosum* (L.) A. Camus	Nadi blue grass	Indigenous						✓		
Poaceae	*Digitaria ciliaris* (Retz.) Koeler		Introduced							✓	
Poaceae	*Digitaria fuscescens* (Presl) Henrard		Introduced						✓		
Poaceae	*Digitaria violascens* Link, Enum.		Introduced						✓		
Poaceae	*Echinochloa crus-galli* (L.) P.Beauv.		Introduced						✓		
Poaceae	*Eleocharis ochrostachys* Steudel		Indigenous						✓		
Poaceae	*Eleusine indica* (L.) Gaertn. Fruct.	Wire grass	Indigenous						✓	✓	
Poaceae	*Fimbristylis dichotoma* (L.) Vahl, Enum		Indigenous						✓		
Poaceae	*Gahnia javanica* Moritzi		Introduced						✓		
Poaceae	*Garnotia linearis* Swallen		Endemic						✓		
Poaceae	*Imperata conferta* (Presl) Ohwi		Indigenous						✓		
Poaceae	*Megathyrsus maximus* (Jacq.) B.K.Simon & S.W.L.Jacobs		Indigenous						✓		✓
Poaceae	*Miscanthus floridulus* (Labill.) Warb. ex K. Schum. & Lauterb.	Gasau	Indigenous					✓	✓	✓	✓
Poaceae	*Paspalum conjugatum* Berg.		Introduced								
Poaceae	*Paspalum distichum* L		Indigenous						✓	✓	
Poaceae	*Polytrias indica* (Houtt.) Veldkamp		Indigenous						✓		
Poaceae	*Sacciolepis indica* (L.) Chase		Indigenous						✓		
Poaceae	*Schaemum rugosum Salisb.*		Indigenous						✓		
Poaceae	*Schizostachyum glaucifolium* (Rupr.) Munro		Indigenous							✓	✓
Poaceae	*Setaria parviflora* (Poir.) Kerguélen	Co manivusi	Introduced						✓		
Poaceae	*Sporobolus indicus* (L.) R. Br. Prodr.		Indigenous					✓	✓		
Poaceae	*Stenotaphrum micranthum* (Desv.) Hubbard		Indigenous						✓		
Poaceae	*Stenotaphrum secundatum* (Walter) Kuntze,		Introduced						✓		
Poaceae	*Themeda quadrivalvis* (L.) Kuntze	Kangaroo grass	Introduced						✓		

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Zingiberaceae	*Alpinia boia Seem.*		Endemic						✓	✓	
Zingiberaceae	*Alpinia parksii* (Gillespie) A.C. Sm.		Endemic						✓	✓	
Fern and fern allies											
Acanthaceae	*Graptophyllum insularum* (A.Gray) A.C.Smith		Indigenous							✓	
Adiantaceae	Adiantum hornei Baker (endemic)		Indigenous								✓
Adiantaceae	Pteris ensiformis Burr.		Indigenous								✓
Aspidiaceae	*Blechnum orientale* L.		Indigenous					✓		✓	
Aspidiaceae	*Blechum pyramidatum* (Lam.) Urb.		Indigenous							✓	
Aspidiaceae	*Tectaria decurrens* (Presl.) Copel.		Indigenous								✓
Aspidiaceae	*Tectaria latifolia* (Forster)		Indigenous							✓	
Aspleniaceae	*Asplenium polyodon* Forster		Indigenous							✓	
Aspleniaceae	*Asplenium amboiense* Willd.		Indigenous								✓
Aspleniaceae	*Asplenium australasicum* Hooker		Indigenous							✓	✓
Aspleniaceae	*Asplenium nidus* L.		Indigenous					✓		✓	
Athyriaceae	*Diplazium esculentum* (Retz.) Sw.		Indigenous					✓			✓
Athyriaceae	*Diplazium proliferum* (Lam.) Thouars		Indigenous								✓
Blechnaceae	*Stenochlaena palustris* (Burm.f.) Bedd.		Indigenous								✓
Cyatheaceae	*Culcita straminea* (Labillardiere) Maxon		Indigenous							✓	✓
Cyatheaceae	*Cyathea affinis* (Forster) Swartz	Balabala	Indigenous							✓	
Cyatheaceae	*Cyathea alata* Copeland	Balabala	Indigenous							✓	
Cyatheaceae	*Cyathea hornei* (Baker) Copel.	Balabala	Indigenous							✓	
Cyatheaceae	*Cyathea lunulata* (G. Forst.) Copel	Balabala	Indigenous					✓		✓	✓
Cyatheaceae	*Cyathea sp.*	Balabala	Indigenous	✓		✓					
Cyatheaceae	*Cyathea truncata* (Brackenridge) Copeland	Balabala	Indigenous							✓	
Cyatheaceae	*Dicksonia brackenridgei* Mettenius	Balabala	Indigenous							✓	
Cyatheaceae	*Cyathea medullaris* Sw.	Balabala	Indigenous							✓	

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Cyatheaceae	*Cyathea propinqua* Mett.	Balabala	Endemic							✓	
Davalliaceae	*Nephrolepis biserrat*a (Swartz) Schott		Indigenous							✓	✓
Davalliaceae	*Davallia fejeensis* Hook.		Endemic								✓
Davalliaceae	*Davallia solida* Ogata		Introduced							✓	
Davalliaceae	*Nephrolepis hirsutula* (Forster) Presl		Indigenous							✓	✓
Equisetaceae	*Equisetum ramosissimum* Desf.		Indigenous							✓	
Gleicheniaceae	*Dicranopteris linearis* (Burmann)		Indigenous							✓	
Hymenophyllaceae	*Trichomanes boryanum* Kunze		Indigenous								✓
Hypolepidaceae	*Histiopteris incisa* (Thunberg) J.Smith		Indigenous							✓	
Lindsaeaceae	*Lindsaea ensifolia* Swartz		Indigenous							✓	
Lomariopsidaceae	*Bolbitis rivularis* (Brack.) Ching (endemic)		Indigenous								✓
Lomariopsidaceae	*Lommagramma polyphylla* Brack.		Indigenous								✓
Marattiaceae	*Marattia smithii Mettenius* ex Kuhn	Basovi	Indigenous							✓	
Marattiaceae	*Angiopteris evecta* (Forster) Hoffman	Basovi	Indigenous					✓		✓	✓
Polypodiaceae	*Belvisia mucronata* (Fee) Copeland		Indigenous							✓	
Polypodiaceae	*Drynaria rigidula* (Sw.) Bedd.		Indigenous								✓
Polypodiaceae	*Phymatosorus grossus* (Langsdorff et Fischer) Brownlie		Indigenous							✓	
Psilotaceae	*Psilotum nudum* (L.) Palisot de Beauvois		Indigenous							✓	
Schizaeaceae	*Lygodium reticulatum* Schkuhr		Indigenous							✓	✓
Selaginellaceae	*Selaginella beyinoides* Baker		Endemic								✓
Thelypteridaceae	*Christella harveyi* (Mettenius) Holttum		Indigenous							✓	
Thelypteridaceae	*Cyclosorus suprastrigosus* (Rosenst.) Copel.		Indigenous								✓
Thelypteridaceae	*Plesioneuron prenticei* (Carr.) Holtt. (endemic)		Endemic								✓
Thelypteridaceae	*Pronephrium rubinerve* (Mett.) Holtt.		Indigenous								✓
Thelypteridaceae	*Sphaerostephanos invisus* (Forst.) Holtt.		Indigenous								✓
Thelypteridaceae	*Sphaerostephanos unitus* (L.) Holtt.		Indigenous								✓

Family	Species	Fijian name/Common name	Origin	D1	D2	UD1	UD2	BI	FVN	ER	UNC
Vittariaceae	*Antrophyum alatum* Brack.		Indigenous								✓
Vittariaceae	*Vaginularia angustissima* (Brack.) Mett.		Indigenous								✓
Vittariaceae	*Vittaria elongata* Sw.		Indigenous								✓
Gymnosperms											
Araucariaceae	*Agathis macrophylla* (Lindl.) Mast.	Dakua makadre	Indigenous		✓		✓		✓	✓	
Podocarpaceae	*Acmopyle sahniana* Buchholz & N.E.Gray	Drautabua	Endemic							✓	
Podocarpaceae	*Dacrycarpus imbricatus*		Indigenous				✓				
Podocarpaceae	*Dacrycarpus imbricatus var. patulus* de Laubenfels		Indigenous						✓	✓	
Podocarpaceae	*Dacrydium nidulum* de Laubenfels		Indigenous						✓	✓	
Podocarpaceae	*Podocarpus affinis* Seem.		Endemic						✓	✓	
Podocarpaceae	*Podocarpus decipiens* N.E. Gray		Endemic							✓	
Podocarpaceae	*Podocarpus neriifolius* D.Don		Indigenous	✓	✓	✓	✓			✓	✓
Podocarpaceae	*Retrophyllum vitiense* (Seem.) C.N.Page		Indigenous						✓	✓	

Table 12 Flora data from Undisturbed Forest-Plot 1, Nabukelevu

Species	**No.**	**Trees >15 cm DBH**	**Trees >35 cm DBH**	**Relative Frequency (%)**	**Basal Area**	**Relative Dominance**
Calophyllum vitiense	28	26	13	13	121303	26
Syzygium spp.	27	24	9	13	108593	23
Myristica castaneifolia	18	11	3	8	33291	7
Garcinia myrtifolia	33	1	1	15	25969	6
Canarium vitiense	8	8	2	4	20222	4
Endospermum macrophyllum	4		2	2	19886	4
Parinari insularum	4	3		2	16585	4
Ficus storckii	9	8	1	4	16403	4

Species	No.	Trees >15 cm DBH	Trees >35 cm DBH	Relative Frequency (%)	Basal Area	Relative Dominance
Heritiera ornithocephala	5	5	2	2	12767	3
Gonystylus punctatus	3	2	1	1	9514	2
Dillenia biflora	6			3	9492	2
Kingiodendron platycarpum	3		1	1	8911	2
Firmiana diversifolia	1	1	1	0	6936	1
Burckella fijiensis	6			3	6748	1
Litsea sp.	10	3		5	6745	1
Gironniera celtidifolia	10	1		5	5646	1
Endiandra gillespiei	3	3		1	4999	1
Semecarpus vitiensis	3	2		1	3105	1
Myristica chartacea	2	2		1	2996	1
Dysoxylum sp. 1	2	1		1	2687	1
Ficus barclayana	2	2		1	2669	1
Alstonia pacifica	2	2		1	2512	1
Heterospathe phillipsii	6	0		3	2292	0
Cryptocarya turrilliana	1	1		0	2289	0
Podocarpus neriifolius	2	1		1	2277	0
Cyathea sp.	1	1		0	1963	0
Degeneria vitiensis	2	1		1	1523	0
Pagiantha thurstonii	2	0		1	1068	0
Anacolosa lutea	1	1		0	1017	0
Premna protrusa	1	1		0	1017	0
Dysoxylum sp. 2	1	1		0	1017	0
Cyathocalyx sp.	2	0		1	995	0

Species	No.	Trees >15 cm DBH	Trees >35 cm DBH	Relative Frequency (%)	Basal Area	Relative Dominance
Plerandra pickeringii	2	0		1	995	0
Aglaia sp.	1	0		0	804	0
Crossostylis seemannii	1	0		0	615	0
Storckiella vitiensis	1	0		0	452	0
Burckella richii	1	0		0	380	0
Garcinia pseudoguttifera	1	0		0	314	0
Saurauia rubicunda	1	0		0	314	0
TOTAL	216	112 (52%)	37 (17%)	100	467311	100

Table 13 Flora data from Undisturbed Forest-Plot 2, Nabukelevu

Species	No.	Trees DBH >15 cm	Trees DBH >35 cm	Relative Frequency (%)	Basal Area	Relative Dominance
Agathis macrophylla	14	9	4	6	87,414	19
Calophyllum vitiense	22	17	4	9	85,813	19
Myristica castaneifolia	48	31	6	20	83,609	18
Syzygium spp.	16	15	8	7	65,585	14
Garcinia myrtifolia	21	14	1	9	26,737	6
Endospermum macrophyllum	3	2	2	1	10,434	2
Canarium vitiense	9	7		4	10,192	2
Gonystylus punctatus	7	4	1	3	8,368	2
Parinari insularum	2	2	1	1	7,175	2
Heritiera ornithocephala	3	2		1	6,208	1
Endiandra gillespiei	4	4		2	6,151	1
Elaeocarpus sp.	4	4		2	4,537	1
Macaranga graeffeana	4	3		2	4,164	1

Species	No.	Trees DBH >15 cm	Trees DBH >35 cm	Relative Frequency (%)	Basal Area	Relative Dominance
Aglaia sp.	5	2		2	3,548	1
Plerandra pickeringii	5	3		2	3,435	1
Niuniu	8	1		3	3,379	1
Ficus storckii	8	1		3	3,313	1
Garcinia pseudoguttifera	3	2		1	3,278	1
Anacolosa lutea	5	3		2	3,215	1
Endiandra elaeocarpa	2	6		1	3,197	1
Xylopia sp	3	2		1	3,058	1
Degeneria vitiensis	1	1		0	2,826	1
Cerbera manghas	3	1		1	2,782	1
Buchanania attenuata	2	2		1	2,273	0
Burckella richii	4	1		2	2,163	0
Turrilla ferruginea	1	1		0	2,123	0
Saurauia rubicunda	4	1		2	1,981	0
Pagiantha thurstonii	1	1		0	1,963	0
Podocarpus neriifolius	2	1		1	1,765	0
Storckiella vitiensis	2	1		1	1,708	0
Litsea sp.	4	0		2	1,388	0
Dysoxylum sp.	1	1		0	1,256	0
Palaquium hornei	1	1		0	1,256	0
Gironniera celtidifolia	3	0		1	1,080	0
Kingiodendron platycarpum	2	0		1	832	0
Emmenosperma micropetalum	1	0		0	615	0
Crossostylis seemannii	1	0		0	452	0

Species	No.	Trees DBH >15 cm	Trees DBH >35 cm	Relative Frequency (%)	Basal Area	Relative Dominance
Antirhea smithii	1	0		0	452	0
Trichospermum richii	1	0		0	452	0
Alangium vitiense	1	0		0	380	0
Dacrycarpus imbricatus	1	0		0	314	0
Pittosporum rhytidocarpum	1	0		0	314	0
Semecarpus vitiensis	1	0		0	314	0
	235	146 (62%)	27 (11%)	100	461,499	100

Table 14 Flora data from Disturbed Forest-Plot 1, Nabukelevu

Species	No.	Trees DBH >15 cm	Trees DBH >35 cm	Relative Frequency (%)	Basal Area	Relative Dominance
Calophyllum vitiense	16	15	2	11	24,219	13
Garcinia myrtifolia	18	9		12	18,272	10
Gonystylus punctatus	8	7	1	5	16,934	9
Myristica castaneifolia	11	7		8	11,442	6
Syzygiu spp.	9	5		6	10,501	6
Palaquium fidjiense	6	6		4	10,211	5
Canarium harveyi	7	7		5	9,643	5
Endospermum macrophyllum	1	1	1	1	6,936	4
Neuburgia corynocarpa	7	3		5	6,880	4
Xylopia sp	3	3		2	6,173	3
Barringtonia edulis	2	2		1	5,919	3
Parinari insularum	6	4		4	5,570	3
Homalium pallidum	5	2		3	4,993	3
Kingiodendron platycarpum	3	2		2	4,754	3

Species	No.	Trees DBH >15 cm	Trees DBH >35 cm	Relative Frequency (%)	Basal Area	Relative Dominance
Semecarpus vitiensis	2	2		1	4,584	2
Heritiera ornithocephala	1	1	1	1	4,069	2
Buchanania attenuata	1	1		1	3,215	2
Litsea sp.	5	2		3	2,948	2
Cerbera manghas	3	2		2	2,854	2
Podocarpus neriifolius	2	2		1	2,462	1
Trichospermum richii	1	1		1	2,462	1
Dillenia biflora	3	1		2	2,402	1
Storckiella vitiensis	1	1		1	2,289	1
Alstonia vitiensis	2	2		1	2,277	1
Saurauia rubicunda	3	3		2	2,038	1
Ficus storckii	2	1		1	1,834	1
Atuna racemosa	3	1		2	1,539	1
Amaroria soulameoides	4	4		3	1,473	1
Alangium vitiense	1	1		1	1,385	1
Cyathea sp	1	1		1	1,256	1
Pagiantha thurstonii	1	1		1	1,256	1
Tapeinosperma hornei	1	1		1	1,017	1
Cyathocalyx sp.	2	0		1	766	0
Terminalia sp.	1	0		1	531	0
Dysoxylum sp.	1	1		1	452	0
Niuniu	1	0		1	452	0
Aglaia sp.	1	0		1	380	0
Pittosporum rhytidocarpum	1	1		1	314	0

Species	No.	Trees DBH >15 cm	Trees DBH >35 cm	Relative Frequency (%)	Basal Area	Relative Dominance
	146	103 (71%)	5 (3%)	100	186,702	100

Table 15 Flora data from Disturbed Forest-Plot 2, Nabukelevu

Species	No.	Trees DBH > 15cm	Trees DBH> 30 cm	Relative Frequency (%)	Basal Area	Relative Dominance
Calophyllum vitiense	28	11	1	19	30,258	25
Parinari insularum	4	4	2	3	16,536	13
Myristica castaneifolia	13	4		9	8,484	7
Palaquium hornei	3	3	1	2	6,943	6
Gonystylus punctatus	6	4		4	5,574	5
Trichospermum richii	4	3		3	5,037	4
Buchanania attenuata	3	3		2	4,500	4
Cerbera manghas	7	1		5	4,098	3
Syzygiu spp.	5	1		3	3,865	3
Garcinia myrtifolia	7	1		5	3,624	3
Palaquium fidjiense	6	1		4	2,908	2
Agathis macrophylla	2	1		1	2,905	2
Pagiantha thurstonii	4	1		3	2,619	2
Amaroria soulameoides	5	1		3	2,462	2
Canarium harveyi	5	1		3	2,371	2
Litsea sp.	5	0		3	2,201	2
Cyathocalyx sp.	4	1		3	2,148	2
Dysoxylum sp.	1	1		1	1,963	2
Podocarpus neriifolius	3	2		2	1,824	1
Homalium pallidum	3	0		2	1,762	1

Species	No.	Trees DBH > 15cm	Trees DBH> 30 cm	Relative Frequency (%)	Basal Area	Relative Dominance
Niuniu	5	0		3	1,486	1
Saurauia rubicunda	4	0		3	1,388	1
Gnetum gnemon	2	1		1	1,118	1
Anacolosa lutea	2	0		1	1,061	1
Kingiodendron platycarpum	2	1		1	1,021	1
Heritiera ornithocephala	2	0		1	832	1
Alangium vitiense	1	1		1	707	1
Neuburgia corynocarpa	1	1		1	707	1
Tapeinosperma hornei	1	1		1	707	1
Dillenia biflora	2	0		1	628	1
Alstonia vitiensis	1	0		1	452	0
Semecarpus vitiensis	1	0		1	452	0
Aglaia sp.	1	1		1	380	0
Macaranga harveyana	1	0		1	314	0
	144	50 (35%)	4 (3%)	100	123,335	100

Appendix 2. Google Map of point-count transect line for the Bird Survey

Figure 18 Map of transects used in bird surveys

Table 16 Location of transects used for bird surveys

GPS Coordinates		
Transect Line 1	– Start: 18, 05' 44.16 S	177, 54'03.73 E, Elevation 315m
Transect Line 1	– End: 18, 06' 29.61" S	177, 52' 34.37" E, Elevation 286m
Transect Line 2	– Start: 18, 08' 00.02" S	177, 53' 45.64" E, Elevation 132m
Transect Line 2	– End: 18, 08' 27.48" S	177, 52' 06.43" E Elevation 173m

Appendix 3 - Bird Species recorded at Nabukelevu

Table 17 Bird species data from Nabukelevu. Names and taxonomic order of birds follow the checklist in Watling (2001)

ENGLISH NAME	FIJIAN NAME	*SCIENTIFIC NAME*	STATUS	IUCN LISTING	ABUNDANCE CATEGORY	NO. RECORDED	10-HOUR ABUNDANCE INDEX
Forest birds							
Fiji goshawk	Reba	*Accipiter rufitorques*	Fiji endemic		Fairly common	3	4.3
Pacific harrier	Manu levu	*Circus approximans*			Not recorded	0	0.0
White-throated pigeon	Soqeloa	*Columba vitiensis*			Not recorded	0	0.0
Friendly ground dove	Qilu	*Gallicolumba stairi*		Vulnerable	Uncommon Very	2	2.8
Barking pigeon	Soqe	*Ducula latrans*	Fiji endemic		common	34	48.4
Many-coloured fruit dove	Kulavotu	*Ptilinopus perousii*	Regional endemic (Fiji, Tonga and Samoa)		Uncommon	2	2.8
Golden dove	Buneko	*Ptilinopus luteovirens*	Viti Levu endemic		Common	14	19.9
Collared lory	Kula	*Phigys solitarius*	Fiji endemic		Very common	15	21.4
Red-throated lorikeet	Kulawai	*Charmosyna amabilis*	Fiji endemic	Critically Endangered	Not recorded	0	0.0
Masked shining parrot	Kaka	*Prosopeia personata*	Viti Levu endemic	Vulnerable	Very common	30	42.7
Fan-tailed cuckoo	Todi	*Cacomantis flabelliformis*			Fairly common	3	4.3
White-rumped swiftlet	Kakabace	*Aerodramus spodiopygius*			Common	9	12.8
Collared kingfisher	Lesi	*Todiramphus chloris*			Common	6	8.5
Fiji woodswallow	Vukase	*Artamus mentalis*	Fiji endemic		Fairly common	3	4.3
Polynesian starling	Vocea	*Aplonis tabuensis*			Common	7	10.0

ENGLISH NAME	FIJIAN NAME	*SCIENTIFIC NAME*	STATUS	IUCN LISTING	ABUNDANCE CATEGORY	NO. RECORDED	10-HOUR ABUNDANCE INDEX
Island thrush	Tola	*Turdus poliocephalus*			Common	13	18.5
Fiji bush-warbler	Manu	*Cettia ruficapilla*	Fiji endemic		Very common	48	68.4
Long-legged warbler		*Trichocichla rufa*	Fiji endemic	Endangered	Not recorded	0	0.0
Scarlet robin	Diriqwala	*Petroica multicolor*			Not recorded	0	0.0
Streaked fantail	Sasaira	*Rhipidura spilodera*			Common	10	14.2
Slaty monarch	Sasaira	*Mayrornis lessoni*	Fiji endemic		Common	7	10.0
Lesser shrikebill	Digisau	*Clytorhynchus vitiensis*			Common	9	12.8
Black-faced Shrikebill	Kiro	*Clytorhynchus nigrogularis*	Fiji endemic	Near Threatened	Fairly common	3	4.3
Vanikoro broadbill	Matayalo	*Myiagra vanikorensis*			Fairly common	3	4.3
Blue-crested broadbill	Batidamu	*Myiagra azureocapilla*	Fiji endemic		Common	8	11.4
Golden whistler	Ketedromo	*Pachycephala pectoralis*			Common Very	10	14.2
Polynesian triller	Manusa	*Lalage maculosa*			common Very	36	51.3
Fiji white-eye	Qiqi	*Zosterops explorator*	Fiji endemic		common	72	102.6
Silvereye	Qiqi	*Zosterops lateralis*			Not recorded	0	0.0
Fiji parrotfinch	Qiqikula	*Erythrura pealii*	Fiji endemic		Common	11	15.7
Pink-billed parrotfinch	Sitibatitabua	*Erythrura kleinschmidti*	Viti Levu endemic	Vulnerable	Uncommon	2	2.8
Orange-breasted myzomela	Delakula	*Myzomela jugularis*	Fiji endemic		Very common	24	34.2

ENGLISH NAME	FIJIAN NAME	*SCIENTIFIC NAME*	STATUS	IUCN LISTING	ABUNDANCE CATEGORY	NO. RECORDED	10-HOUR ABUNDANCE INDEX
Wattled honeyeater	Kikau	*Foulehaio carunculata*			Very common	58	82.6
Giant forest honeyeater	Sovau	*Gymnomyza viridis*		Vulnerable	Very common	48	68.4
Non-forest birds							
Pacific black duck	Ganiviti	*Anas superciliosa*			Not	2 seen	0.0
					recorded	seen	
Eastern reef heron	Belo	*Egretta scara*			Not recorded	1 seen	0.0
Peregrine falcon	Gãnivatu	*Falco peregrinus*	Regional endemic race		Not recorded	0	0.0
Introduced birds							
Spotted dove					Not recorded	2 seen	0.0
Common mynah	Maina	*Acridotheres tristis*			Not recorded	2 seen	0.0
Jungle myna	Maina ni veikau	*Acridotheres fuscus*			Uncommon	2	2.8
Red-vented bulbul	Bulbul	*Pycnonotus cafer*			Common	12	17.1
Red avadavat	Siti	*Amandava amandava*			Not recorded	4 seen	0.0

Appendix 4 - Summary of Bird Species Observed at Nabukelevu

Site name (text): Nabukelevu
Island (text): Serua, Viti Levu
Date of first obs. session: 3/Jan/23
Date of last obs. session: 4/Jan/23
Total observation hours: 7.0
Team members Vilikesa Masibalavu, Eparama Navale

Table 18 Summary of bird species abundance observed at Nabukelevu

English name	Total records	10-hr Abun. Index	Abundance category
Pacific pigeon	0	0.0	Not recorded
Eastern reef heron	0	0.0	Not recorded
Fiji goshawk	3	4.3	Fairly common
Peregrine falcon	0	0.0	Not recorded
Pacific harrier	0	0.0	Not recorded
White-throated pigeon	0	0.0	Not recorded
Friendly ground dove	2	2.8	Uncommon
Spotted dove	0	0.0	Not recorded
Barking pigeon	34	48.4	Very common
Many-col. fruit-dove	2	2.8	Uncommon
Golden dove	14	19.9	Common
Collared lory	15	21.4	Very common
Crimson-crown fruit dove	0	0.0	Not recorded
Masked shining parrot	30	42.7	Very common
Fan-tailed cuckoo	3	4.3	Fairly common
White-rumped swiftlet	9	12.8	Common
Collared kingfisher	6	8.5	Common
Pacific swallow	0	0.0	Not recorded
Fiji woodswallow	3	4.3	Fairly common
Polynesian starling	7	10.0	Common
Common mynah	0	0.0	Not recorded
Jungle mynah	2	2.8	Uncommon
Red-vented bulbul	12	17.1	Common
Island thrush	13	18.5	Common
Fiji bush-warbler	48	68.4	Very common
Long-legged warbler	0	0.0	Not recorded
Scarlet robin	0	0.0	Not recorded
Streaked fantail	10	14.2	Common
Slaty monarch	7	10.0	Common
Lesser shrikebill	9	12.8	Common
Black-faced shrikebill	3	4.3	Fairly common
Vanikoro broadbill	3	4.3	Fairly common

English name	Total records	10-hr Abun. Index	Abundance category
Blue-crested broadbill	8	11.4	Common
Golden whistler	10	14.2	Common
Polynesian triller	36	51.3	Very common
Fiji white-eye	72	102.6	Very common
Silvereye	0	0.0	Not recorded
Fiji parrotfinch	11	15.7	Common
Pink-billed parrotfinch	2	2.8	Uncommon
Red avadavat	0	0.0	Not recorded
Orange-br. myzomela	24	34.2	Very common
Wattled honeyeater	58	82.6	Very common
Giant forest honeyeater	48	68.4	Very common

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