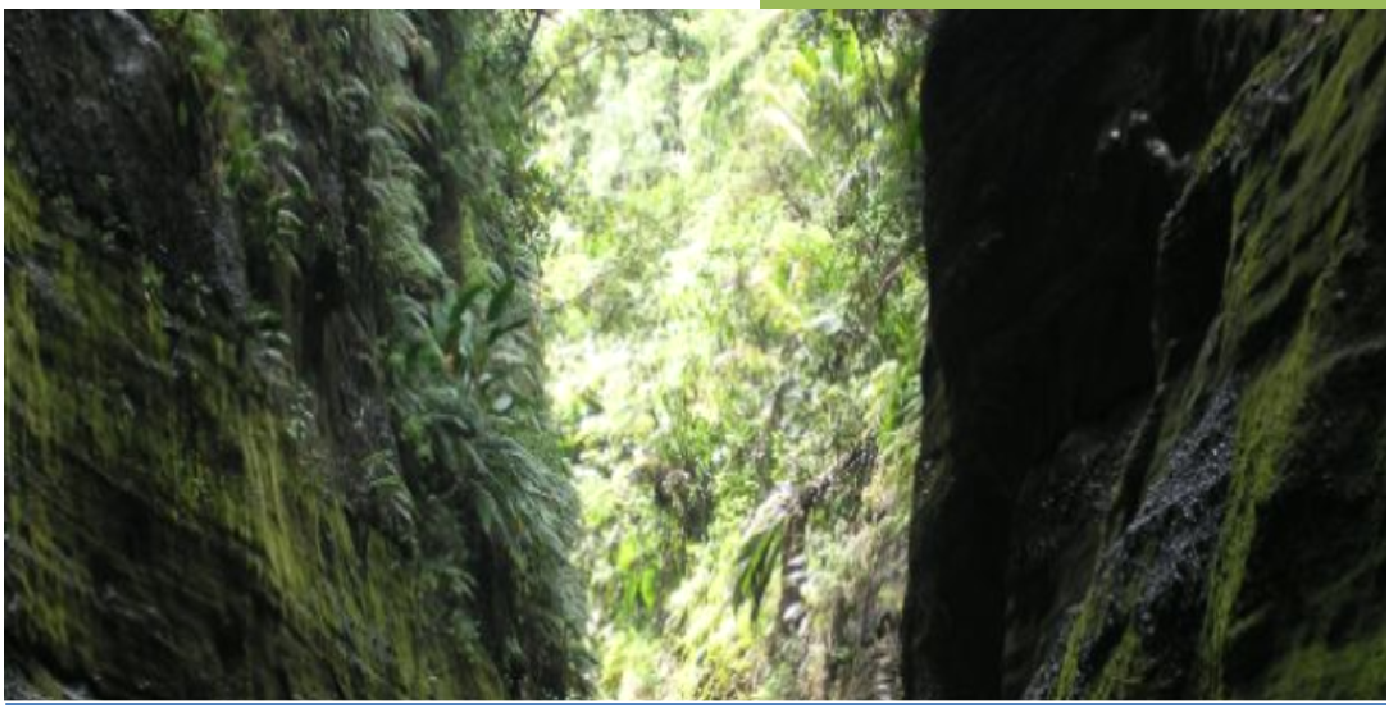
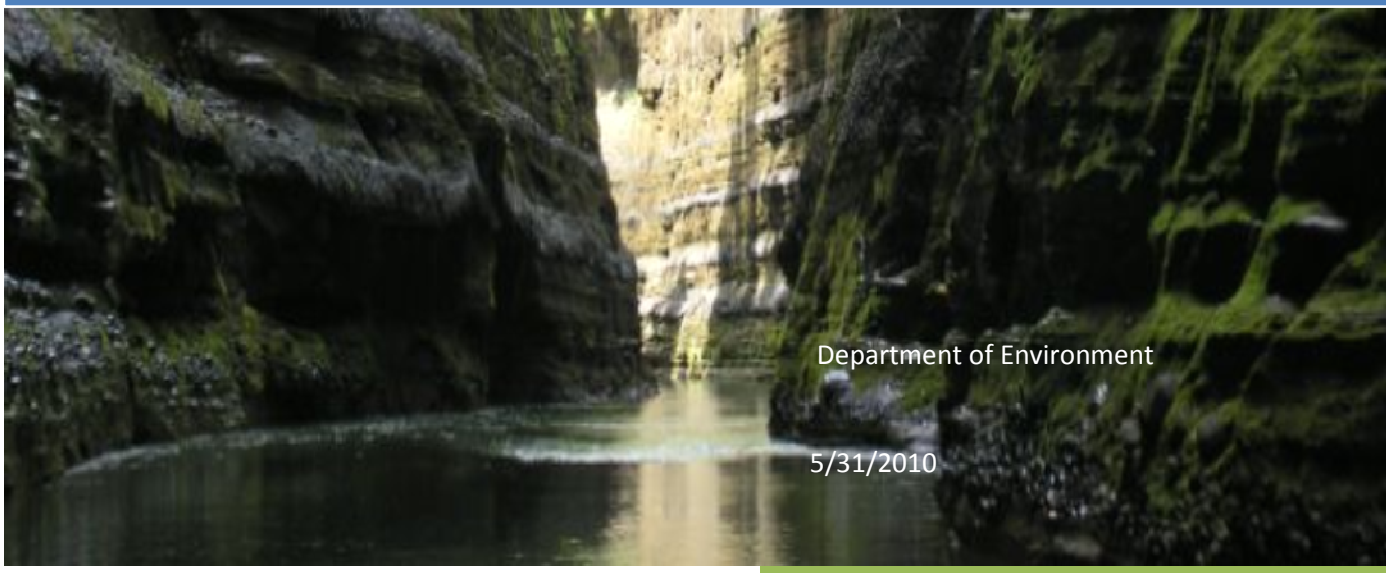
DEPARTMENT OF ENVIRONMENT FIJI

2010



Fiji's Fourth National Report to the United Nations Convention on Biological Diversity



Department of Environment

5/31/2010

Contents

ACRONYMS

ADB	Asian Development Bank
BI	Birdlife International
BOD	Biological Oxygen Demand
BSC	Biodiversity Steering Committee
CBD	Convention on Biodiversity
CI	Conservation International
DoE	Department of Environment
DP	Development Plan
DP 9	Development Plan 9
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ESCAP	Economic and Social Commission for Asia and the Pacific
FAB	Fijian Affairs Board
FIT	Fiji Institute of Technology
FNBSAP	Fiji National Biodiversity Strategy and Action Plan
FLMMA	Fiji Locally Managed Marine Area Network
IAS	Institute of Applied Science, University of the South Pacific
FTDP	Fiji Tourism Development Plan
ICMC	Integrated Coastal Management Committee
IUCN	International Union Conservation of Nature
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-government Organization
NIWA	National Institute of Water & Atmospheric Research
NFMV	NatureFiji-MareqetiViti
NLTB	Native Land Trust Board
PAC	Protected Area Committee
SPACHEE	South Pacific Action Committee on Human Ecology and the Environment
SPC	South Pacific Community
SPREP	South Pacific Regional Environment Programme
USP	University of the South Pacific
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

This report has been prepared by the Republic of the Fiji Islands for the Convention on Biological Diversity (CBD) as required by Article 6 of the Convention.

This fourth national report covers the period from 2001-2009 and aims to:

- analyze the status, trends and threats to biodiversity
- outline the current status of implementation of the national biodiversity strategies and action plans
- review sectoral and cross-sectoral integration or mainstreaming of biodiversity considerations.
- assess the progress towards the 2010 biodiversity targets and the goals and objectives of the strategic plan

Included and attached to the reports are appendix documents which are relevant to the report.

Chapter 1: is an analysis of the status of biodiversity in Fiji, trends and threats to biodiversity. Fiji is a natural resource based economy that thrives on exploitation of natural resources as the main key for economic development. Land and marine based natural resources have been harvested for exports to improve Fiji's foreign reserves for national economic development. There are downturns to all of these activities. Habitat destruction in the coastal areas for tourism development is a major threat to Fiji's biodiversity in the mangrove, estuaries, reef and foreshore ecosystems. Unplanned and uncoordinated tourism activities can become a major threat to Fiji's biodiversity. To facilitate tourism development, infrastructure and basic amenities have to be improved to cater for all the different facets of economic activities emanating out from the tourism sector in Fiji. All these developments by the different sectors have accumulated impacts that are stressing Fiji's biodiversity leading to the loss of important ecosystems. Invasive species is another threat that is posing problems to Fiji's biodiversity. Most of Fiji's endemic species are threatened from native and introduced invasive species. As highlighted in the report threatened species have been identified in Fiji, and programs initiated to address the problems associated with threatening invasive species. There are some new found species also, which relevant stakeholders are working tremendously hard to preserve and multiply.

Chapter 2: of the report investigates the status of NBSAP implementation in Fiji. The FNBSAP was completed in 1999 and endorsed by Cabinet in 2003. Assessing the actions and objectives of the FNBSAP, highlights that a lot of work has been done to implement the FNBSAP, this is witnessed by initiatives from government and non-government agencies and the different work programs implemented in the

communities. However, gaps exist in the assessment of programs and policies to gauge their effectiveness in terms of halting biodiversity loss. The FNBSAP in its current form does not have clear demarcation of roles for the different stakeholders. In 2009 a review of the FNBSAP saw the development of a results framework and implementation framework with annual action plan for priority areas, which will be reviewed quarterly, and new annual priorities established in the last quarterly review. Realizing the objectives of the NBSAP has been slow and hampered by a lack of capacity. The **National Capacity Self-Assessment (NCSA)** project was designed to gather information that would be useful in determining how best to implement the national action plan. The key weaknesses identified through this project assisted in the selection of priorities to be addressed and the framework to be followed, which has been addressed through the review of FNBSAP in 2009.

Chapter 3: In terms of mainstreaming, Fiji is a leader in the region enabled by the fact that a few of the world renowned conservation organizations are based in Fiji. Inclusion of environmental and biodiversity in Fiji's national and line policies has seen a number of government agencies working together in conservation programs or on the sustainable use of natural resources. The departments of Fisheries, Forestry, Agriculture, Tourism and Town planning along with non-government agencies have collaborated in programs and initiatives such as FLMMA, SOVI basin and Bouma conservation programs in Taveuni and Kubulau. There is a need to strengthen these collaborations and to ensure that legislations and policies of each organization compliment that of another to avoid duplication, wastage of resources and increasing effectiveness. A gap analysis study is vital to identify all legislations, policies, programs and initiatives incorporating biodiversity conservation and to determine their relevance and to identify ways for complimentary efforts at the same time establishing the gaps and areas that needs strengthening.

Considerations of implementation efforts in different sectors and across-sectors have been included in this report as well. Available information shows that environmental issues and biodiversity have been considered and integrated into appropriate national plans and policies. Some outcomes have been recorded as well. Success hinges on c**ollaboration and networking** between stakeholders. NGOs are playing an important and active role in this area and should be encouraged to share their findings. A **centralized inventory** of reports and information (may be kept by DoE) would bring more cohesion. It is envisaged that with the new framework and priorities in place, implementation of the NBSAP for Fiji will progress more quickly and will arrest the decline in biodiversity.

Chapter 4: concludes the report with a summary on the progress towards the 2010 targets. Overall Fiji needs analysis to technically highlight its achievements towards the 2010 targets. Judging from activities undertaken by different government and non-government organizations, Fiji has achieved a few targets. The achievement by Fiji is due to the collaborative work by relevant stakeholders from government and non-government organizations. At this juncture, contributions from the communities is worth mentioning as they have been working tirelessly managing

their own fishing and terrestrial areas. This has surely contributed immensely to the achievements of the CBD targets.

INTRODUCTION

The NBSAP is evidence of Fiji's commitment to the following features of the Convention in recognition:

- of national sovereignty over biodiversity and biological resources
- that biodiversity is essential to our planetary life support systems and that it makes an important contribution to the economy of our nation
- of the role of indigenous and local communities in protecting biodiversity
- that the Convention promotes the fair and equitable sharing of the benefits arising from the use of genetic resources.

Article 26 of the Convention states that the objective of national reporting is to provide information on measures taken for the implementation of the Convention and effectiveness of these measures[1]. Fiji has therefore shown its commitment to sustainably and effectively manage its environment by adhering to the obligations of the Convention.

One of the obligations of the Parties when preparing its fourth National Report is to highlight the following:

- outcomes and impacts of actions or measures taken to implement the Convention
- success stories and case studies if any
- major obstacles encountered in implementation
- actions that need to be taken to enhance implementation

Fiji has also ratified other related Conventions to enhance the sustainable management of its environment such as:

- Convention on International Trade in Endangered Species (CITES) in 1997
- Convention on Wetlands (RAMSAR)
- Convention to Combat Desertification
- Framework Convention on Climate Change

Other conventions are discussed later in this report.

Apart from these international commitments Fiji has been included in a number of regional initiatives and strategies developed by Pacific island nations including those that are linked to the conservation and sustainable use of biological diversity. These include:

[1] www.cbd.org

- The Pacific Plan – The Auckland Declaration of April 2004 saw Pacific Forum Leaders agreeing to the development of a 'Pacific Plan' with the goal to '*Enhance and stimulate economic growth, sustainable development, good governance and security for Pacific countries through regionalism"*[2]. In this Plan there is an overt reference to '*Improved Natural Resource Management and Environmental Management*' and in Strategic Objective No.5, with initiatives being promoted for the first three years in: sustainable development, fisheries, forestry, coastal waters, waste management, energy, freshwater management, biodiversity and climate change.

- The 'Action strategy for Nature Conservation in the Pacific Islands Region' developed by the Roundtable for Nature Conservation was the result of the 7th Conference on Nature Conservation & Protected Areas, held in 2002. Its mission is to '*protect and conserve the rich natural and cultural heritage of the Pacific Islands forever for the benefit of the people of the Pacific and the world'*[3]. A revised strategy for 2008-2012 was discussed at the Alotau Conference in October 2007.

There have been other regional initiatives relevant to the conservation and sustainable use of biodiversity which Fiji is a party to such as the:

- Pacific Invasive Initiative (PII)
- Pacific Island Learning Network (PILN)
- Coral Reef Initiative for the Pacific (CRISP)
- Locally Managed Marine Areas Initiative (LMMA)
- Pacific Biodiversity Information Forum (PBIF)[4]

There have also been initiatives at the national level such as the Environment Management Act 2005 specifically focused on conservation and sustainable use of biodiversity in Fiji.

Sectoral and cross-sectoral integration or mainstreaming of various aspects of biodiversity is regarded as vital to Fiji's context. Specific considerations such as conservation, training and sharing of information and inventories would help consolidate Fiji's efforts.

[2] The Pacific Plan, 2005, p.3
[3] Action Strategy for Nature Conservation in the Pacific Islands Region: 2002-2007, p.3
[4] National Biodiversity Strategies & Action Plans – Pacific Regional Review 2007, p.8

Chapter 1.0 OVERVIEW OF FIJI'S BIODIVERSITY

Even though biodiversity has been defined in different forms, this report uses the definition adopted by the FNBSAP which defines biodiversity as being:

> "***the variety of life forms, the different plants, animals and micro-organisms,***
> ***the genes they contain, and the ecosystems they form. It is usually considered***
> ***at the three levels: genetic diversity; species diversity and ecosystem diversity***."[5]

Fiji's unique characteristics of its biodiversity distinguish Fiji from all other countries and it is a living treasure that forms a national heritage which Fiji can be proud of. However, it also places a heavy responsibility on the country for its continued existence.

For a meaningful consideration of Fiji's biodiversity, the social aspect needs to be addressed and in particular Article 10c, Convention on Biological Diversity (IUCN 1994), which states "*protect and encourage customary use of biological resources in accordance with traditional practices that are compatible with conservation or sustainable use requirements."*

The current status of Fiji's biodiversity is summarized in Table 1.0.

In respect to NBSAP, there are two important considerations:

- the lack of knowledge in many important groups especially in the Arthropods
- Fiji's endemic fauna and flora are almost exclusively terrestrial forest species

[5] cited FNBSAP, 2007, p.1

Table 1.0 Status of Fiji's Biodiversity

Group	Total number of living species	Number of introduced species	Number of known living native species	Number (%of native species) endemic to Fiji	Number currently threatened or endangered
Terrestrial					
Birds	68	11	57	27	17
Mammals	17	11	6	1(17%)	2
Amphibians	3	1	2	2(66.6%)	2
Reptiles	27	6	21	12(57.1%)	3
Invertebrates	Greater than 5102	Research ongoing	Research ongoing	Research ongoing	Research ongoing
Freshwater fish	161	10	151	11(7%)	Research ongoing
plants	2543	949	1594	893	281
Marine					
fish	1198	15	1183?	14 (1%)	49 Research ongoing
mammals	12	**?**	**?**	**?**	8
Reptiles	10	0	**?**	**?**	Research ongoing
Invertebrates	1056	**?**	**?**	3	Research ongoing
Plants	426	?	?	?	Research ongoing

Source: *NatureFiji-MareqetiViti*

1.1 Country Background

Fiji consists of more than 300 islands and about 100 are inhabited, covering a total land area of 18, 376 square kilometers. The two largest islands of Viti Levu and Vanua Levu comprise of more than 85% of the total area. Most of the islands are volcanic.

The Fiji population stood at 837, 271 with annual growth rate of -0.5% in 2007 and -0.1% in 2008[6]. Around 51% of the population lives in urban areas.

Fiji has a mild tropical climate with plentiful rain. It is however subject to potentially catastrophic climatic events such as cyclones and flooding. During El Nino years droughts can be severe on the western parts of the larger islands especially during the May to October dry season.

Diverse ecosystems exist in Fiji including significant areas of natural forest and a range of coastal and marine ecosystem including extensive systems of mangrove and coral reefs. These resources form the basis of Fijian culture, employment and food supply, thus the need to be well maintained for future generations. The remaining area of natural forest is approximately 860,000 ha and the current rate of deforestation is moderate. Fiji's EEZ covers 1.3 million square kilometers and contains rich marine resources. Reef systems include barrier, fringing and platform reefs. Some are under pressure from pollution, coral mining and hurricane damage.

A significant portion of Fiji's economy is dependent on exploitation of Fiji's natural resource base. This includes agriculture, forestry, fisheries, mining and tourism. Gross earnings from tourism for 1st quarter, 2009 have been estimated at $167.6 million[7]. This represents a decrease of $25.4millin or 13.2% below the gross earnings of $193.0 million for 1st quarter of 2008[8]. Due to impacts to the environment, any planning for economic development especially in the tourism sector needs to include the conservation and management of these resources in a sustainable manner.

1.2 Agricultural Sector

About 16% of total land area in Fiji is suitable for sustained arable farming. Over the last 30 years there has been a small but steady loss of good arable land to non-agricultural use.

In Fiji, agriculture is organized along commercial lines although the subsistence sector remains important. Sugar is still the backbone of the agricultural production,

[6] http://www.statsfiji.gov.fj/
[7] http://www.statsfiji.gov.fj/
[8] http://www.statsfiji.gov.fj/

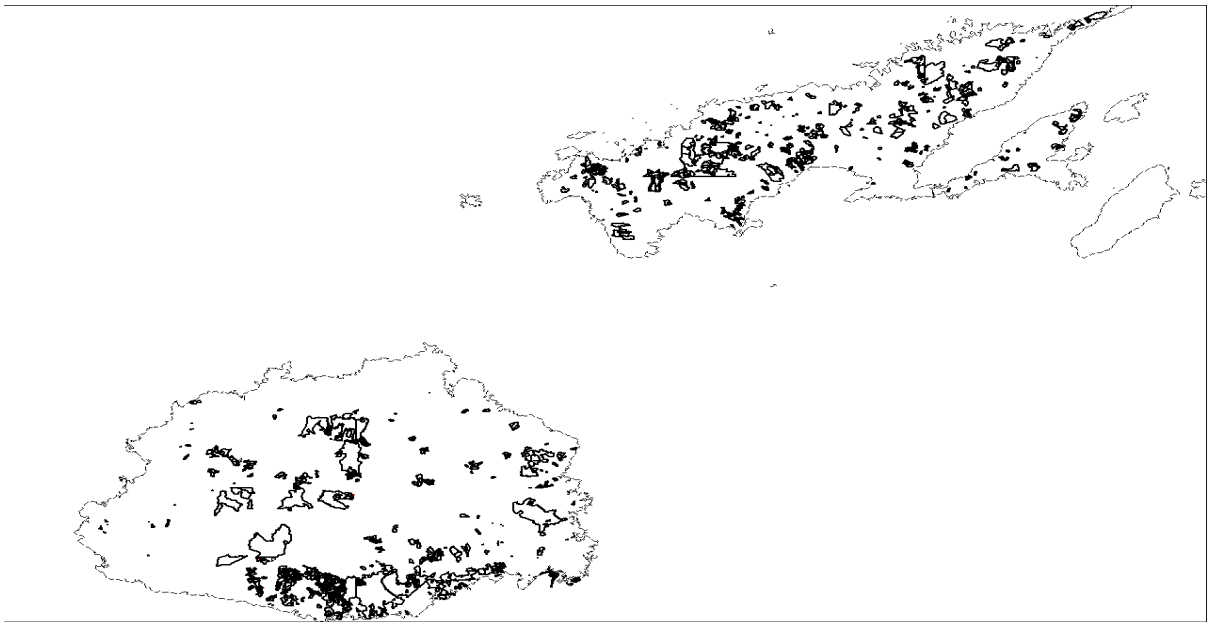
although there is a decline in recent years. Large scale agriculture comprises mainly copra, ginger, tropical fruits, cocoa and rice.

As a result of sugar cultivation, soil changes have occurred mainly due to unsustainable cane farming practices. In fact declining sugar cane yield has been attributed mainly to soil productivity which is the result of soil erosion.

Significant farming areas in Viti Levu and Vanua Levu have been influenced by soil erosion and now urgently needs soil conservation measures. Severe erosion has been associated with ginger cultivation, which is almost entirely cultivated on slopes. Although there has been encouraging increase in the ginger industry much of this increase has been based on unsustainable agricultural practices which urgently need to be eliminated.

Off-site ecological and economic damage from induced erosion is also serious. Notable in Fiji is the downstream flooding and sedimentation, which extends to the coral reefs. Marine productivity is threatened by land-based activities.

Map 1.2.1: Eroded areas in Fiji;



Cited: Unpublished Natural Resource Inventory report. Map 1.2.1 shows the eroded areas in Fiji. The eroded areas are particularly those areas where heavy logging has been undertaken.

It appears that in Fiji's government circles there has been an increased awareness to the need for integrated watershed management and that the issue of soil erosion and land degradation and their economic implications have now induced counter measures. Integrated watershed management still has to pick up momentum.

1.2.1 Land Use Capability

Land classification maps or land capability maps shows a general assessment of the combined resource base of landforms, climate and soils (Ward, 1965:61). They show which areas may be easily occupied and where there is land, which might be occupied through the use of various advanced techniques. A realistic assessment of resources can only be made in terms of the technology at present used in an area or which might conceivably be introduced (Ward, 1965:61). The categories of land classes used by Wright and Twyford recognize this fact.

Table 1.2.1: Categories of Land

Land Category	Descriptions
Class I	Land which may be used without improvement, other than by the occasional addition of fertilizers (Ward, 1965:61). This is the land that can be used immediately without serious danger of soil erosion or depletion, with the techniques now commonly applied in Fiji in either arable or pastoral farming (Ward, 1965:61).
Class II	Land which may be used if more advanced techniques are employed. In general the techniques of regular application of fertilizer, or minor drainage or soil conservation measures which are needed if Class II land is to be used safely is already known and can be applied in Fiji. The combined area of Class II land and I may be considered to be the area which can be used immediately with the level of technology now generally available in Fiji (Ward, 1965:61).
Class III	Land that can only be fully utilised after major improvements, such as regular and heavy application of fertilizers, major drainage schemes or major soil conservation measures are carried out (Ward, 1965:61). These improvements require a large capital investment per unit area and may be considered outside the range of available technology at least

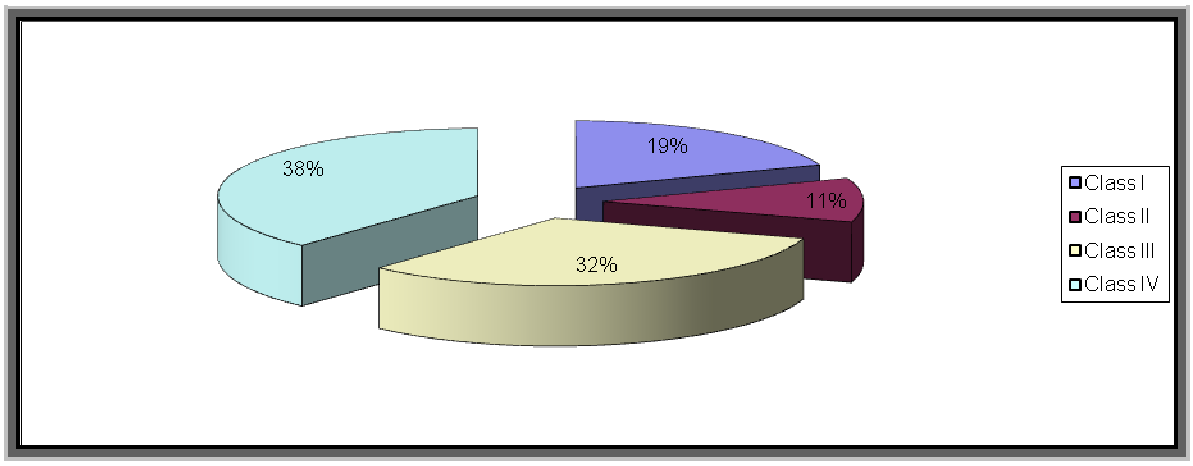
	until more of the land of better class is fully utilised.
Class IV	Land that is largely unsuited to permanent agriculture although some of it might be used for forestry. The population supported by this class of land, which amounts to 38.2% of the area of Fiji which will always be small (Ward, 1965:61).

Figure 1.2.1: Distribution of Land by Class

	CLASS							
	I		II		III		IV	
Island or Group	**Area sq.m.**	**% of Area of Island or Group**	**Area sq.m**	**% of Area of Island or Group**	**Area sq.m.**	**% of Area of Island or Group**	**Area sq.m.**	**% of Area of Island or Group**
Viti Levu	881.95	21.5	315.05	7.7	1,192.14	29.0	1,719.75	41.8
Vanua Levu	328.60	14.6	282.72	12.6	934.44	41.7	696.42	31.1
Taveuni and Islands	4.63	2.5	79.99	42.8	56.68	30.3	45.62	24.4
Kadavu and Islands	11.96	7.4	21.80	13.5	35.00	21.7	92.61	57.4
Lomaiviti	45.60	27.8	34.88	21.3	20.20	12.4	63.02	38.5
Lau	61.70	42.9	4.47	3.1	20.42	14.2	57.33	39.8
Yasawas and adj islands	23.61	38.1	4.01	6.5	5.24	8.5	29.00	46.9
Beqa and Vatulele	15.51	57.9	3.01	11.2	1.25	4.7	7.04	26.2
Total Fiji	**1,373.56**	**19.4**	**745.93**	**10.5**	**2,256.46**	**31.9**	**2,710.79**	**38.2**

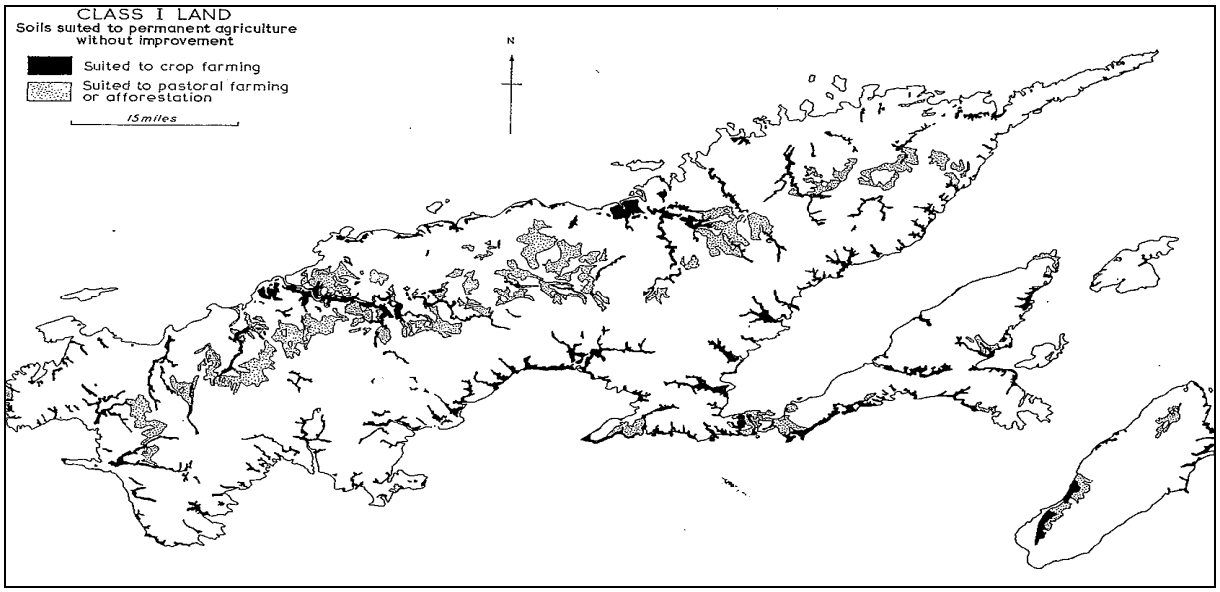
Source: Unpublished Natural Resource Inventory Report, (2010).
Table 1.2.1 and figure 1.2.1 shows that 38% of the land in Fiji are from 'Class IV', 32% of the land in Fiji are from 'Class III', 19% of the land in Fiji are from 'Class I' and 11% of the land in Fiji are from 'Class II'.

Fig 1.2.2: Showing Class I Land – Viti Levu



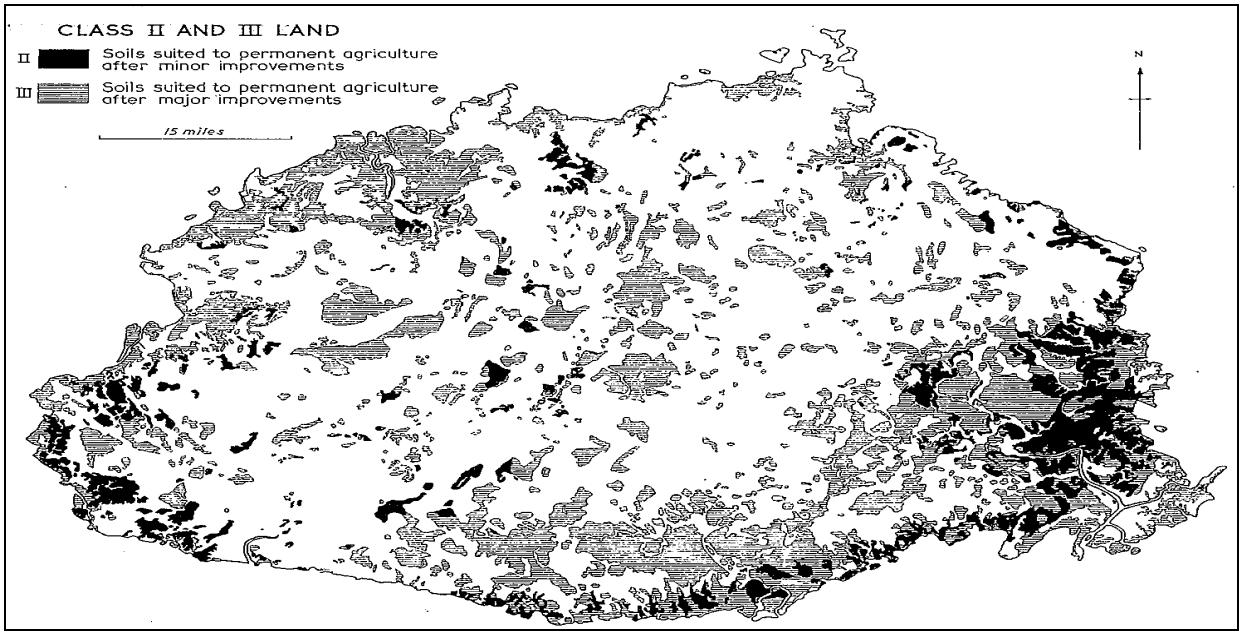
Source: Ward, (1965:63), as cited from unpublished Natural Resource Inventory, Biman Prasad 2010. Figure 1.2.2 shows soils suited for permanent agriculture without improvement in Viti Levu.

Map 1.2.3: Showing Class I land – Vanua Levu



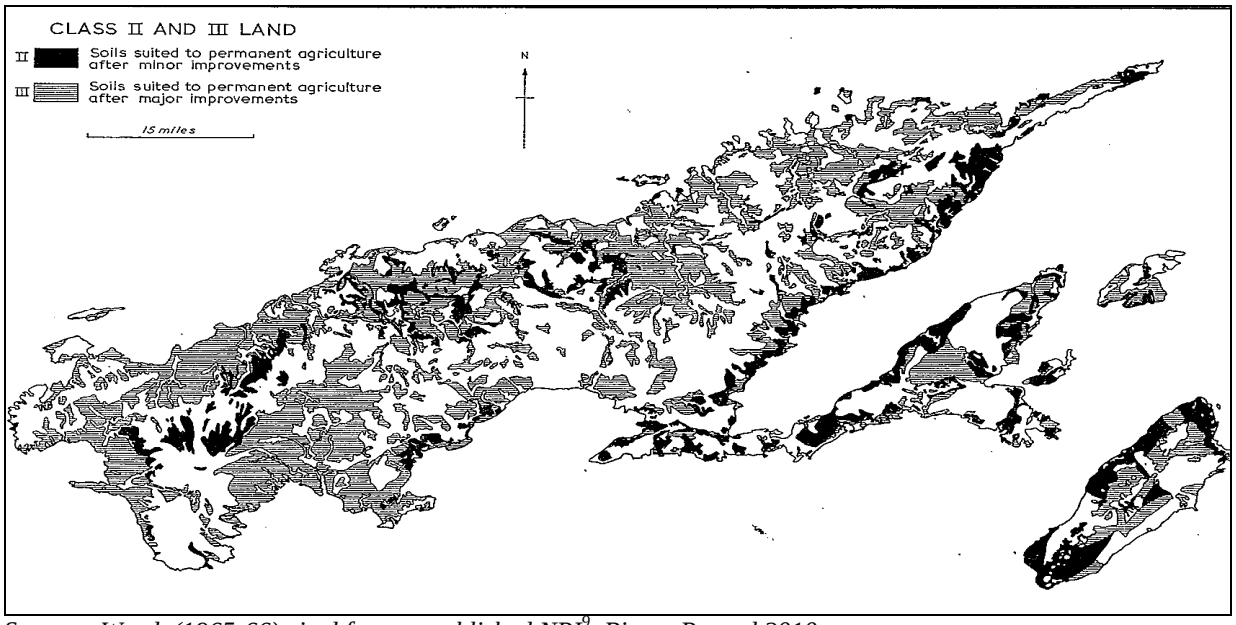
Source: Ward, (1965:64) as cited from unpublished Natural Resource Inventory Report Biman Prasad 2010. Map 1.2.3: shows soils suited for permanent agriculture without improvement in Vanua Levu.

Map 1.2.4: Map Showing Class II and III Land in Viti Levu



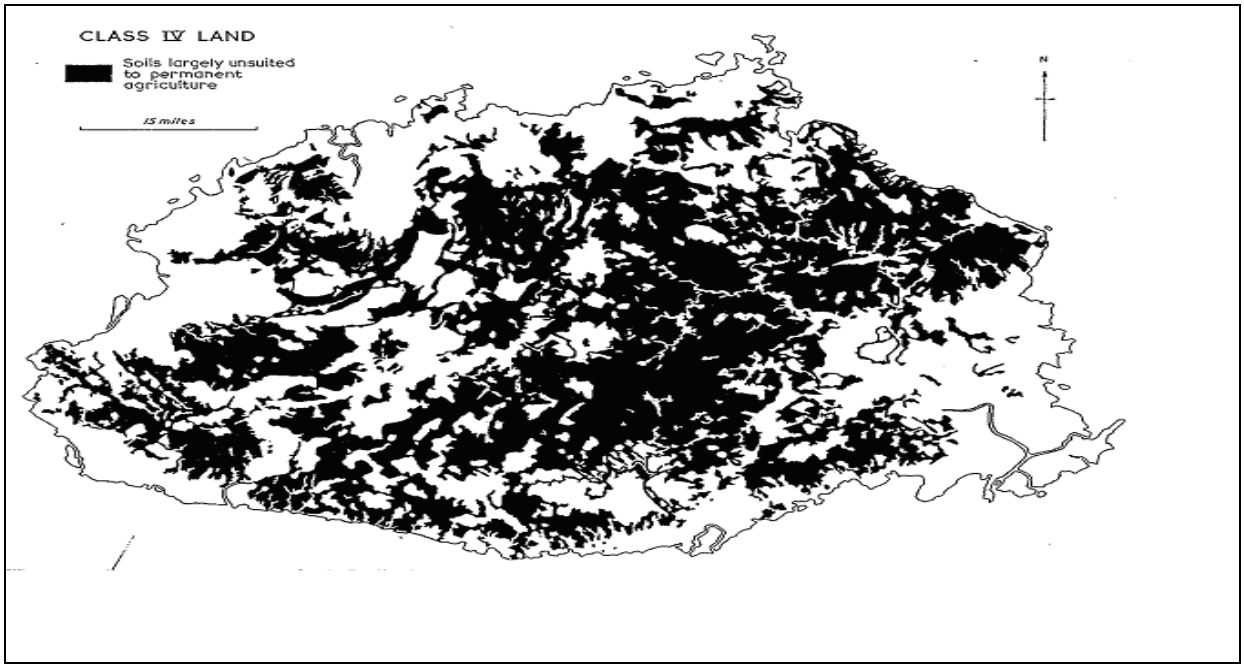
Source: Ward, (1965:65) as cited from unpublished Natural resource Inventory Report Biman Prasad 2010 Map 12..4 shows soils suited to permanent agriculture after minor improvements and soils suited to permanent agriculture after major improvements.

Map 1.2.5: Map Showing Class II and III Land in Vanua Levu



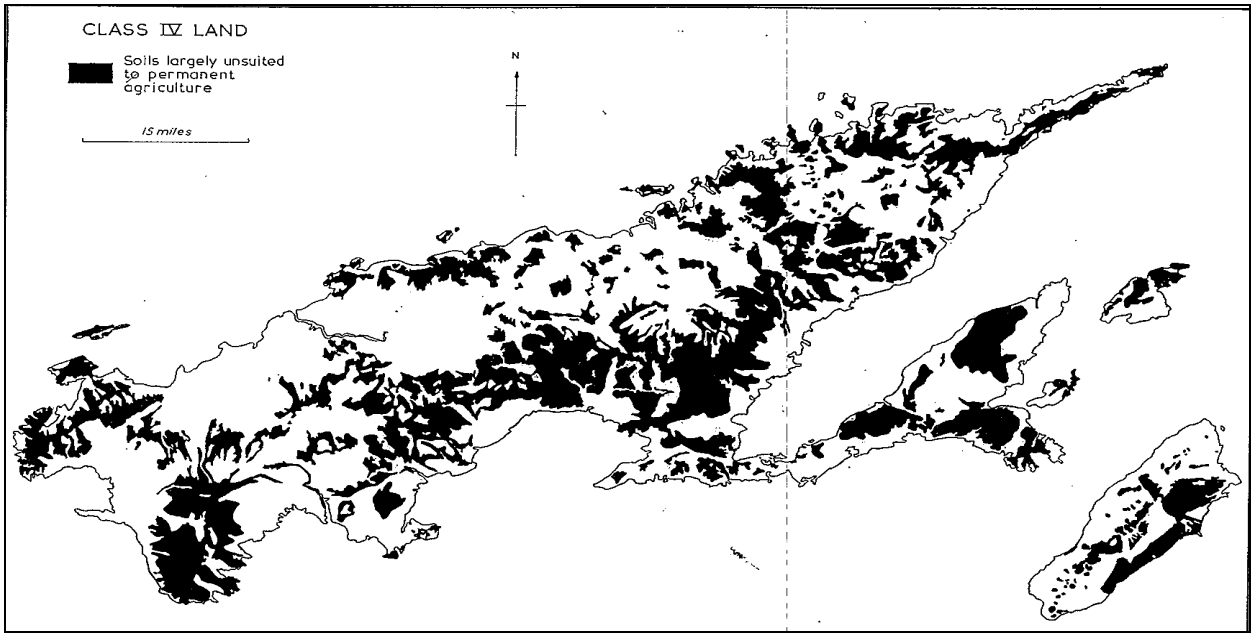
Source: Ward, (1965:66) cited from unpublished NRI[9], Biman Prasad 2010
Map 1.2.5 shows soils suited to permanent agriculture after minor improvements and soils suited to permanent agriculture after major improvements.

Map 1.2.6: Map Showing Class IV Land – Viti Levu



Source: Ward, (1965:67 cited from NRI Biman Prasad 2010
Map 1.2.6 shows soils largely unsuited to permanent agriculture in Viti Levu.

Map 1.2.7: Map Showing Class IV Land – Vanua Levu



Source: Ward, (1965:68).cited from NRI 2010.
Map 1.2.7 shows soils largely unsuited to permanent agriculture on Vanua Levu.

1.2.2 State of research and gaps in existing literature

A close examination of the current literature states that the state of research regarding the 'agricultural resources' inventory of Fiji is very weak. Majority of the data collected from the Ministries were outdated and were not relevant to the changing context of Fiji. Studies needs to be conducted to ascertain the following:

- Changing patterns in the land use types.
- Changing patterns in the current practices.
- Various ways through which the land can be utilized more sustainably.

1.3 Forestry Sector

It has been suggested that the area of remaining native forest is approximately 750,000 ha and aforestation has brought some 50,000 ha back into production which is concentrated mainly in the western side of Viti Levu.

Since 1967 an estimated 140,000 ha of Fiji's forests have been converted to non-forest land-use. Four principal causes of deforestation in Fiji are:

- clearing of forests for commercial agriculture and rural development projects
- mixed commercial and subsistence farming
- spread of small settlements
- urban growth and infrastructure to service them such as roads

Exploitation of forests for timber is also a factor in deforestation. Logging practices within and outside of logging concession areas have significantly affected forest quality and diversity.

Detrimental impacts of logging in Fiji include the following:

- *Increased soil erosion* - Logging contributes to soil degradation and stream sedimentation.

- *Regeneration and vegetation damage* – Damage to trees and vegetation after logging is always severe initially. However, many species in Fiji have a remarkable ability to recover.

- *Loss of wildlife habitat* – Even though there has been little field studies on the effect of logging on wild life habitats, some general findings from experienced observers have been documented. It appears that most species are quite resilient and a testimony to their evolution in cyclone ravaged forests. However, because of restricted distribution in the flora being commonplace in Fiji, it makes them very vulnerable to logging and deforestation. Adequate management and control measures may hold the key to the long term survival of Fiji's wildlife.

Deforestation is an immediate issue for the forest industry in Fiji because of the need to protect and enhance long term viability of the forests. Any strategy to control deforestation must include the means to determine the distribution, quantity and ongoing quality of the existing forest resources and monitor their use.

Wildlife Conservation Society (WCS)/Conservation of Fijian Forests (CFF) project carried out in 2004 entitled "*Conservation of Fijian Forests: Building Conservation Landscapes into Forestry Operation & Forest Certification* documented that during expedition into Fiji's forested areas they found small-scale logging occurring in remote areas. Many such operations were in direct violation to Fiji's National Code of Logging Practices.

During this project, WCS made presentations to specific provincial offices, relevant governmental agencies including Planning, Environment, Forestry, NLTB, SPC, FAB and Tourism and other NGOs and Institutions in an effort to inform and gain their assistance. It is hoped that results of this project will assist in linking National Biodiversity Strategies and goals to the conservation of forest ecosystem and its sustainable management.

1.3.1 Native Forests

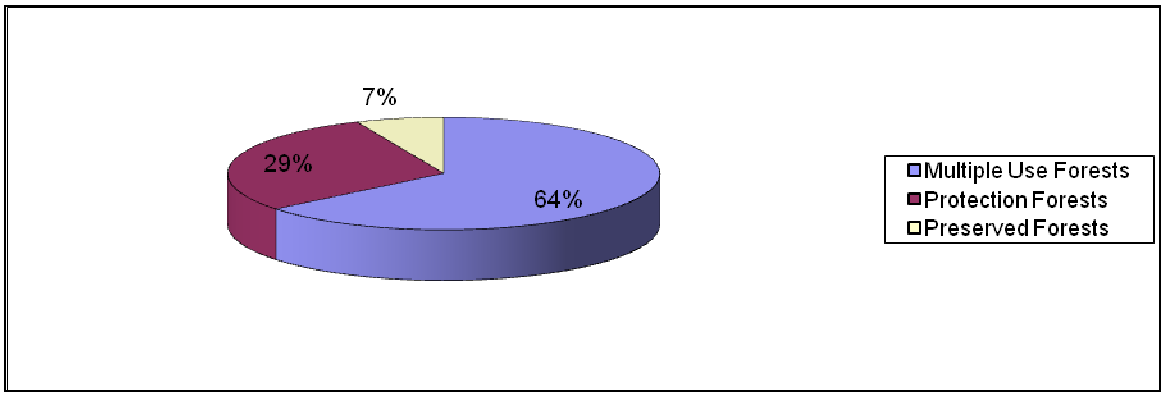
Native forests are subdivided into 3 management categories, including preserved forests, protected forests and multiple use forests (Ministry of Forest, 2006:9). Table 1.3.1 and figure 1.3.1 shows the proportions of each of the categories of forest types.

Table 1.3.1: Major forest types at December 2006

Forest Uses	Estimated Area	Percentage
Multiple Use Forests	549, 394	64.1
Protection Forests	251, 264	29.3
Preserved Forests	56, 850	6.6
Totals	**857, 508**	**100**

Source: Ministry of Forest, 2006:9 as cited from Natural Resource Inventory Report Biman Prasad 2010.

Figure 1.3.1: Major forest types at December 2006



Source: Created by Author, (2010), Unpublished Natural Resource Inventory.

Over 80% of Fiji's native forests are communally owned (Ministry of Forest, 2006:9). This poses a great challenge to the management of native forests as the rights to the resource rests with the forest owners but legislation on how the resource is to be utilized rests with the state (Ministry of Forest, 2006:9). This challenge is even greater when dealing with issues of protected areas, as the state has to define what constitute a protected forest (Ministry of Forest, 2006:9). Under Fiji's National Land Use Policy land classification; 67-72% of Fiji's forests are in rough terrain and 13-17% are under medium terrain; while only 16% are under easy or relatively flat terrain (Ministry of Forest, 2006:9).

1.3.2 Logged Forests

The trend in log production for the past decade indicates a general decline in production in the order of 200,000 cubic meters as compared to the previous decade with pine dictating the trend (Ministry of Forest, 2006:11). Projections indicate that pine production may increase to 65% by 2008 and mahogany by 100 percent from current (2006) level of production (Ministry of Forest, 2006:11).
These projections are based on the assumption that infrastructural and institutional frameworks would be available to support the full production from plantation resources of both pine and mahogany (Ministry of Forest, 2006:11). At the same time it is envisaged that production from indigenous forest would be maintained at 100, 000 cubic meters annually at a sustainable level (Ministry of Forest, 2006:11).

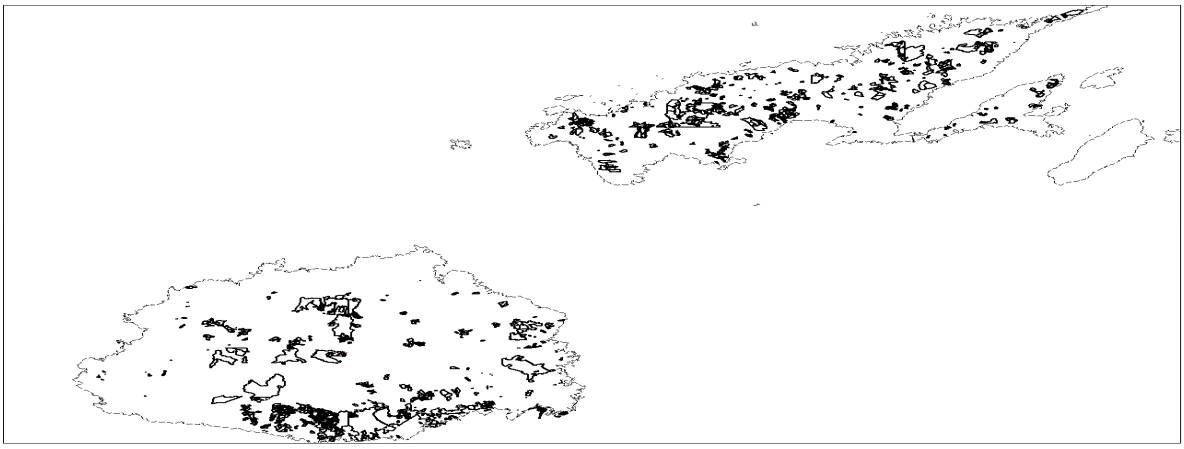
The largest growth in 2006 was from Mahogany log production, which more than doubled its production from the 2005 level (Ministry of Forest, 2006:11). Pine recorded a slight increase of just over 1 percent (Ministry of Forest, 2006:11). This made the total increase in log production from indigenous forests from the 2005 level, the overall national log production is affected, and it reduced by less than 1 percent from the 2005 level (Ministry of Forest, 2006:11).

Table 1.3.2: Log production (m^3) as at 31/12/2006-Pine figures log volumes from pine woodlots

Year	Indigenous	Plantation			Grand Total
		Pines	Mahogany	Sub Total	
1987-2005	2,547,745	6,549,631	107,385	6,657,016	8,926,581
2005	104,484	321,681	17,406	339,087	443, 571
2006	79, 480	326, 821	37, 216	364, 037	443, 516
Total to-date	2, 627,225	6, 876, 452	144, 601	7, 021, 053	9, 370, 097
Annual Mean	138, 274	361, 918	7, 610	369, 529	493, 163

Source: Ministry of Forest, 2006:11.cited from NRI Biman 2010.

Map 1.3.1: Logged Areas in Fiji



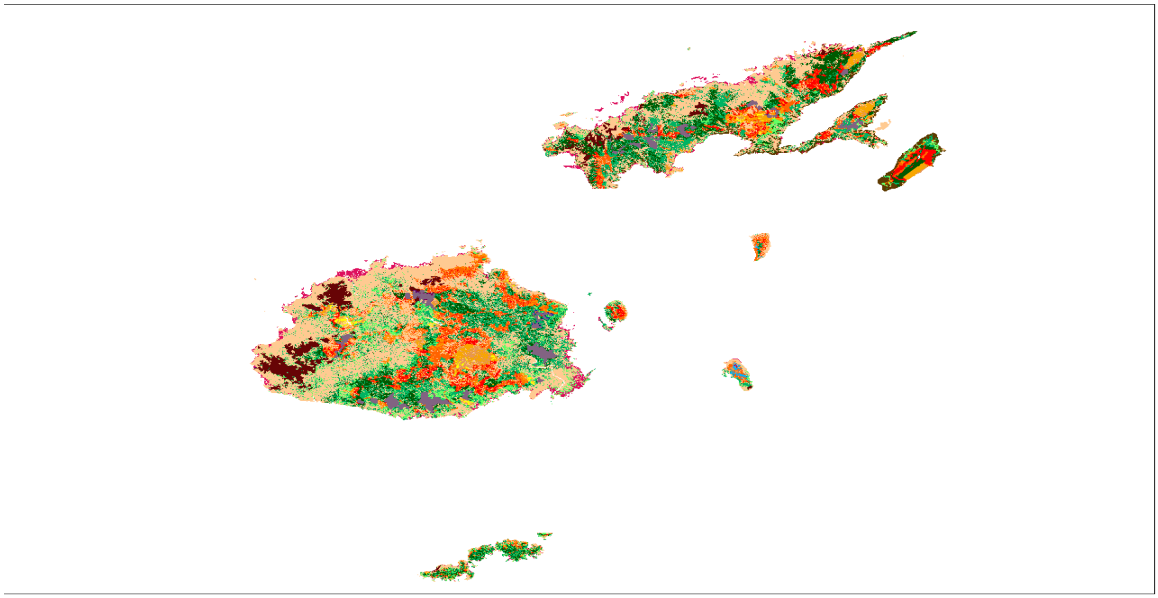
Source: Ministry of Forestry (Unpublished Data), 2010a.cited in NRI 2010

Map 1.3.1 shows the various areas of logged forests in Fiji. As illustrated in map 1.8 the most logged areas includes areas near Nausori highlands, Nadarivatu and Nabou. Namuavoivoi, Dreketi/Wainunu and koroutari.

1.3.3 Rehabilitated areas

Rehabilitated areas basically include the amenity plantation (Ministry of Forestry, 2010b). Amenity plantations are sites of or intended areas for plantations primarily for some amenity reasons such as reforestation, catchments rehabilitation, and landscape improvement (Ministry of Forestry, 2010b). Map 1.3.2 shows that rehabilitated areas (amenity plantations) in Fiji.

Map 1.3.2: Forest Cover of Fiji



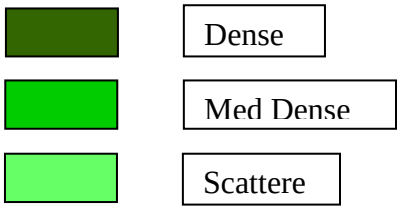
Source: Ministry of Forestry (Unpublished material), 2010b as cited in NRI Biman Prasad 2010

Key:
Forest Densities:

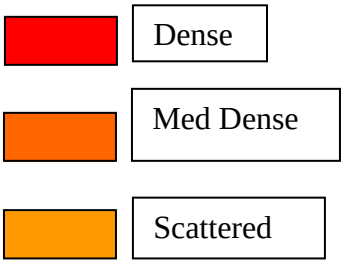
1. dense forest: crown density by trees and/ or ferns 75-100% and ground coverage by grass, palm and/ or bamboo 0-25%
2. medium dense forest: crown density by trees and/ or ferns 45-80% and ground coverage by grass, palm and/ or bamboo 20-55%
3. scattered forest: shrub forest (including scattered coconut stands), dense bushland (thickets) with single trees. Crown density by trees and/or ferns 15-50% and ground coverage by grass, palm and/ or bamboo 50-85%.

Non-forest: is defined as areas covered by settlements, urban areas, and grass and shrub vegetation visible as such in the satellite images.

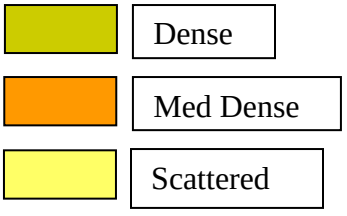
[10]Multiple Use Natural Forest (MUF) - are areas carrying indigenous forest vegetation to be maintained under forest cover and to be used for timber production, catchment protection, wildlife habitat, forest recreation and amenity uses for minor forest products.



[11]Protection Forest (PTF) - are areas of highly sensitive native forest by virtue of their topography, climate, soil type or combinations of those factors. Timber harvesting or other forestry operations would be restricted to minor forest products or to manual or non-mechanized timber extraction. Such operations should have negligible effect on forest cover, stand composition or hydrological conditions.

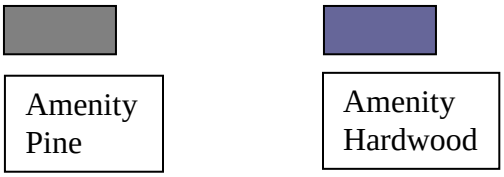


[12]Preserved Forest (PRF) - are areas of natural forest to be maintained in an undisturbed natural condition and for the preservation of specific biological values. It includes the Forestry Department Nature Reserves, other legally established reserves and other areas of known unique, rare character under consideration for formal preservation. This includes formal proposals or recommendations for World Heritage, Nature Reserves or National Park status.

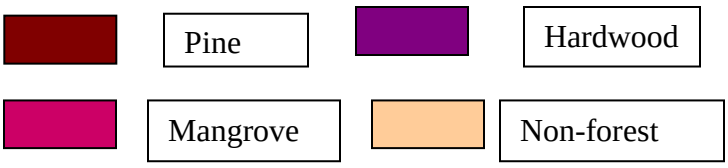


[10] Adapted from NRI report 2010; B. Prasad
[11] Adapted from NRI report 2010; B. Prasad
[12] Adapted from NRI report 2010; B. Prasad

Amenity Plantation- is sites of or intended areas for plantations primarily for some amenity purposes such as reforestation, catchment rehabilitation, and landscape improvement. Timber production would be permissible to the extent compatible with the retention of the amenity value, but is not the primary purpose.



Timber Production Plantation- these are areas of existing or intended plantation established primarily for timber production.



1.3.4 Protected Forests

Protected forests are areas of highly sensitive native forest by virtue of their topography, climate, soil type or combinations of timber harvesting (Ministry of Forestry, 2010c:2). Forestry operations such as minor forest products and manual or non-mechanized timber extraction would be restricted on protected forest cover (Ministry of Forestry, 2010c:2). Forestry operations are restricted on protected forest cover because these operations would have negligible effect on forest cover, stand composition or hydrological conditions (Ministry of Forestry, 2010c:2). Map 3.5 shows areas of protected forests in Fiji.

1.3.5 Conservation Areas & Mangroves

Conserved areas are areas of natural forest to be maintained in an undisturbed natural condition and for the preservation of specific biological values (Ministry of Forestry, 2010d: 2). It includes the Forestry Department Nature Reserves, other legally established reserved and other areas of known unique, rare or consideration for formal preservation (Ministry of Forestry, 2010d: 2). This includes the formal proposals or recommendations for World Heritage, Nature Reserves or National Park Status (Ministry of Forestry, 2010d: 2).

It is a well known fact that mangroves are very productive ecosystems which sustain coastal fisheries. Coastal villagers and fishermen rely on mangrove ecosystems for their livelihood. However, mangroves have been targeted often in the past for reclamation for sugar cane, rice and aquaculture. Large scale reclamation of mangroves has caused loss of fauna and flora and loss of biodiversity.

Mangrove areas were originally classified as conserved areas because of their high biological diversity, national and international importance (Ministry of Forestry, 2010d: 2). Mangroves were later excluded from forest function mapping after

decision of the Forestry Department Headquarter (Ministry of Forestry, 2010d: 2)s. Map 1.9 shows conservation (preserved) areas in Fiji.

1.3.6 Plantation Forests

Plantation forests are categorized into softwood plantation and hardwood plantation (Ministry of Forest, 2006:9). Fiji's forest covers 52.6% of Fiji's landmass, estimated at 1.8 million hectares (Ministry of Forest, 2006:9). Of the total forest cover, 89% is of indigenous forests, while plantations of predominantly Mahogany and Pine make up the remaining 11% (Ministry of Forest, 2006:9). Table 1.3.6 shows the breakdown of the various forest types with proportion relative to the total forests area.

Table 1.3.6: National Forest Area – Figure based on 2006 estimates

Forest Types	Area (Ha)	%
Indigenous Forests	857, 508	89.3% of total forest cover
Hardwood Plantation	53, 843	5.6% of total forest cover
Softwood Plantation	48, 770	5.1% of total forest cover
Total Forest Cover	**960, 121**	**52.6% of total land mass**

Source: Ministry of Forest, 2006:9 as cited from unpublished NRI Biman Prasad 2010

1.3.6.1 Softwood plantation

The total stocked plantation area under Fiji Pine Limited at the end of December, 2006 is estimated at 49, 503 hectares, which covers around 58% of the total leased estate of 86,678 hectares (Ministry of Forest, 2006:9).

Table 1.3.6.1: Pine Plantation Area at December 2006

Forest	Leased Area (ha)	Stocked Area (ha)	% of Stocked Area Against Leased Area	Planned Estate Size
VITI LEVU				
Nabou	21, 795	10, 803	50	10, 000
Nadi	12, 917	6, 278	49	9, 000
Lololo	17, 345	10, 915	63	12, 000
Ra	10, 597	5, 476	52	5, 000
VANUA LEVU				
Bua	15, 229	11, 671	77	11, 000
Macuata	7, 795	4, 360	56	5, 000
Totals	85, 678	49, 503	58	52, 000

Source: Fiji Pine Limited (2006) as cited in unpublished NRI Biman Prasad 2010.

An additional 6,466 hectares of pine forest is owned by various pine schemes around the country (Ministry of Forest, 2006:10). The schemes are managed under the Fiji Pine Trust and account for 12% of the total pine forest cover in Fiji. Hence

the total pine forests area is estimated at 55,969 hectares (Ministry of Forest,

2006:10). In addition to pine areas under Fiji Pine Limited, and under various pine schemes, a relatively significant area of privately owned un-surveyed pine woodlots are also scattered around the country, this may take the total area of pine resource in Fiji to well over 56, 000 hectares when included (Ministry of Forest, 2006:10). Fiji pines are used mainly for the production of two main products: timber; and chips. In terms of timber volumes, the estimated product mix in the Viti Levu pine resource is around 30% for timber and 70% for chips while the estimated product mix in the Vanua Levu pine resource is estimated at 50% for timber and 50% for chips (Ministry of Forest, 2006:10).

1.3.6.2 Mahogany Resource

Fiji has a total of 43, 568 hectares under Mahogany that are spread out over 14 forest stations (Ministry of Forest, 2006:10). Fifty percent of these mahoganies are in four of the stations: Galoa; Nukurua; Wainunu; and Naboutini (Ministry of Forest, 2006:10). Table 4 indicates the stocking of mahogany and other species in the various Mahogany forests in Fiji (Ministry of Forest, 2006:10). In summary, of the total Fiji Hardwood Corporation Limited plantation estate, 82 percent is stocked with forest species of which 79 percent is mahogany and 21 percent other species (Ministry of Forest, 2006:10).

Table 1.3.6.2: Hardwood Plantation Area As At 31/12/2006

No:	Forest	Estate Area (ha)	Stocked Area (ha)	Mahogany Area (ha)	Other Species (ha)	% Mahogany By Station	Total Percentage of Mahogany	Cumulative Percentage of Mahogany
1	Galoa	8,924	7, 389	6, 691	754	91	15	15
2	Nukurua	8, 257	8, 009	5, 668	2,388	71	13	28
3	Wainunu	5, 449	5, 207	5, 100	107	98	12	40
4	Naboutini	5, 490	4, 676	4, 401	319	94	10	50
5	Dreketi	6, 981	4, 740	3, 864	876	82	9	59
6	Sawakasa	4, 898	3, 530	3, 411	119	97	8	67
7	Seqaqa	2, 798	2, 694	2, 600	94	97	6	73
8	Navonu	2, 983	3, 073	2, 269	804	74	5	78
9	Baravi	4, 126	2, 796	2, 145	171	77	5	83
10	Korotari	3, 312	3, 303	2, 128	1, 175	64	5	88
11	Nadarivatu	9, 714	5, 078	1, 868	3, 210	37	4	92
12	Saqani	2, 519	1, 688	1, 688	0	100	4	96
13	Nausori Highlands	3, 827	1, 759	1, 200	559	68	3	99
14	Colo-i-Suva	968	560	535	25	96	1	100
	Totals	70, 246	54, 502	43, 568	10, 601	80	100	100

Source: Fiji Hardwood Corporation (2006) as cited in unpublished NRI Biman Prasad 2010.

1.4 Fisheries Sector

Fiji has an extensive and high diversity of marine habitats including estuaries, mangrove wetlands, sea grass, macro-algal assemblages, protected and exposed soft shores, lagoons, coral reefs and slopes. These support a rich biodiversity, and a major subsistence and moderate commercial fisheries. However despite its subsistence, commercial and conservation value, Fiji's marine biodiversity is not very well known.

It is evident that Fiji has high species diversity in spite of the fact that knowledge of most taxa is still very incomplete. There is strong affinity with the west, the Philippine/Indonesia/New Guinea centre of Indo-Pacific marine species diversity, but with a reduction in species diversity (Veron, 1995)[13]. This is due to the prevailing westerly flowing subequatorial current and the trade wind drift and the moderate isolation of Fiji from the western island archipelagos (600 nautical miles from Vanuatu in the west, 1200 nautical miles from Solomon Islands in the northwest). The high marine biodiversity in Fiji is also due to a large number of different habitats within the group. Many of these are less well developed in islands to the east. The Fiji Group receives a small number of Central Pacific marine endemics. Due to the lack of collections in neighbouring groups a number of species appear to be found only in Fiji.

1.4.1 MARINE FLORA AND FAUNA

It is evident from the analysis of current literature that Fiji has high species diversity. Flora and fauna inventory of Fiji is summarized in the following table.

Table 1.4.1: Flora and Fauna Inventory of Fiji

Marine Plants		
Specie	**Status**	**Source**
Algae (Seaweed)	Published the first major algal checklist for the Fiji Group, listing **314** taxa and revising the nomenclature and taxonomy up to date. The most complete list of the Fijian flora to date is the revised checklist by N'Yert et al. (1996) as cited in listing **422** taxa (**39 Cyanophyceae, 113 Chlorophycecae, 42 Phaeophyceae and 288 Rhodophyceae).**	South and Kasahara (1992) as cited in (Morris and Pratt, 1997:2) (Morris and Pratt, 1997:2),
Sea grasses	Four species of sea grasses are common in Fiji. This compares with 14 species in the Philippines, nine in	The studies of the Great Asrolobe Laggon (Dravuni Island Field

[13] cited in NBSAP 2007, p.15

	Papua New Guinea, New Caledonia and Vanuatu, two in Samoa and Tonga and one in Tahiti.	Station of the USP) by Dr Mukai, Koike and colleagues from Japan during the past 5 years have been the principal work on Fijian sea grasses (Morris and Pratt, 1997:4).
Mangroves	Pillai (1985) 33 species including mangroves and important mangrove tracheophytes represented in Fiji mangrove areas.	(Morris and Pratt, 1997:4)
Marine Invertebrates		
Coral	According to Zann (1992) there are around one thousand coral reefs in Fiji. Pichon (1980) identifies 230 forms about 200 of which to the species level. Notably, about 100 species have been identified by Paulay (1990) from the Astrolabe reef. Fiji's National Environment Strategy project by E, Lovell provided a detailed description of corals in a preliminary listing of 198 species from the Manamucas and Southern Viti Levu (Zann and Lovell, 1992. There were 17 genera and 45 species identified from Ovalau	cited in (Morris and Pratt, 1997:5), cited in (Morris and Pratt, 1997:5) cited in (Morris and Pratt, 1997:6) cited in Morris and Pratt, 1997:6). (Lovell, 1997 as cited in Morris and Pratt, 1997:6).
Lower Invertebrates	The area of lower invertebrates of Fiji has been under researched in Fiji. Some of the studies that are conducted concerning lower invertebrates include Morton (1990), Bailey brock (1985) and J. Ryland (Morris and Pratt, 1997:6).	
Mollusks	K. Gilchrist compiled 7000 species including around 760 species of Fijian gatropods bivalves.	(Morris and Pratt, 1997:7).
Gastropods	Brodie and Brodie (1990) list 253	cited in (Morris and

	species of shell –less molluscs mainly collected from southern Viti Levu.	Pratt, 1997:7)
Bivalves	Parkinson (1982) listed 102 speices of bivalves form 25 families from Viti Levu and adjacent islands.	cited in (Morris and Pratt, 1997:7)
Crustaceans	The crustaceans (crabs, lobsters, barnacles etc) are moderately studied in Fiji. Some of studies conducted on crustaceans include Myers (1985), Morton (1990), Wells (1977), Yeatman (1983) and Bruce (1984) The shrimps are relatively well studied. Some of studies conducted on shrimps include Choy (1981), Choy (1983), Bruce (1980), King (1983) and Shokita et al., (1984) identified 26 species on 4 families.	(Morris and Pratt, 1997:8). (Morris and Pratt, 1997:8).
Echinoderms	The echinoderms are not well known. The inventory of echinoderms is under researched.	
Ascidians	Kott (1981) have described 60 species from reefs in Viti Levu and Kadavu.	as cited in (Morris and Pratt, 1997:8) and Ryland et al., (1984) as cited in (Morris and Pratt, 1997:8)
Marine Vertebrates		
Fishes	Fiji's fish fauna is moderately well known. Fowler (1959) described 439 species from a listing by Gilbert Whitley. In a study conducted by Carlson (1975) as cited in a collection of 147 species from 39 families of reefal species was made which is now based at the University of the South Pacific Marine Collection. Morris and Pratt (1997:9) referred to the study conducted that mentioned a preliminary listing of reefal, pelagic and deepwater bottom fish which comprised a total of 1198 species from 162 families. An interview with	cited in (Morris and Pratt, 1997:9) (Morris and Pratt, 1997:9), Baldwin and Seeto (1986, unpubl.).

	J. Seeto stated that this listing would be substantially increased perhaps to 1500 species when the Springer, and Emery and Winterbottom collections are fully identified. Notably, smaller collections have been initiated on the Astrolabe reef by Emery and Winterbottom (1991) and Bandy (1989).	(Morris and Pratt, 1997:9). as cited in (Morris and Pratt, 1997:9).
Reptiles	2 species of turtles are found in Fiji. They include Chekonia mydas and the hawkbill turtle Eretmochelys imbricata Loggerheads (Caetta caretta) are present but uncommon. Flatbacks (Chelonia depressa), Ridleys (Lepidochelys olivacea) and leather backs are occasional rare visitors to Fijian waters Three species of sea snake breed in the Fiji Group: Laticauda colubrine, L. laticauda and Hydrophus melanocephalus. The oceanic bellied sea snake Pelamis platuris is an occasional visitor.	(Bustard, 1970 as cited in Morris and Pratt, 1997:10). (Morris and Pratt, 1997:10). cited in (Morris and Pratt, 1997:10).
Seabirds	Seabirds nesting in the ringgold island of Fiji include reef herons (Egretta sacra), black noddies (Anous stolidus), black-naped terns (Sterna sumatrana), white terns (Gygis alba), sooty terns (Sterna fuscata), brown bopbies (Sula leucogaster), red-footed boobies (Sula sula), lesser frigate birds (Fregata ariel) and White tailed tropic birds (Phaethon lepterus).	(Clunie, 1985 as cited in Morris and Pratt, 1997:10).
Marine Mammals	The marine mammals in Fiji are not well known. The smaller whales are uncommon. Some of the marine mammals common in Fiji include the bottlenose dolphins, pilot whales, humpback whales and sperm whales.	(Morris and Pratt, 1997:10).

Source: Created by Author, 2010, unpublished Natural Resource Inventory Report.

1.4.2 Marine Plants

Marine algae are important primary producers on coral reefs and certain groups such as the crustose coralline algae play a very important role in the calcification and cementation processes on coral reefs. Several species of algae are edible and part of the traditional Fijian diet while species such as the *Ulva* and *Enteromorpha* are key indicator species in environmental impact assessments of pollution in coastal and estuarine regions. The most recent and complete list of algal flora has listed 422 taxa.

Sea grass beds are found inter-tidally and in the shallow sub-tidal more protected soft shores throughout Fiji. They have a very high biological productivity, are efficient recyclers of nutrients and support a large biomass of consumers, especially those of fisheries importance.

The largest mangrove formations in Fiji are found in the deltas of the mouths of some of the largest rivers such Ba, Rewa, Nadi and Dreketi. Fiji has a considerable area of mangrove but the community is relatively simple by comparison with those of island continental south Asia.

Fiji's mangrove flora is composed of eight mangrove species and a unique hybrid. It is dominated by *Bruguiera gymnorrhiza* (*dogo*), *Rhizophora stylosa* and *Rhizophora samoensis* (both *tiri*) and a sterile hybrid *R.selala* (*selala)* which is a cross between *Rhizophora stylosa* and *Rhizophora samoensis.* The *Rhizophora selala* is of great scientific interest because it is only found in Fiji, Tonga and New Caledonia with the largest area of the hybrid being in Fiji (Watling, 1985).[14]

Pillai (1985) identified 33 species including mangroves and important mangrove-associated species represented in Fiji's mangrove areas.[15]

1.4.3 Coral

There are approximately one thousand coral reefs in Fiji (Zann, 1992).[16] These are geologically recent structures (younger than 10, 000 years old) forming a capping biogenic limestone over previous reef formations. The major reef types are fringing reefs which surround almost all high islands and barrier reefs which lie at the edges of island shelves. Platform reefs lie in shallow island shelves. Several atolls and near atolls are present in the east.

Coral reefs are one of the essential features of the marine ecosystem. Hence discussion on the inventory of marine resources in Fiji is not complete without proper analysis of inventory of coral habitat in Fiji. Notably, Fiji has an extensive range of coral formation Coral reefs are a highly integrated marine ecosystem that supports the biodiversity of organisms (Morris and Pratt, 1997:9). A close analysis of the collection of research of Fiji's coral reefs recorded 50 genera and 144 species of coral (Morris and Pratt, 1997:9). This

[14] cited FNBSAP, 2007, p.16
[15] cited FNBSAP, 2007, p. 16
[16] cited FNBSAP, 2007, p. 17

estimate for coral reef biodiversity is for 6 locations that has major reef systems (Morris and Pratt, 1997:9).A collection of Fijian stony corals is in the University of the South Pacific reference collection. Although the collection is far from complete, Pichon (1980) identified 230 forms.[17]

1.4.4 Reef Fishes

Fiji's reef fishes are moderately well known. In a study conducted by Carlson (1975) as cited in (Morris and Pratt, 1997:9), a collection of 147 species from 39 families of reefal species was made which is now based at the University of the South Pacific Marine Collection. Morris and Pratt (1997:9) referred to the study conducted by Baldwin and Seeto (1986, unpubl.) as cited in (Morris and Pratt, 1997:9). These authors mentioned a preliminary listing of reefal, pelagic and deepwater bottom fish which comprised a total of 1198 species from 162 families. An interview with J. Seeto stated that this listing would be substantially increased perhaps to 1500 species when the Springer, and Emery and Winterbottom collections are fully identified (Morris and Pratt, 1997:9). Notably, smaller collections have been initiated on the Astrolabe reef by Emery and Winterbottom (1991) and Bandy (1989) (Morris and Pratt, 1997:9).

1.4.5 Lower invertebrates

The lower invertebrates of Fiji are very well studied. The mollusks (snails, bivalves, octopus etc) are very well represented in Fiji. The larger and more common species are particularly important in the subsistence diet of Fijians. Each year over 1 000 MT of nails and bivalves are marketed but possibly 5-10 times that quantity are consumed at the subsistence level.

Because of their interest to shell collectors, Fiji molluscs have been widely collected and are scientifically well described. The more spectacular cowries (*Cypraeidae)* and cones (*Conidae)* have attracted the most attention but even the less conspicuous species are reasonably well known. The most comprehensive Fiji collection was compiled by K. Gilchrist over the past 40 years; 7 000 specimens including around 760 species of Fijian gastropods and bivalves from this collection now held by the Smithsonian Institution and 1000 fossil species are held by the Australian Museum.

1.4.6 Marine vertebrates

Fiji's fish fauna is moderately well known. There have been very few that are endemic to Fiji. Fiji's fish have strong zoogeographical affinities with the Western Pacific (Australian Plate) but with fewer species present. Springer (1982) noted that about 163 families were found on the Great Barrier Reef, 125 in New Caledonia-Vanuatu, 118 in Fiji and 102 in Samoa. Springer (*loc.cit.)* proposed that the distribution of fish in the Pacific is related to the history of plate tectonics. A preliminary listing of reef, pelagic and deepwater bottom fish by Baldwin and Seeto (1986, unpubl.) contains a total of 1198 species from 162 families (including pelagic deepwater bottom fish species).[18]

[17] cited FNBSAP, 2007, p. 17
[18] cited FNBSAP, 2007, p.18

A comprehensive list of Fiji fish was made by John Earle (Research Associate in Zoology, Bishop Museum, Honolulu, Hawaii) from the results of two dives at Shark Reef, off Beqa Island. In 2004, 266 species were observed and 381 species in 2008.[19]

Three species of sea turtles nest in Fiji. In order of their abundance they are:

- Hawksbill, *Eretmochelys imbricata* (*taku)*
- Green turtle, *Chelonia mydas (vonu dina)*
- Loggerheads, *Caretta caretta(tuvonu)*

Flatbacks*, Chelonia depressa,* Olive Ridley*, Lepidochelys olivacea* and leather backs, *Dermochelys coriacea* are occasional to rare visitors to Fiji waters.[20]

Three species of sea snakes breed in the Fiji group. Two of these are the banded kraits, *Laticauda colubrine, L.laticauda* which breed on land. *Hydrophus melanocephalus* Gives birth to live young at sea. The oceanic bellied sea snake *Pelamis platuris* is an occasional visitor (Guinea, 1980).[21]

There is little information known about the Fiji mammals. Zann *et al.* (1997) indicate that about 13 species are likely to be found in Fiji, however, Jefferson *et al.* (1993) indicate that 16 whales and seven dolphins may be found in Fiji waters.[22]

1.4.7 Other Marine Habitats

Some of the common marine habitats include the following:

- Estuaries (gusu ni wai) – The lower usually tidal sections of rivers where the freshwater meets the seawater.
- Intertidal Zone (dela ni wasa, tavola/vei vutia) – These are the areas of old fringing reefs or tidal flats that are above sea level during low tide but goes under water at high tide.
- Lagoons (namo, lomaloma/toba) – These are the bodies of saltwater or brackish water more or less separated from the open sea by reefs, islets or other barriers.
- Fishponds/Maricultural Areas (tobu ni ika) – These are the artificially constructed fish ponds or other forms of development primarily for the purpose of fish farming or mariculture.
- Coral reefs/Outer reef (cakau/batilili) – These include coral reefs, algal reefs, barrier reefs, fringing reefs and lagoon/patch reefs.
- Island Shelf/Reef Platform (boto ni sauloa) – These include areas of 50-200m adjacent to islands.

[19] http://www.fiji-sharks.com_conservation_reef_fish_list.cfm
[20] http://www.sprep.org/att/IRC/eCopies/Countries/Fiji?35.pdf
[21] cited FNBSAP, 2007, p.17
[22] cited FNBSAP, 2007, p.17

Open Ocean (waituiloa, wasa) – These are the areas deeper than 200m that are found within Fiji's Economic Exclusive Zone (EEZ). Notably, these are very crucial pelagic fishing areas.
(Thaman et al., 1998 : 92-93)

1.4.8 Traditional Fishing Grounds

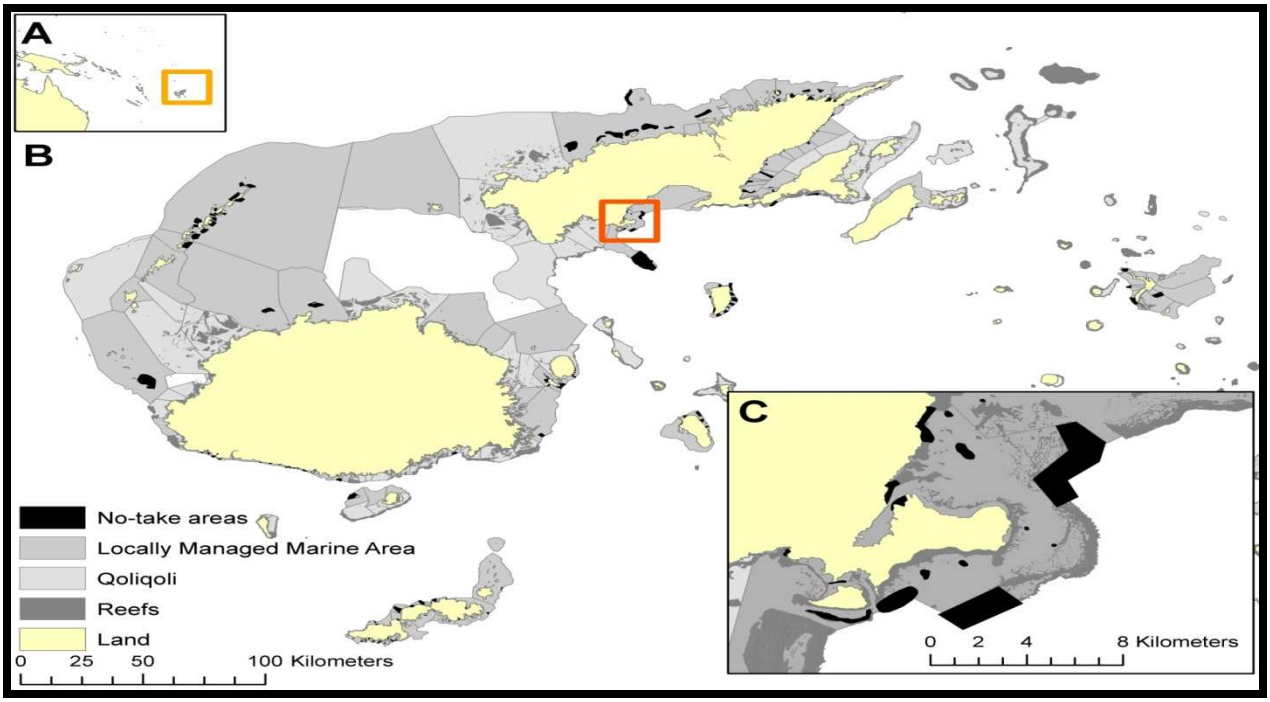
The understanding of the traditional management systems was entrenched in the wider communal structure in which the traditional authority prevailed and the structure of retribution ensured fulfillment. Traditional fishing grounds were those special areas where cultural rules were strictly adhered to (Veitayaki, 1997). Fishing at the traditional fishing grounds were conducted with the permission of a bete, or traditional priest or when special requirements were met (Veitayaki, 1997). Furthermore, in Qoma today, the people going to Cakau Davui, the sacred fishing ground are expected to obtain permission to perform the rituals of an arrival party at the reef and to fish according to the rules (Veitayaki, 1997). Notably, among the turtle fisherman of Qoma, the belief is that their gods will provide a catch enough for the purpose for which the fishing was asked for (Veitayaki, 1997). In Kaba, the traditional swimming spot for the paramount chief is only fished at the request of the chief (Veitayaki, 1997).

1.4.9 Marine Protected Areas (MPAs)

A technical report prepared by Hugh Govan (2009) on the Status and Potential of Locally Managed Marine Areas in the South Pacific states that the South Pacific has experienced a remarkable proliferation of Marine Managed Areas (MMAs) in the last decade. These protected areas, implemented by over 500 communities spanning 15 independent countries and territories represent a unique global achievement. The approaches being developed at national levels are built on a unique feature of the region, customary tenure and resource access, and make use of, in most cases, existing community strengths in traditional knowledge and governance, combined with a local awareness of the need for action, resulting in what have been most aptly termed Locally Managed Marine Areas (LMMAs).

The main driver in most cases is a community desire to maintain or improve livelihoods, often related to perceived threats to food security or local economic revenue. In the South Pacific conservation and sustainable use are often seen as inseparable as part of the surviving concepts of traditional environmental stewardship. The success of these community based management approaches comes at a time when the region faces enormous **challenges to food security, biodiversity and adaptation to climate change**.

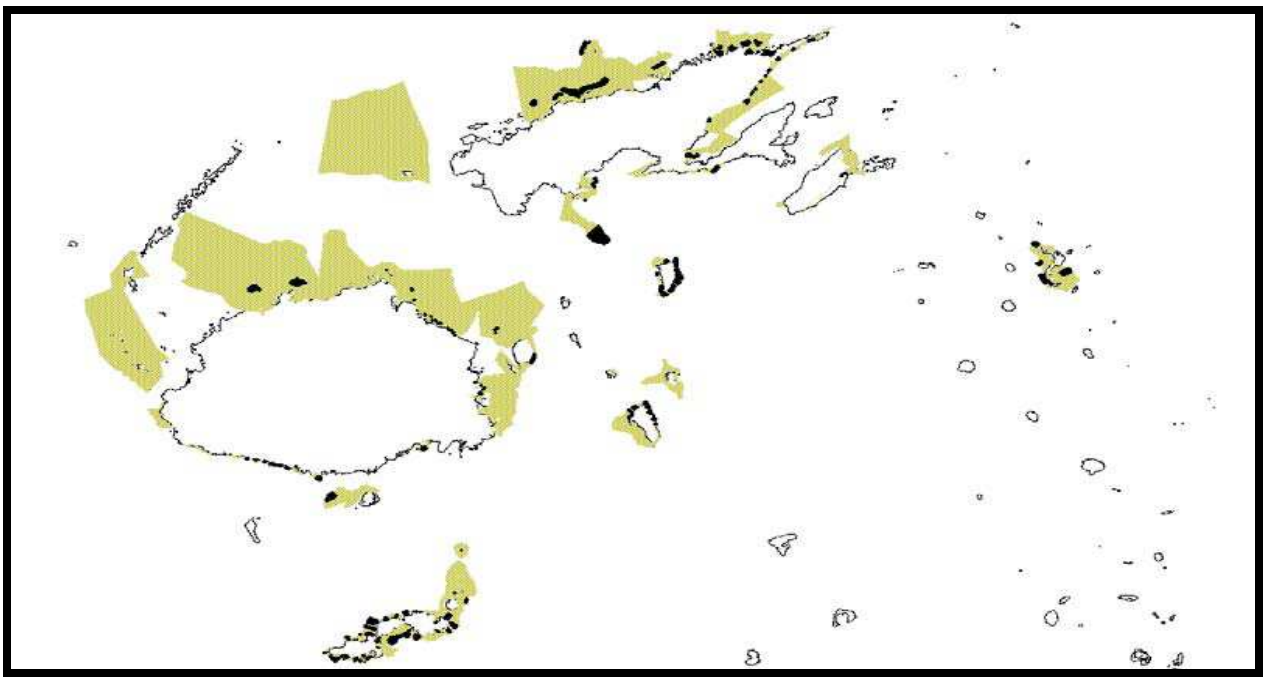
Map 1.4.9.1: Occurrence of Tabu and LMMAs in Fiji



Source: Stacy Jupiter et al, Fiji's 2010 Marine targets Report

Map 1.4.9.2: Status of Marine Managed Areas

Map 1.4.9.2 showing location of 217 Marine Managed Areas (shaded) and No-take zone or tabu locations (bold) in Fiji (source: FLMMA) as cited from POWPA presentation by Stacy Jupiter.



1.4.10 Buffer Zones

A buffer zone is any zonal area that serves the purpose of keeping two or more other areas distant from one another for whatever reason (Wikipedia Foundation Incorporation, 2010). The field of buffer zones in Fiji is under researched. However, as stated before in Chapter 1 few newspaper articles have been written on government granting permit to Natural Waters of Viti Limited (NWVL) for the introduction of a ground water protection zone for the Yaqara Basin in Rakiraki, Ra (Fiji Government Online, 2005). The field of marine buffer zones has been under researched in Fiji and further studies needs to be carried out in this discipline.

1.4.11 Introduced Species

Studies conducted by Wildlife Conservation Society and other groups underline that tilapia is a problematic invasive species to the native fish of the islands. Scientists suspect that tilapia introduced to the waterways of the Fiji Islands may be gobbling up the larvae and juvenile fish of several native species of goby fish that live in both fresh and salt water and begin their lives in island streams (Science Daily Incorporation, 2010).

Some of the introduced species of marine flora and fauna include the following:

Table 1.4.12: describes invasive species in Fiji

Species	Number Introduced	Description
Fish	**21**	Brown trout, bass, mollies, guppies, swordtails, mosquito fish, carps, tilapia, grunters, Australian bass, herrings etc).
Bivalve	**6**	oysters and mussels
Seaweed	**1**	*Eucheuma*
Tilapia		*Oreochromis mossambica* has thrived in every river to which it has been introduced and is considered to have had a detrimental effect on the status of certain native species, in particular, the *Ika* ni Vatu *Kuhlia rupestris.*

1.4.12 Other Species

Fiji's marine flora and fauna is inclusive of other species that are neither introduced nor invasive, the report will categortises these species as follows

1.4.12.1 Migratory Species

Some of the marine flora and fauna that is migratory include the following:

- Pelagic dolphins of the genus *Stenell.*
- Turtles
- Tuna
- Billfish
- Shark
- Mahi Mahi
- Swordfish

(World Wildlife Fund, 2010; South Pacific Regional Environment Programme: 2010) as cited in unpublished Natural Resource Inventory, Biman 2010.

1.4.12.2 Endangered Species

Some of the species of endangered fish include the following:

- Humphead Maori Wrasse
- Redigobius New Species

Other endangered species include:

- Devil Clams
- Leatherback turtle
- Green turtle
- Hawksbill turtle
  (Nature Fiji, 2010) as cited from the Natural resource Inventory, Biman 2010.

1.4.12.3 Endemic Species

Some of the species of endemic marine flora and fauna include the following:

- Uspi Rabbitfish
- Yellow Poison Fang Blenny and Poison.
- Fang-blenny Mimic

(Andrewartha, 2010) as cited from unpublished natural Resource Inventory, Biman 2010.

1.4.12.4 Indicator Species

Analysis of the contemporary literature suggests that the field of indicator species is under researched in Fiji. As mentioned in the literature Butterflyfishes are indicator species in Fiji. *(Crosby and Reese, 1996:1) as cited from unpublished Natural Resource Inventory, Biman, 2010.*

1.4.12.5 **Traded Species**

The marine species trade industry contributes to source of income and living for the local communities. This industry contributes to Gross Domestic Product (GDP) and contributes to foreign exchange earnings. Some of the species of fish that is traded in Fiji include:

- Black marlin
- Blue marlin
- Sail fish
- Occasional striped marlin
- Broadbill
- Wahoo
- Dolfini
- Barracuda
- Shark
- Jack Cravelle
- King Mackerel
- Yellow fin tuna
- Sea breem
- Salmon cod
- Mangrove snapper
- Jack
- Yellow Fin Tuna
- Dolpin fish
- Tilapia

(Fiji Escapes Travel, 2010) as cited from unpublished Natural Resource Inventory, Biman 2010.

7 taxa of seaweeds feature the diet of Fijians. These are the seaweeds sold in Fiji. Species of coral trade in Fiji include *Acropora* spp., *Catalaphyllia* spp., *Euphyllia* spp., *Goniopora* spp. , *Heliofungia* spp. , *Lobophyllia* spp., *Nemenzophyllia* spp. , *Plerogyra* spp., *Porites* spp. , *Trachyphyllia* spp., live rock. Sea cucumbers are also traded in Fiji. *(South, 1993) as cited from unpublished Natural Resource Inventory, Biman 2010.*

1.4.13 Current State of Research and Gaps

Analysis of contemporary literature in the field of 'Marine Resource Inventory' states that:

- Studies that were undertaken have become outdated and new studies needs to be undertaken to determine the current state of marine resource inventory of Fiji.
- Improper knowledge on marine resource inventory of Fiji will lead to devastating impact on the marine flora and fauna due to human activities. Historical evidence indicates that some of the marine flora and fauna has become extinct. Further we do not want this from happening. Studies needs to be carried out to ensure that:
    - Sustainability practices are encouraged.
    - Conservation is encouraged.

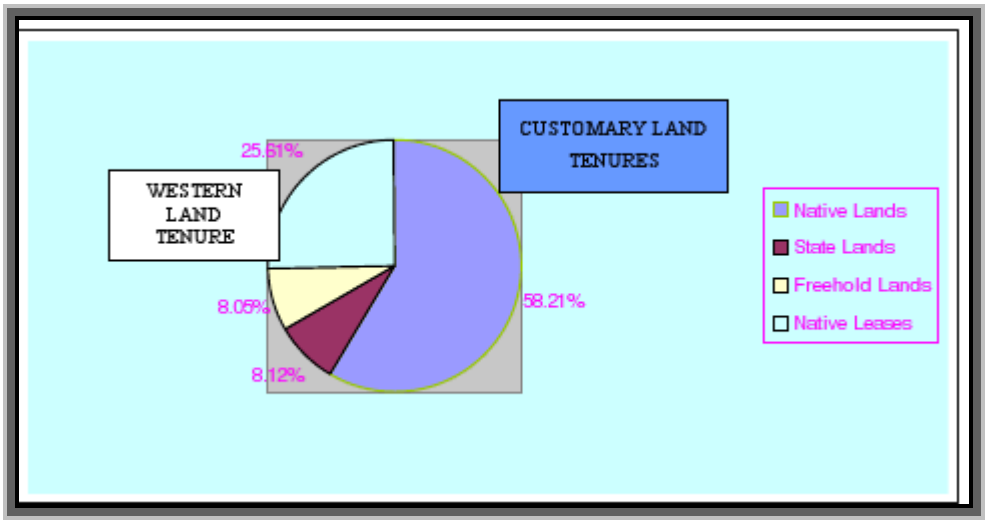
1.5 Physical Planning

1.5.1 Crown Land – Department of Lands

The total land area of the 332 islands is 18,270 sq. km with 110islands of which are inhabited and the rest of the islands are uninhabited; the latest trend is the leasing out of these islands for tourism development. Fiji has four main types of land holdings; State lands, Native leases, Freehold lands and "Vakavanua" Native lands. These land holdings can be further classified into two different type of land tenure system: "Western[23]" and "Customary[24]".

[23] Freehold, state and portion of native land leased out as native leases and are subject to Land Transfer Act.
[24] Communally held native land.

Fig 1.5.1: Comparison of land tenure by areas



Adapted from Land Tenure Report in Fiji – Department of Lands 2002.

The Department of Lands and Surveys is responsible for the administration and oversight of all development on State Land in Fiji which is 8.12% of the total land area under the State Lands Act, Cap 132. As the principal survey authority in Fiji under the Surveyors Act Cap 260, it is responsible for the regulation of all land surveys undertaken in Fiji by registered surveyors. It also develops, provides and maintains the network of survey controls nationwide. A major and growing role is that of land information, and the production and update of all national maps of Fiji. The Valuation Division of the Department undertakes all negotiations of state land for public purposes including assessments of rentals.

Since foreshore is state owned all foreshore development lease application and approval is given by the Department of Lands. The Department of lands is one of the regulatory authorities responsible for mangrove habitats in Fiji. There is a market demand for foreshore development due to the booming tourism industry in Fiji, most foreshore development leases are for tourism developments.

1.5.2 Department of Town & Country Planning

The Department of Town & Country Planning under the Ministry of Local Government, Urban Development, Housing & Environment is crucial in terms of physical planning. The Department is responsible for land zoning and subdivision within the urban areas and approval of development within the rural areas via the Local Rural Authorities. Zoning of land into commercial, residential and industrial is a crucial role of the department. Zoning is an ongoing process due to the demand in land acquisition from local and foreign investors.

Subdividing of land to create more plots for residential and or commercial is high in demand due to the demand in the market. Demand for land acquisition is high from home buyers and commercial businesses. Another vital responsibility of the department is the

approval of all physical construction of new buildings, this is given after due diligence from all approving agencies, including, Native Lands Trust Board for native owned land, Department of Lands for crown or state lands, Department of Environment for EIAs and Ministry of Health for through Local Rural Authorities for compliance with the Ministry's Health Code prior to issuing approval.

1.5.3 Ministry of Public Utilities

The Ministry of Public Utilities is home to the National Department of Roads, Water and Sewerage. For development purposes the Ministry works in line to their master plans for infrastructural development. The western division has increased in demand for these services due to the increase in visitor to the region annually from the tourism sector. The current system is not capacitated to cater for the extra visitors. One of the resolutions was for integrated resort developers such as the ones in Denarau, First Landing, etc to have their own water and sewerage systems.

1.6 TOURISM SECTOR

Another important sector that relies heavily on our natural resources is the tourism sector. Currently tourism is the main foreign revenue earner for Fiji. As stated in the introductory paragraph Fiji's gross earnings from tourism for 1st quarter, 2009 has been estimated at $167.6 million. This represents a decrease of $25.4millin or 13.2% below the gross earnings of $193.0 million for 1st quarter of 2008. The main attraction for Fiji is its natural environment and pristine marine waters. For the tourism sector to remain the key foreign revenue earner the use of our natural resources should be at a sustainable level. Best practices and approaches are encouraged to maintain the pristine environment visitors to Fiji enjoys.

The tourism sector has a policy document on promoting eco-tourism activities to ensure the utilization of natural resources with emphasis and consideration on the natural state of the environment. The document outlines 5 principles tourism operators' needs to comply with to be recognized as eco-tourism operators. A Fiji Tourism Development Plan 2007 - 2011 has also been developed identifying the best possible scenario for sustainable tourism development in Fiji and strategies to ensure Fiji worked towards it.

1.6.1 Principles of Ecotourism Development in Fiji[25]

The following principles of ecotourism development in Fiji are put forward as the basis of the formation and implementation of policies, not only at the level of Government but also in the tourism industry itself. Acceptance of these principles by all the main participants in tourism is essential if a more coherent structure is to emerge.

- **The principle of complementarity:** In Fiji, ecotourism will not and cannot replace more conventional tourism. However, properly planned and strictly controlled, it can supplement conventional tourism, add new dimensions to visitor experience, and spread the benefits of tourism to rural areas.

[25] Adapted from Principles of Eco-Tourism policies in Fiji document

- **The principle of environmental conservation:** Some parts of Fiji may be considered so important to the national heritage, and/or so vulnerable to environmental and other damage from tourism, that tourism in such areas should be either banned or restricted, e.g. through the use of selected charging policies, to ensure that they are conserved for future generations.
- **The principle of social co-operation:** Organisations involved in village-based naturetourism should come together on a regular basis.
- T**he principle of centralised information:** Information about ecotourist products and other village-orientated forms of nature tourism should be centrally available and continually monitored and up-dated.
- **The principle of strong and effective institutions:** An increase in inter-organisational co-operation and the development of a central pool of information about ecotourism necessitates the development of strong, effective and well supported formal organisations, both at government and non-government levels.

1.6.2 Development - Environmental Impacts

Tourism relies heavily on natural attractions and there are strong arguments for suggesting that tourism can have a positive impact on the physical environment. However, although often seen as an 'industry without chimneys,' it may also have a detrimental impact. Water and atmospheric pollution, deforestation and the loss of natural habitats for native flora and fauna, and soil and sand erosion, for example, can all are attributed to poorly execute unplanned and thoughtless tourism development.

1.6.3 Fiji Tourism Development Plan – 2007 – 2011

The Fiji Tourism Development Plan 2007-2016 provides a framework for a sustainable tourism growth in Fiji. The project reviewed the content, relevance and implementation of the Fiji Tourism Development Plan 1998-2005 and then collaboratively prepared a Tourism Development Plan 2007-2016 that identifies, considers and prioritizes the tourism development, management and marketing strategies for Fiji's tourism industry, in a sustainable manner.

The fundamental challenge is balancing tourism demand with quality environmentally sustainable tourism experiences. Furthermore, the challenge is to achieve this whilst fostering ongoing growth in a competitive global tourism market. Three scenarios were presented with the managed growth scenario chosen as the backdrop of the plan. This scenario considers room numbers, infrastructural development, and state and sustainability of the environment. The key strategy is promoting tourism as an avenue for conserving the environment and biodiversity.

The project outcomes were:
• Fiji Tourism Development Plan 2007-2016 (The Plan);
• Tourism Action Plan 2007-2009 (The Action Plan; and
• 4 Regional Tourism Development Strategies.

1.6.3.1 Managed Growth Scenarios

The 3 document outcome of the project spelled out the strategies and activities to achieve the managed growth scenario. The Tourism Development Plan is the overall policy document that identifies scenarios of the plan and at the same time sheds light on to the

plan in a specific manner. This document also contains strategies for the different regions. The Action Plan is a 3 year rolling plan that contains institutional arrangement. The regional strategies are documents on specific regions identifying appropriate tourism developments and strategies to achieve them.

The managed scenario was selected after series of consultation with relevant key stakeholders from government, non-government, industry and the community. Assessment of current trends in tourism from relevant statistics and data provided and through the assessment of what is available on the ground in terms of room number, flight seats, infrastructural development and tourist arrivals. All these facts and data determined that tourism growth should be maintained at the managed growth scenario, considering the impacts of tourism activities on the natural environment.

1.7 Current Status of Biodiversity in Fiji

1.7.1 Fiji's flora

The origin of Fijian flora is believed to be an extension of the of the Indo-Malesian floristic province with about 90% of all seed plant genera found in Fiji being present in New Guinea (Balgooy, 1971; Ash 1992)[26]. The total number of vascular plants known from Fiji is approximately 2600 of which 1600 are native and 1000 introduced. Current best estimates suggest that the Fijian flora consists of 310 pteridophytes (Brownli 1977) and at least 2225 seed plants (Watkins 1995).[27] Based on Smith's *Flora Vitiensis Nova* (1979 – 1991), the endemism of Fiji's seed plants is estimated to be 56%, 893 of 1594 native species. Smith (1979-1991) records 934 introduced species which is believed to be an underestimate and suggests that the correct figure is likely to be over 1000 introduced species.[28]

The single endemic family *Degeneriaceae* has two species. Out of the 450-470 genera eleven are endemic. These are:

- *Degeneria* (Degeneriaceae)
- *Alsmithia* (Arecaceae)
- *Neovetchia* (Arecaceae)
- *Gillespeia* (Rubiaceae)
- *Hedstromia* (Rubaceae)
- *Readea* (Rubiaceae)
- *Squamellaria* (Rubiaceae)
- *Sukunia* (Rubiaceae)
- *Amaroria* (Simaroubaceae)
- *Pimia* (Sterculiaceae)[29]

[26] cited FNBSAP, 2007, p.10
[27] cited FNBSAP, 2007, p.10
[28] cited FNBSAP, 2007, p.10
[29] cited FNBSAP, 2007, p.11

Genetic radiation and endemism in some groups is extremely due to the isolated nature of the island flora. The genus *Psychotria* (Family Rubiaceae) is represented by 76 species of which 72 are endemic.
Sago Palms are the best studied group. However recent works have shown how poorly we understand even such well-studied groups. NFMV has just acquired funds in 2009 to purchase 30 hectares of endangered Sago Palm forest at Pacific Harbour. The forest is in urgent need of rehabilitation and needs protection from illegal harvesting.[30]Sago palms are being cut and the soft inner part is consumed and sold frequently on the roadside along Pacific Harbour. This practice threatens the survival of sago palms since the tree only bears fruit once in its twenty years lifespan.

The structure of Fiji's forests was once clearly distinguishable but today this is far less apparent with the almost complete loss of certain forest types, some of which were once extensive. Fiji's remaining forest is mainly confined to areas of higher rainfall or at a greater altitude and in combination with steep topography. Much of Fiji's tropical forests have been cleared by loggers and converted to plantations. Increasingly, its ecosystems are in need of protection.

Table 1.7.1: Log production (m^3) as at 31/12/2006-Pine figures log volumes from pine woodlots

Year	Indigenous	Plantation			Grand Total
		Pines	Mahogany	Sub Total	
1987-2005	**2,547,745**	**6,549,631**	**107,385**	**6,657,016**	**8,926,581**
2005	104,484	321,681	17,406	339,087	443, 571
2006	79, 480	326, 821	37, 216	364, 037	443, 516
Total to-date	2, 627,225	6, 876, 452	144, 601	7, 021, 053	9, 370, 097
Annual Mean	138, 274	361, 918	7, 610	369, 529	493, 163

Source: Ministry of Forest, 2006:11.Cited from Unpublished Natural Resource Inventory Report 2010

[30] NFMV Newsletter 2 Feb 2009, p.1

Map 1.7.1: Logged Areas in Fiji

Source: Ministry of Forestry (Unpublished Data), 2010a as cited from NRI Biman Prasad 2010.
Map 1.7.14 shows the various areas of logged forests in Fiji. As illustrated in map 3.4 the most logged areas includes areas near Nausori highlands, Nadarivatu and Nabou. Namuavoivoi, Dreketi/Wainunu and koroutari.

The Sovi Basin is the largest remaining undisturbed tract of lowland forest in Fiji. As an alternative to the logging and agricultural conversion that has decimated some of the country's other forests, Conservation International, the Fiji government and the local landowners have agreed to use a conservation agreement to create new protected areas on land owned by traditional owners.

The landowners will receive lease and royalty payments in return and CI continues to work towards ensuring that financing for the wider community development investments. The 20,000 hectares of the basin is now protected, conserving 11 different forest types and 10 endemic bird species, one of which is the endangered long legged warbler (*Trichocichla rufa)* which was previously considered extinct and then re-discovered in Sovi only six years ago.[31]

Within the dry zone, only remnant patches of forests remain at higher elevation which receives more rainfall. Most other areas have been converted to grassland or scrub communities. The distinctive forest type has been almost completely logged out.

Fiji also has a small areas of freshwater swamps mainly restricted to areas of impeded drainage along river valleys and parts of the coastal plains. One of the largest is the Melimeli swamp between Suva and Navua through which the Queens road traverses. Several of the volcanic craters also support swamp vegetation such as Mt Uluiqalau on Taveuni. However no full inventory has been undertaken.

[31] http://conservation.org

Fiji also has a considerable area of mangrove but the community is relatively simple by comparison with those of island and continental South East Asia. Only seven species of mangrove exist including the hybrid *selala* which is of great botanical interest and not found to a great extent outside of Fiji. Within the Pacific Island region, Fiji has the third highest area of mangroves (517 sq km).

Much of Fiji's biodiversity is unique to Fiji and many species are not found anywhere else in the world. Fifty per cent or more of Fiji's plants and birds, all 24 palms, 72 of the 76 species of *Psychotria*, both frogs, over 90% of some insect groups, such as cicadas and marine insects, are all endemic.

The uniqueness of its biodiversity distinguishes Fiji from all other countries. As such it is a living treasure which forms a natural heritage that Fiji can be justly proud of. There is an urgent need to raise national and international awareness of this heritage and to undertake detailed fauna and flora surveys to ensure that the full complement of the national heritage is known.

1.7.2 Adequacy of our Knowledge of Fiji's flora

When compared to other islands in the South Pacific archipelago, Fiji's flora appear to be better researched even though there are many localities that have never been studied or collected. Although research on flora is minimal there are still new plant species being discovered. It is highly likely that there could be up to more than 200 species that may have remained undocumented.

It is believed that at least one thousand herbarium collections per 100 square kilometers are required to obtain a reasonable estimate of the flora composition of an area and on the basis there are few if any areas in Fiji for which the species composition is adequately known (Ash and Vodonaivalu 1989).[32]

As to be expected the distribution of Fiji's endemic species is skewed heavily in favour of the larger islands (Viti Levu, Vanua Levu and Taveuni and Kadavu). Ovalau is the only other island that has significantly more endemic species than might be expected from this area.
A few species of plants are believed to be endangered or highly vulnerable to extinction due to the limited distribution of many species. Of the 27 indigenous palms for example, 26 are endemic (96%) and 12 are known to have restricted distribution. As one might expect the vast majority of endemic plants are forest species and therefore do not survive in open habitats.

1.8 Terrestrial and Freshwater Invertebrates

Fiji's invertebrate fauna has received little attention and many groups have not been studied at all. Species of economic importance have been the focus of research such as plant pests. Literature on other groups is very scanty if it exists at all.

[32] cited FNBSAP, 2007, p.13

1.8.1 Insects

Robinson (1975) suggested that the total number of insect species inhabiting the Fiji group is in excess of 3 500.[33]

It has been reported that of the *Macrolepidoptera* (butterflies and large moths), Fiji has 400 species with seven endemic genera. Fiji has more endemic genera and more endemic radiation than any other Pacific island group with the exception of Hawaii. Another group that has received relatively detailed study is the Fiji cicadas (Duffels 1988). Of the 15 species of Fijian cicada, 14% are endemic. This includes one endemic genus *Fijipsalta*. Tillyard (1929) recorded 33 species of *Odonata* (dragonflies and damselflies) from Fiji, of which 22 (67%) were endemic.[34]

1.8.2 Molluscs and Crustaceans

There appears to have been no review of Fijian terrestrial molluscs undertaken, but Solem (1974) records 58 species for *Viti Levu.*

Haynes (1998) records 62 species of freshwater molluscs and crustacean with 7 being endemic and one endemic monotypic genus, *Fijidoma maculate,* found in the fast flowing headwaters of the *Rewa* River.[35]

Some freshwater invertebrate species have also been documented during the development of a PAC-SHMAK (Fiji's Stream Health Monitoring and assessment Kit). This is a current New Zealand Aid Funded project implemented by Fiji Institute of Technology (FIT), Live and Learn and New Zealand's NIWA.

1.9 Terrestrial Vertebrates

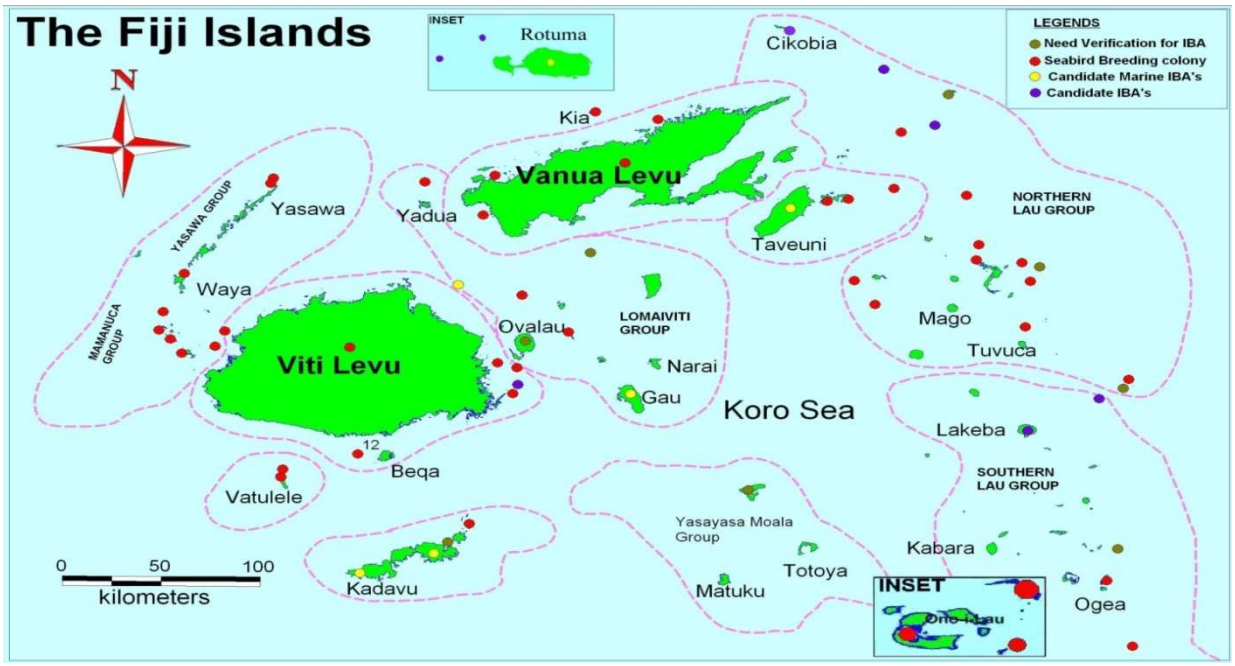
1.9.1 Birds

Birds are Fiji's most conspicuous wildlife with:

- 162 species reported and confirmed 150 recorded
- 88 resident breeding species; 57 native wetland; 20 seabirds; 11 introduced
- 22 seabirds; 20 confirmed breeding seabirds; 2 non-breeding but otherwise
- 55 migrants/vagrants; 21 shorebirds; 28 seabirds; 6 land and wetland
- 11 introduced species are naturalized.[36]

[33] cited FNBSAP, 2007, p.13
[34] cited FNBSAP, 2007, p.13
[35] cited FNBSAP,2007,p.13
[36] Environment Consultants Fiji, 2001

Map 1.9.1: Seabird IBAs



Source: Stacy Jupiter et al 2010, Fiji's 2010 Marine Targets Report

1.9.2 Mammals

Fiji's only indigenous mammals are bats of which there are six known species, four of which are large fruit bats (megachiropterans) and two are small insectivorous species (microchiropterans). One of the former, the Fiji Flying Fox, *Pteralopex acrodonta* is endemic. The five introduced species are now naturalized which are four rodents and the Indian mongoose, *Herpestes auropunctatus.*

1.9.3 Reptiles

Fiji's terrestrial reptile fauna consists of:

- 2 snakes (incl. one endemic genus)
- 2 iguanas (one endemic species)
- 10 geckos (two endemic species)
- 12 skinks (five endemic species)

Out of a total of 27 reptile species, twelve are endemic (57.1%)[37]. The single endemic genus is the elapid snake- Fiji burrowing Snake *Ogmodon vitianus.* The two species of iguana, *Brachylophus spp.* are of special interest. Three of the skinks have been described within the last decade and indication that the reptile fauna is as yet incompletely known.

[37] NatureFiji-MareqetiViti

1.9.4 Amphibia

Fiji has two little-known endemic frogs (*Platymantis)* both of which are endemic. One introduced species, the giant toad, *Bufo marinus,* is naturalized widely.

1.9.5 Freshwater fish

There are 161 living species with 10 introduced species. Out of the 151 native species 11 are endemic species and represents 7%.

1.9.6 Marine Biodiversity

FIJI Summary

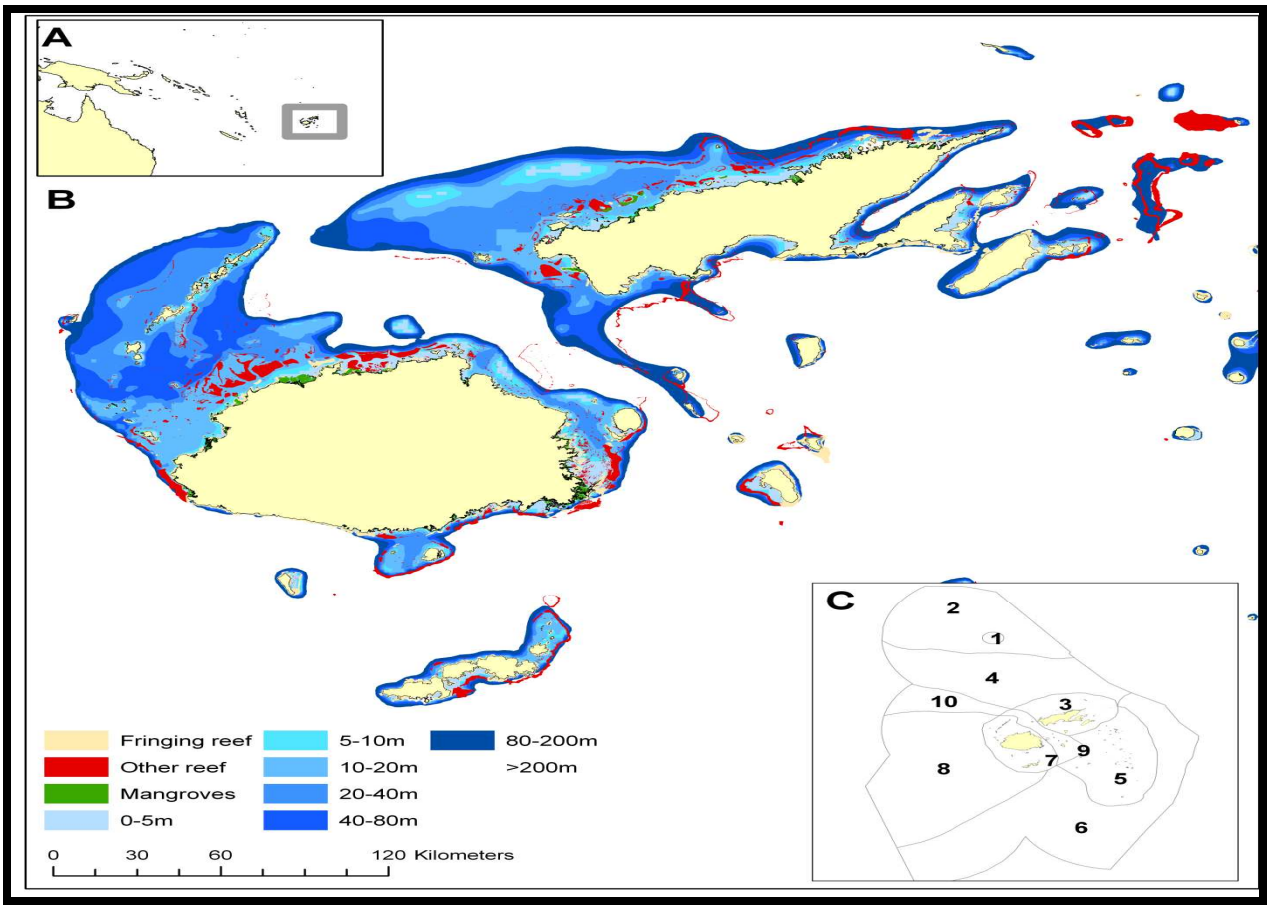
Table 1.9.6: Estimated number of described and assessed species

Taxonomic Group	**Sub group**	**Estimated number of species described***	**Number of Species Assessed**
Plants	Mosses 281 0	Ferns 234 0	Cycads 8 2
	Conifers 21 9	Dicots 1220 101	Monocots 382 20
	Algae 99 0	Plants	Fungi 415 0
	Mosses 281 0	Ferns 234 0	Cycads 8 2
	Conifers 21 9	Dicots 1220 101	Monocots 382 20
	Algae 99 0	Plants	Fungi 415 0
	Mosses 281 0	Ferns 234 0	Cycads 8 2
	Conifers 21 9	Dicots 1220 101	Monocots 382 20
Total Plants		**2660**	**132**
Birds		**105**	**105**
Mammals		**29**	**29**
Reptiles		**36**	**36**
Amphibians		**2**	**2**
FISH	Marine fish	883	77
	Freshwater fish	53	0
Total Fish		**936**	**77**
Invertebrates	**Insecta**	**748**	**0**
	Arachnids	**64**	**0**
	Hard corals	**410**	**410**
	Mollusks (Bivalves & Gastropods)	**427**	**6**
	Crustaceans	**Unknown**	**2**
	Hydrozoa	**Unknown**	**2**
	Other invertebrates	**Unknown**	**1**
Total invertebrates		**1649**	**425**
Totals		**5417**	**776**

1.9.7 Marine and coastal ecosystem

Zann (1992) provided an overview of marine biodiversity in Fiji and the use and status of marine ecosystems. Extensive reef formations occur around all the islands. All of the major reef types are represented: fringing reefs, barrier reefs, platform reefs, oceanic ribbon reefs, drowned reef shoals, atolls and near atolls. Fiji has one of the longest fringing reefs along the Coral Coast of *Viti Levu* and one of the longest barrier reefs in the world which is the *Mamanuca/Yasawa*/Great Sea Reef complex.

Map 1.9.7: Highlights reef ecosystems and locations



Source: Stacy Jupiter et al: 2010, Fiji's 2010 marine Target Report.

1.9.8 Status of Marine Biodiversity and ecosystems

Much of the knowledge about Fiji's marine flora and fauna are the result of active marine research carried out by the University of the South Pacific and the Fisheries Division. Approximately 1 200 different species of fish, belonging to 162 different families; about 200 different corals and 1 100 different mollusks have been identified. Many thousands of other invertebrates have also been described. The number of species of fish is expected to increase if new collections and identification is done.

1.8 Threats:

Fiji's biodiversity is constantly under pressure from all sectors. The main driver of threats to Fiji's biodiversity is economic development and is mostly human induced.

1.8.1 Damage of reefs

Cyclones regularly cause damage to Fiji reefs. Strong waves cause massive destruction and physically break up the more fragile species. Lowered salinity and sedimentation following flooding and coral bleaching regularly affect coral reefs on a large scale. Large scale destruction of reefs has also occurred as a result of outbreaks of the Crown-of- Thorns starfish (*Acanthaster planci*).

Localised severe damage to reefs and shore environment in Fiji has been due to the construction of ports; wharves and marinas, sea walls and reclamations. Major areas of mangroves have been cleared and reclaimed for farming, for tourism and for urban development. Dredging of silt from estuaries also created silting on nearby reefs. Dredging for coral sand to be used in the manufacture of cement has been done in the Suva lagoon.

1.8.2 Over-fishing& Exploitation

Invertebrates which are widely overfished but not biologically threatened include the trochus, mud crabs and certain species of bech-de-mer. Some species which have been overfished and threatened include turtles, giant clams and coconut crabs. Many species in heavily populated areas are grossly overfished and the stock severely depleted.

Destructive fishing practices are a serious problem in certain parts of Fiji. Dynamiting is a practice that destroys and kills marine organisms indiscriminately. Traditional fish poisons such as *duva* is a common practice. Sometimes modern pesticides and bleach may have been used.

1.83 Pollution and water quality

Potential sources of pollution in Fiji include: mining, shipyards and slipways, moorings, tourist developments, sugar mills, timber mills, cement factories, municipal waste disposal sites, sewage, agricultural pesticides and herbicides, changing land use and various industries.

A review of pollution in the Suva Harbour found elevated biochemical oxygen demand (BOD), elevated amounts of nutrients (nitrates and phosphates), high suspended solids, ph and high coliform bacterial levels in discharges from a large number of light and medium industries in the city. Levels of tributyl tin (TBT) were higher in Suva Harbour than any other port.

Levels of heavy metals in Suva Harbour are also high and are equal to the most polluted harbours in Australia. Lagoonal sediments and shellfish from the Lami area have high levels of mercury, zinc and lead.

Litter is fast becoming a problem in marine and aquatic environments in Fiji. Solid wastes such as plastic bags, metal cans, glass etc are often discarded and indiscriminately dumped on beaches, in mangrove areas and in the sea. Dumps located close to mangrove areas, rivers and the sea elevate the problem.

The introduction of Waste Disposal and Recycling Regulation 2007 is a step in the right direction for Fiji and when implemented fully should go a long way in addressing the problem of water pollution.

Sedimentation following large scale clearing of land for agricultural purposes poses an agricultural problem in the wet tropics and a major problem for coral reefs. The problem of high nutrient level may not just be confined to urban areas of Fiji since large amounts of fertilizer applied to sugar cane and rice may increase in adjacent waters.

1.8.4 Aquatic introductions

Several species of fish, shellfish and crustaceans have been introduced into Fiji. Some were introduced as ornamentals, for sports fishing or biological controls. Most were introduced for aquaculture. At least 21 species of fish (brown trout, bass, mollies, guppies, carps, tilapia etc), four species of prawns, six species of bivalves and one species of seaweed (*Eucheuma)* have been introduced into Fiji.

A recent study entitled "*The Importance of Ecosystem-Based Management for Conservation of Aquatic Migratory Pathways on Tropical Islands: a Case Study from Fiji."*[38]has reported that the introduction of non-native tilapia (*Oreochromis species)* into stream networks in areas covered in this study have affected native fish species populations. There has been a noticeable reduction in numbers of native fish species in stream networks where there is a well established *Oreochromis species* population. The loss of these native species has meant a loss of food source for the local population. Therefore the decline in the native fauna has had both ecological as well as socio-economic consequences. The study has also recommended that an ecosystem-based approach to management required should incorporate conservation of forests at or above 50% of catchment area and should actively exclude introduction of *Oreochromis species* into hydrologic networks.

An introduced terrestrial iguana has been recently reported in the media. It has been found in various locations on Qamea Island and believed to be thriving. It has been alleged to have been brought in illegally because it is not native to Fiji.[39]It was previously thought to be a marine species. It has not been established what effects these iguanas have had or will have on the environment and others species.

[38] Aaron P Jenkins, Stacy D Jupiter, Ingrid Qauqau & James Atherton (2009)
[39] Fiji Times, January 17, 2010, p. 13

Table 1.8: Threat Analysis

Driver	Threat	Direct/Indirect	Impacts
Natural Disasters	• *Climate Change* • *Cyclones.* • *Strong waves Lowered salinity and sedimentation following flooding and coral bleaching.* • *Outbreaks of the Crown-of- Thorns starfish (Acanthaster planci).*	**Indirect** **Direct** **Direct** **Direct**	Natural disasters and climate change which to some extent can be proved to be an indirect result of human induced activities, have also contributed to the destruction of reef and coral ecosystems. Rehabilitation programs caused the government million in dollars. Impacts are economical, social and environmental. Reef ecosystems have vital services such as wave breaker, and habitat for organisms that contribute to the overall food chain. With the destruction of reefs, communities are vulnerable to natural disasters and maintenance of sustainable food supply.
Economic	***Multiple stressors*** - Damage of reef - Mangrove clearing - Sand extraction - Coastal Development ***Unsustainable exploitation of natural resources*** - Overfishing - Logging - Coral extraction ***Waste and Pollution***	**Direct** **Direct**	Accumulative impacts of development will have major impacts on Fiji's biodiversity. There are limitations on our natural resources and multiple threats and stress can be catastrophic to biodiversity. Unsustainable development increases the level of stress on the environment and Fiji's biodiversity as a whole. This can result in the collapse of ecological significant areas and very important ecosystems. These systems that Fiji depends on as resource base for economic, cultural, and social development. Impacts are noticeable with the number of destructive flooding, severity and irregularity of natural disasters witnessed in Fiji. Natural disasters have increased intensities and local communities identifying different patterns within their marine and terrestrial areas.

Chapter 2.0 CURRENT STATUS OF IMPLEMENTATION OF CONVENTION ON BIOLOGICAL DIVERSITY (CBD

National Obligations under the Convention

The two primary obligations for Fiji as a signatory to the CBD were:

- preparation and production of a National Biodiversity Action Plan which was endorsed by the Fiji Cabinet in 2003
- undertaking a National Capacity Self Assessment program (NCSAP) which was completed in 2008

2.1 National Reports to the Conference of Parties (COP)

Fiji like other signatories is obligated to submit national reports to the Secretariat of the Convention of Parties (SCOP) to the CBD every four years. Fiji's First National Report to the CBD was submitted in 1998; the Second National Report in 2001. The full texts of both reports can be accessed on the CBD website at: Full text at www.cbd.int/reports/search/Fiji

Unfortunately a Third National Report was not submitted according to the Department of Environment and the CBD websites. This document is Fiji's Fourth National Report which technically covers the years between the second national report and to date.

2.2 National Biodiversity Action Plan (NBSAP)

The Department of Environment had the overall responsibility of preparing National Biodiversity Strategy and Action Plan for Fiji. Funding for the development of Fiji's NBSAP was made available through the Global Environment Facility (GEF) of the United Nations Development Programme (UNDP). The FNBSAP was completed in 1999 and was endorsed by Cabinet of the Fiji Government in 2003.

An essential part of the FNBSAP is the goal and its guiding principle;
The goal is "***to conserve and sustainably use Fiji's terrestrial, freshwater and marine biodiversity and to maintain the ecological processes and systems which are the foundation of national and local development".***

It incorporated nineteen guiding principles which are explicit statements to ensure that the NBSAP remain focused and easy to implement. These guiding principles revolve around the main idea of "***the need to ensure that future generations of landowners and citizens, as well as today's youth and children, all have an equal opportunity to use and enjoy Fiji's biodiversity as the current generation***".

Six focal points drawn up with objectives and actions as tabulated which included:

Table 2.0: FNBSAP implementation Analysis.

FOCUS	OBJECTIVE	Remarks & Analysis
Community support – Awareness, involvement and ownership.	**5 objectives**	**26 actions identified**
Key:	- Promote community support.	
	- Equitable share from the use of genetic material and products.	
	- Minimize loss of native forests.	
	- Minimize loss of aquatic resources.	
	- Minimize occurrence of wildfire.	
Improving our knowledge	**6 objectives**	**18 actions identified.**
	- Implement a program of ethno biological and traditional conservation and practices enquiry.	
	- Clarify rehabilitation needs for degraded biological resources.	
	- Improve biodiversity studies in formal education curricular.	
	- Detail knowledge of occurrence and status of Fiji's threatened and endemic biodiversity resources.	
	- Mechanisms to be established to facilitate biodiversity research and enable Fiji to access international findings and development.	

	- Establish specific research programs on Rotuma.	
Developing protected areas	**5 objectives:**	**15 actions identified.**
	- Establish a comprehensive and representative core protected system.	
	- Institutionalize the Sites - of National Significance Programme.	
	- Effectively manage existing protected areas.	
	- Encourage establishment of protected or conservation areas.	
	- Provide adequate funding for protected area management.	
Species Conservation	***2 objectives:***	***11 actions identified.***
	- Effectively manage threatened species.	
	- Effectively manage species of cultural significance	
Management of invasive species	***4 objectives:***	***18 actions identified.***
	- Reduce risk of introduction of invasive species.	
	- Control invasive and potential invasive species.	
	- Develop inter-island quarantine awareness and enforcement for important biodiversity.	

	- Ensure governmental awareness and participation in the current Biosafety protocol discussions and debate.	
Capacity building and strengthening	***5 Objectives:***	***16 actions identified.***
	- Legislations to establish institutional framework.	
	- Enhance biodiversity management skills and capabilities.	
	- Develop communities' capabilities to manage and utilize natural resources in a sustainable manner.	
	- Promote biodiversity and bioresource	
	- Considerations into government's economic decision making mechanism.	
	- Promote and apply ecologically sustainable practices in the natural resource sectors.	

Key:

High

Low

Medium

None

Table 2.1: Colour Indicator Interpretation

Key Colour:	***Number:***	***Remarks:***
	9	A lot of work being carried out by different stakeholders, but needs a detail analysis on the effectiveness of the programs towards these objectives.
	13	Works to some extent have

		been implemented from different partners, the, priority is to assess the programs and its effectiveness towards the objectives.
	4	Not much work has been visible to be implemented towards objective with blue coloured.
	1	Very little or none has been done in this area.

2.3 Implementation Framework & key Stakeholders

The implementation of the FNBSAP is coordinated by the Department of Environment.
The steering committee that oversees the finalization of the NBSAP document was identified to be Biodiversity Steering Committee[40], which is chaired by the Department of Environment. The basic role of this committee is to bring together the key stakeholders to decide on all aspects of policy, priority and programming in respect of the FNBSAP.

The BSC will be purely executive in nature and will not have managerial or administrative function. Existing Government departments, NGOs and other agencies such as the National Trust for Fiji would retain or be allocated with responsibility as lead agency for each action.[41]

A scientific Advisory Authority was also established to undertake the functions of providing the best available and factual scientific information in the cause of implementing the FNBSAP.

Other key stakeholders identified in the FNBSAP are;

- Provincial councils,
- Landowners and fishing rights owners,
- Native Land trust Board;
- National Trust of Fiji;
- Non – Government organizations;
- Business Sector.

2.4 Review of the implementation of the NBSAP

2.4.1 Results framework 2010 -2014

There were concerns about the need to address certain issues concerning implementation of NBSAP such as:

[40] As defined in the Fiji National Biodiversity & Action Plan
[41] Refer appendix.

- national priorities were inadequate and unclear
- co-ordination and collaboration among partners was greatly lacking
- absence of appropriate mechanism to track and assess progress

Representatives from key government ministries including Environment, Forestry, Education, Culture, Lands, Fisheries and with those from non-government organizations such as CI, IUCN, WCS, USP, WWF, FPSI met in April 2009 to develop a **roadmap for reviving and streamlining the implementation** of key thematic areas of the NBSAP. The key thematic areas were all threat-based which were:

- Forest Conversion
- Invasive Species
- Inshore Fisheries
- Coastal Development
- Indigenous Species Conservation

In August 2009 a detailed set of agreed **results framework**[42] were identified by stakeholders for the period 2010 – 2014 for each of the thematic areas mentioned earlier. A total of 63 stakeholders participated thus ensuring that the results framework would reflect the views of key actors in the sector. The results framework provides guidelines on the focus of government and its partners in their efforts under each thematic area. These also provide the basis for the development of annual priorities and outputs over the period 2010-2014 which is under consideration.

2.4.2 Implementation Priorities for 2010

After the development of the results framework, an implementation plan needed to be developed in order to simplify specific target for 2010 and years after. This would also specify accountabilities and provide timelines for action. In December 2009, stakeholders again met for this purpose.

2.4.3 Establishing a tracking and monitoring framework

Department of Environment has the responsibility of calling quarterly meetings of stakeholders in each thematic area in order to review progress on the 2010 implementation priorities as agreed to in December 2009 meeting. The tentative schedules of the quarterly monitoring meetings are as follows:

- 1st quarter – first week of April 2010
- 2nd quarterly – second week of June 2010
- 3rd quarterly - first week September 2010
- 4th quarter – first week December 2010

[42] Appendix 2010 Implementation Priorities

At the 4th quarterly meeting, the overall 2010 targets will be assessed and new targets set for 2011. Department of Environment has been tasked to draw up a **2010 Tracking Sheet** which will identify key actions under each thematic area and which 2010 priority to be tackled quarter by quarter. This will provide guidance during the planned quarterly monitoring meetings during the year and clearly show if there is progress or not.

2.4.4 Co-ordination mechanism

In order to assist and achieve national progress the National Environment Committee (NEC) as stipulated under section 8 (2) of the Environment Management Act 2005 "*may appoint any technical committee necessary to advise it on matters affecting environmental protection and resource management.*"

Two technical committees which have been set up so far under this clause in the EMA are:

(a) National Protected Area Committee (PAC)
(b) Integrated Coastal Management Committee (ICMC)

(a) ***Protected Areas Committee (PAC)***

The **functions** of the PAC are:

- to advise NEC on protected area policies and priorities
- to support the establishment of an adequate and representative national protected area system, consistent with national and international policy commitments;
- to facilitate consensus on national priority areas for conservation, including terrestrial, freshwater and marine protected areas;
- to identify gaps in the existing protected area system, including the extent of protected areas, the state of scientific knowledge an the adequacy of existing management measures
- to identify actions for the establishment and effective management of protected areas to be implemented by government, non-government organizations and the private sector;
- to identify optional to resource protected area management activities
- to facilitate the exchange of information and data sharing between stakeholders

The **membership** of PAC includes at a minimum:

- a representative of the National Trust of Fiji
- a representative of the Department of Environment
- a representative of the Forestry Department
- a representative of the Fisheries Department
- a representative of the Department of Culture and Heritage
- a representative of the Native Land Trust Board
- six representatives from non-governmental organizations, academia and the private sector

The **activities o**f PAC in 2009 are listed below:

- an **ecological gap analysis** as an inventory of biodiversity in the country in order to make judgments about where and how new protected areas will be established and existing ones extended
- supporting the process of drafting of specific legislation for protected areas

Data collected during the ecological gap assessment process was through agreements with project partners and representatives of PAC. As a result of the analysis of data priorities for the terrestrial environment were set[43]. The vegetation map produced will be used as the basis for the terrestrial ecological gap analysis. Future plans for 2010 include collation of data on rare and threatened species as well as plants.

Another planning workshop was organized by PAC in June 2009 with the aim of collating information on marine and estuarine species and habitats. Workshop findings support the fact that diversity surveys conducted in the past focused on certain species such as seabirds and data on aquatic habitat condition and species distribution are still too deficient to:

- determine quantitative targets for protection
- establish gaps in current aquatic conservation efforts
- prioritize regions for protection to minimize biodiversity conservation[44]

As a result of the workshop, a proposal to address the need to collect data for a more accurate and representative gap analysis for Fiji was submitted to the CBD Lifeweb Project by PAC in December 2009.

(b) Integrated Coastal Management Committee (ICMC)

The national committee roles include:

- advise the NEC on management of coastal resources
- build awareness among national agencies sectoral staff
- provide a mechanism for bringing insights from the demonstration project into national discussions
- provide guidelines for more environmental awareness in the hotels
- capacity building and training activities such as overseas training in coastal management such as that undertaken at the University of Rhode Island
- provide a mechanism to suggest national issues that may need to be considered in the Coral Coast Strategy Plan

[43] Tora, Kasaqa. 2009. Maps & Statistics of Terrestrial Overlays for Viti Levu and Vanua Levu. *Report to PAC*
[44] Jupiter, Stacy. 2009. Report on Protected Area Committee Workshop to Refine Marine Conservation Targets for Fiji. *Report to the PAC by WCS.*

2.4.5 Implementation of NBSAP is summarized in the Table 2.0 below

Table 2.4.5: below shows ONLY the key Priority Projects identified in the NBSAP, actions that have been undertaken and the outcomes[45].

(a) ***Focus 1: Community support – awareness, involvement, ownership***			
Identified Priority action	***Actions taken***	***Outcomes***	***Indicator for Assessment***
Initiate a co-ordinated awareness, educational and training programme for landowning and Traditional Fishing Rights Owners (TFRO) emphasizing the benefits of biodiversity conservation and its links with sustainable management of natural resources.	• Community work done by FLMMA network, also isolated places like Kubulau and Waimanu.	• MPAs established in many FLMMA sites.	• 149 Locally managed areas. • 216 tabu[46] areas

[45] Data adapted from *Final Report, Thematic Assessment, The Convention on Biological Diversity & the Cartagena Protocol on Biosafety*
[46] No take areas

Encourage & assist landowners and TFRO to document their traditional biodiversity knowledge and its uses and develop their own strategies.	• Some wetland ecosystems in Fiji; marine protected areas; Kubulau marine area; traditional knowledge;	• FLMMA network assisted many TFROs. • Establishment of Waimanu nature reserve.	• Record more interest from Traditional Fisheries Resource Owners on establishing MPAs and LMMA. • Database of National wetlands significant sites available.
Promote the sustainable management of indigenous forest including mangrove.	• Considerable activities especially in the Sovi Basin, Forest Policy, Fiji forest certification. • Waisali Forest biodiversity survey.	• Posters and booklet on Sustainable Forest Management. • Sustainable forest management plan. • Mangrove management plan.	• Allocation of forest reserves • Recorded complaints and queries regarding native species increased. • Increase in complaints by local on the harvesting and or clearing of mangroves.
Enact regulations or codes of practice which ensure environment impact assessments of new logging areas and plantation establishment sites.	• Code of logging best practice developed.	• Environment Management Act 2005. • EMA regulations 2008. • Forest policy accepted by Cabinet. • Fiji forest certification policy.	• Registration of business to comply with EMA[47] 2005. • Complaints by local communities on the logging practices employed by loggers. • EIA streamlined into forestry guidelines.

[47] Environment Management Act 2005

Encourage & support community-based natural forest restoration initiatives.	• Considerable activity in sustainable livelihood from several forests in Fiji-Sovi Basin, Waisali, Koroyanitu, Bouma, Kabara. • Fiji forestry certification standard being addressed.	• Forest inventory, management certification. • Community forest management. • Best Practice Draft code.	• Forestry inventory in process. • Establishment and declaration of certain forestry as reserves. • Development of a best practice code.
Strengthen the capacity for strict enforcement of the National code of Logging Practice & biodiversity conservation.	• Forest Decree to be reviewed. • Fiji forestry certification standard being addressed.	• Forest Policy accepted by Cabinet 2007.	• Availability of forestry policy. • A guideline produced on forest certification standard. • Loggers are complying with international and national legislations.e.g. CITES and EPS Act.
Encourage & assist traditional fishing rights of communities to actively manage their "qoliqoli" & to establish or reinforce protected areas, through appropriate traditional conservation measures.	• Conservation & sustainable use of marine biodiversity; marine protected areas. • FLMMA very active participation.	• More than 200 "*qoliqolis"* & MPAs managed by traditional and modern management methods as well as individual community-based organizations. • Marine protected areas tool kit.	• A total of 217 MPAs managed traditionally by local communities and by non-government agencies employing modern techniques.

(b) Focus 2: Improving our knowledge			
Identified priority action	***Action taken***	***Outcome***	***Indicator for Assessment***
Provide further professional development courses in biodiversity, ethno biological knowledge & conservation for in-service teachers.	• Awareness courses for teachers mainly on water and waste management.	• Core group of teachers already trained.	• University of the South Pacific and Fiji Institute of Technology commenced courses on Environment. • Live & Learn is involved in awareness programs on environment targeting schools.
Prepare management plans for existing biodiversity protected areas, nature reserves and community-based eco-tourism sites.	• Management plans for specific nature reserves.	• Management plans for Ravilevu Nature Reserve, Taveuni & Tomaniivi Reserve, Kubulau Marine Reserve etc	• Management Plans available and Kubulau Ecosystem Based Management System Project initiated, in collaboration with communities.
Undertake a comprehensive terrestrial & freshwater biodiversity resource inventory.	• Freshwater fauna & water quality of Kubuna River; Waisali Creek fishes; • training in fish taxonomy; • floristic survey in native forests in Cakaudrove; • fauna & water quality of Macuata rivers; • description of rare	• Some of these studies are still ongoing. • Due to participation of many different organizations and individuals, data available from them.	• Iguana research an ongoing process and a lot of activities generated as a result by National Trust. • Several reports to be assessed.

	freshwater fishes; • crested iguana survey on Yaduataba; • bird survey in Vanua Levu, & Viti Levu forests. • biodiversity of Gau highlands • coral reef surveys invertebrate survey in forest reserves • forest cover analysis • fisheries resource assessment • qoliqoli surveys • assessment of inshore fisheries • baseline survey of Champagne Beach, Yasawas • water quality and ecology of Bua Bay; port development site in Bua & Rokobili in Suva • marine baseline survey & coastal water quality study of Anchorage Beach Resort, Vuda Point.		

(c) Focus 3: Developing protected areas			
Identified priority action	***Action taken***	***Outcome***	***Indicator for Assessment***
Establish the institutional & legislative framework for a core protected areas system in both the terrestrial and marine environments. • ***Secure the priority/core sites through appropriate arrangements with the current landowners or TFROs.***	• Sovi Basin conservation & development; • Kubulau marine Reserve.	• Established reserves & development during 1995-2006.	• Sovi Basin declared a conservation area. • Kubulau reserved declared with Eco Based Management Systems, ridge to reef.
Prepare management plans for existing biodiversity protected areas, nature reserves and community-based eco-tourism sites.	• Management Plans for Ravilevu Nature Reserve, Taveuni, Tomaniivi Reserve, Ba; • LMMAs • Kubulau Marine Reserve • Management Plan for Motoriki • Management Framework for aquarium coral trade	• Work carried out in 1995-2006	• Several Management Plans for certain areas available. • NDF or EIA as stipulated in Scientific Council meeting for extraction in new sites. • Live rock extraction to be phased out, annual quota reduced. • Aquarium traders registered as per EPS Act, and permits issued for exports.

	• EIA for hard coral collection • Collection management of aquarium fish		
Ensure that adequate scientific knowledge is entered into strategies & plans.	• Work carried out same as above.	• Same outcome.	• Involvement of IAS USP and FIT.
Encourage & assist landowners and TFROs in the establishment of their own conservation areas irrespective of their national significance.	• Marine protected areas; • Case study of Votua in Ba-empowering local communities.	• Work carried out from 2000-2003.	• Have to conduct analysis studies on protected areas, however most reported cases have been positive whereby increased in fish population and size is noticed.
Review & establish an appropriate funding mechanism(s) for the management of priority biodiversity protected areas. • ***Ensure meaningful participation and provide equitable incentives and remunerations to resources owners for protected areas establishment and management.***	• Sovi Basin (Waimanu), integrating conservation & development.	• Work done in 1995.	• Identify impacts within the Sovi Basin in regards to programs implemented. • Analyze the difference in terms of biodiversity conservation and livelihoods of local communities.

(d) Focus 4: Species conservation			
Identified priority action	***Action taken***	***Outcome***	***Indicator for Assessment***
• Review the status of threatened species and prioritize species for conservation initiatives.	• Checklist of Fiji terrestrial arthropods. • Freshwater fishes of Fiji. • Turtle population assessment techniques. • Network development for turtle study. • Mapping & assessment turtle nesting beaches. • Survey of endangered parrot finch. • Coral Garden Initiative. • Freshwater gobies survey.	• Endangered & Protected Species Act 2002 & Regulation 2003. • Regional turtle data base. • Work carried out 2002-2007.	• EPS Regulation under review and Legislation to be reviewed next. • Digitizing all important nesting and foraging sites into GIS. • Obtain density of nests from WWF. • Prioritize turtle nesting sites for protection. • Get seabird information (e.g. nest density) from BirdLife into GIS. • Get sites of national significance for seabirds from BirdLife into GIS.
(e) Focus 5: Control Invasive Species			
Identified priority action	***Action taken***	***Outcome***	***Indicator for Assessment***
Appoint a focal point to be responsible for coordinating advice to Government on Biosafety issues and ensuring Fiji's	• Setting up of Biosafety committee & database information. • Awareness activities planned.	• Establishment of Biosafety committee.	• Committee has been established and are working on two invasive species Green iguana and termites.

participation in the current debate.			
Adopt legislation to provide protected status for ALL native terrestrial bird, reptiles, and amphibians with nominated exceptions.	• Legislation to cover such species.	• Endangered & Protected Species Act.	• The list available but needs reviewing.
Strengthen Fiji's capacity to implement CITES (Convention on International Trade in Endangered Species).	• Capacity strengthening mainly in response to CITES ban on coral exports in 2007.	• Ban on coral exports.	• Live coral to be phased out and commenced with the reduction of annual quota.
Review and implement appropriate partnerships with communities to enable them to attain sustainable community level resource management.	• Setting up of marine protected reserves & networks.	• Kubulau marine Reserve Network set up.	• Kubulau – setting up MPAs and Forest reserves, reef to ridge, communities involved. • Qoma set up of MPAs communities involved. • Dawasamu, Tailevu community managed MPAs with assistance from an NZ University. Etc.

Four case studies which exemplify some of the actions or activities that relate specifically to Fiji and provide evidence that implementation of NBSAP is in progress towards meeting the 2010 targets and also intended to continue in the future.

Case Study 1: Wildlife Conservation Society (WCS) – an international NGO

WCS is one of several NGOs based in Fiji which is actively supporting Fiji's efforts in the implementation of the national NBSAP. A report submitted to the Department of Environment, *WCS South Pacific Program Report 2009* highlighted encouraging achievements of the society in Fiji from January to December which directly relate to the implementation of Fiji's NBSAP. WCS has collaborated with local people in their efforts to protect their resources such as through their work on marine protected areas.

Focusing activities on a three-pronged approach of science, management and communication WCS assisted communities in Kubulau and Macuata in Vanua Levu and the Fiji government to:

- Increase the amount of terrestrial, freshwater and marine areas under protection
- Learn about the effectiveness of their management measures
- Scale-up scientific findings to national-scale planning efforts.

WCS has worked hard at strengthening community-based management of natural resources in Fiji through:

- assistance such as that given to the Kubulau Resource Mangement Committee to develop Fiji's first ridge – to – reef management plan
- hosting workshops to build capacity for resource managers
- reviewing national legal and constitutional frameworks to determine where law and custom can be integrated for successful management

WCS has also developed a number of communication tools to raise awareness and disseminate information to the communities and stakeholders. Such tools include community bulletins, EBM partner newsletter, a feature documentary and management rule posters. WCS co-hosted the inaugural Fiji Islands Conservation Science Forum in August 2009. It was an opportunity to bring together students, researchers, government and NGOs to share latest findings relevant to Fiji. WCS has specifically targeted linking their activities to support the implementation plans of NBSAP and especially the areas of priority. Their involvement with the national effort on protected areas is such an example. On June 22nd, 2009, WCS on behalf of Protected Area Committee (PAC) hosted a workshop to review and refine marine conservation targets for Fiji. Participants representing stakeholders and experts from government, non-government organizations, University of the South Pacific and the private sector found that although some diversity survey and prioritization exercises have been done, data on habitat condition and species distribution is still too deficient. Available data is decentralized and not spatially located within a geographic information system (GIS) to be readily available for analysis.

WCS has suggested preliminary conservation targets for Fiji and recommended more funding in order to collate new and existing biodiversity and bio-geographical data into a spatial data base.

Case Study 2: Fiji Locally Managed Marine Areas Network (FLMMA) – a locally formed NGO with members from NGOs, academic institutions, government agencies, local communities and the private sector

Fiji Locally Managed Marine Area Network (FLMMA) was formed in 2000 with the goal to create a network of locally managed areas across Fiji's four hundred and ten (410) traditional fishing grounds or *qoliqoli.* This was set up to support the Fiji government's commitment in Mauritius in 2005. Fiji had committed to set up 30% of marine areas as a network of ecologically representative and effectively managed marine areas within the *qoliqolis*.

The community-based marine conservation network project taking place in Fiji since 1990s was so successful at integrating stakeholders into the management and monitoring of their resources that joining the Network helped the spread of LMMA approach throughout Fiji.

The Fiji LMMA is the first country-level network to operate independently of the overall Network. FLMMA for its significant contribution to locally managed marine activities received the prestigious 2002 Equator Initiative Award from the United Nations Development Programme (UNDP) out of more than 420 nominations and 27 finalists.

FLMMA has shown strong and successful networking between academic institution like the University of the South Pacific (Institute of Applied Science) and FIT, government departments such as Fisheries, Tourism, Forestry, Department of Environment, NGOs such as WWF, CI, WCS, Seaweb, Laje Rotuma, MES and Resort Support and resource owners based in the communities and the private sector. FLMMA has been involved in activities such as training, best practice workshops, research, site profiling, consultations and so forth. The network has tapped into both academic knowledge and skills as well as the traditional knowledge and practices held by people living in villages.

Success stories and data from the communities have been very encouraging and FLMMA has done so much not only in the conservation of Fiji's resources but also in empowering the local communities wherever they have participated.Table 3.0 shows species that have been declared as 'protected species'. This valuable data has been a major achievement of FLMMA.

Case Study 3: Mamanuca Environment Society (Fiji) – local group

The Mamanuca Environment Society (MES) was set up in 2002 by some major hotels in the Mamanuca Group supported by Coral Cay Conservation (CCC). The objective of MES was to *address environmental issues in this region towards protection and betterment of the regions marine and terrestrial environment*. The group has been involved in school education and awareness programmes in order to raise the children's awareness of their environment. Tour operators, divers, hotel guests and staff are also educated on best practice in order to protect the environment. MES has been involved in several different projects such as the Clam and Coral Restoration Project started in 2005 and Mamanuca Dive Operators Reef Check Survey with the aim of monitoring subtle changes in the Mamanuca waters.

Case study 4: Navakavu Clan (Fiji) – a participating indigenous community

FLMMA is experiencing some success at certain locations throughout the provinces of Fiji. A case study was reported on Fiji television in November 2009, involving Institute of Applied Science (IAS,), FLMMA and *Navakavu* clan (*Yavusa)* which owns traditional fishing grounds close to the *Namuka* Passage and entrance to the Suva Harbour.

A collective decision was taken in 1999 by most of the members of 3 villages and 2 settlements of Waiqanake, Namakala, Muaivusu, Nabaka and Ucuinamono who belong to the same clan. They agreed to set aside a portion of their fishing grounds as *tabu*. This meant that no fishing is allowed on this marked out area. The fishing ban was lifted this year 2009, which is after 10 years since the *tabu* was instigated. According to Jolame Sikolia, a member of the clan, they have decided to extend the *tabu* period.

According to the reports from the villagers of *Navukavu* several species which had not been seen for over fifty years are now being seen again. This include several species of fish such as *Colourpa colourpa*, a variety of crabs, prawns and eels that as they were last found in this area over fifty years ago. Research carried out in the area by Conservation International (CI) has reported a marked increase in biomass.

The *tabu* resulted in:

- Increase in biomass
- Increase in the variety of fish
- Increase in the size of fish
- Species of eels, crabs and prawns thought to be extinct found again

Other benefits have also been reported. The findings have shown perceived positive relationship between conservation measures and assets. People are earning more net income now than before from harvesting marine resources even as a result of spill over effect. There has also been improvement in local empowerment where people are taking control of entire conservation areas. There has increased security and reduced vulnerability because of increased earnings. There has been improvement cohesion as people share responsibilities and so are able to meet social obligations. Several challenges faced during this period of *tabu* were the continued fishing and non-observance of the *tabu* by certain members of the clan who disagreed with the *tabu* and the poaching by other fishermen.

The Navakavu case study covers several features that are included in the focal points of the FBNSAP and evidence that its implementation is being carried out. There was community involvement and ownership by the clan. Networking and cooperation between stakeholders also featured where the experts (IAS staff), NGOs and members of the clan were working together.

The clan also learned to deal effectively with the challenge of poachers and non-cooperative members of the clan. The members of the clan who were interviewed expressed their appreciation and excitement at the results of the project.

Chapter 3.0: MAINSTREAMING OR SECTORAL & CROSS-SECTORAL INTEGRATION

This section of the report is a consideration of national activities undertaken and highlights the performance of several stakeholders. It is important to note that both sectoral and cross-sectoral activities are being carried out.

In order for implementation of NBSAP to be successful with positive outcomes and impacts, biodiversity issues need to be integrated as far as possible in the policies, planning and mechanisms of the different sectors in Fiji. It is important that there is collaboration between the different sectors to maximize efforts and prevent duplicating work. The Department of Environment plays a vital role as it attempts to supervise or just keep up with all that is going on in spite of being disadvantaged due to lack of manpower and funding.

The advantages in mainstreaming include:

- empowering Department of Environment and partners the capacity to negotiate collectively;
- enables government to incorporate convention obligations into national legislation, policy and institutions;
- easier to manage resources and report to CBD, stakeholders and funding agencies;
- increases involvement of stakeholders in addressing global environmental issues;
- improve cross-sectoral co-ordination;
- improve development and enforcement of policies, legal and regulatory frameworks;
- improves processes such planning, management, monitoring and evaluation;
- better information and data collection, management and exchange;
- participants especially locals acquire skills and training;

However, there are constraints as well:

- fragmentation of responsibilities which may result in goals not being achieved;
- non-harmonization of Environmental Laws and may result in inconsistencies, overlapping and contradictory overtones especially when there is sectoral biases present;
- limited strengthening and enforcement of policies and legal framework;
- education and awareness of biodiversity issues;
- inadequacy of data, information and dissemination;
- limited training and skills of staff;
- financial constraints;

The stakeholders are being considered under these groupings:

- Government
- Non-government organizations

- Academic institutions
- Community-based organizations
- Statutory bodies
- Private enterprises
- Regional non-government organizations
- Civil organizations
- International donors

3.1 Overall Assessment of Mainstreaming

Fiji's Development planning has been in some form since World War II - as an instrument for stimulating economic development**.** Plans began from capital development budgets for the public sector. More sophisticated plans were tied to the introduction of the Commonwealth Development and Welfare Grant Scheme – submission of DPs by British colonies in order to qualify for financial aid. On this basis, Fiji formulated its first Development Plan for 1949-1958 (DP1 – 10 yrs). Following this, another 8 DPs were formulated up to 1990 –5 year development plans.

In 1989, a Technical Aid grant by ADB to support environment management projects (NEMPs) which tried to identify and evaluate implementation of environmental policies from DPs. DP6 (1971-75) prepared after independence started containing statements on environment and resource use. DPs that followed saw the introduction of environments Chapters, identification of programs and integration of environment issues into other sectors, convening of a national economic summit(1989) to produce policies and strategies for the Short and medium Term' DP9 (1986-90) included an indicative expenditure for Environment Management Program to include coastal zone management Plan amongst other thing**.**

1992- NEMP led to the State of Environment Report was largely a result of the national development planning process, a non-technical report to promote environmental awareness. In 1992, also Fiji made various commitments in the UN Conference on Environment and Development in Rio de Janeiro e.g. Agenda 21, and Rio Declaration, UNFCCC, CBD etc. In response to these commitments, Fiji Government set up a unit tasked with the formulation of environment reports and policies for Fiji. The first two policy documents produced were the State of Environment Report and the National Environment Strategy 1993**.** NES objectives were designed to achieve sustainable development and identified planning as a component under the objective on establishment of an administrative framework. Planning was identified in 3 main areas: *National land use, environmentally sensitive areas and coastal zone management.*

The Sustainable Development Bill followed, which led to the formulation of the Environment Management Act 2005. Early 2000 saw a shift from exploitation of natural resources due to the development of a national development plan, an overarching plan that defines the direction the government of Fiji intends to move towards. This plan incorporates sustainable development, to be in line with the Millennium Development

Goals. This saw the incorporation of biodiversity into most of the sectoral plans and policies.

3.2 Integration of biodiversity into relevant sectors

Following UNCED, where agenda 21 was one of the outcomes, and because of the MDGs Fiji started incorporating biodiversity into sectoral planning. With the focus on climate change and the idea that conservation of biodiversity will minimize the impacts of climate change, the momentum of mainstreaming accelerates.

There are other factors that contribute to the mainstreaming of biodiversity, mainly due to interest of institutions and non-government agencies initiating programs at the community level and raising awareness on the impacts of biodiversity loss. One of the main drivers of mainstreaming biodiversity is the overarching 10 year National Development Strategic Plan the government devised. The plan defined the way forward for Fiji and highlights strategies to pave the way. One of the goals of the plan is Sustainable Development, which compels all sectors to overall contribute to. Since most of the sectors are resource based, their input is vital to the achievement of the goal on sustainable development.

3.2.1 Ministry of Primary Industries – Agriculture, Forestry, Fisheries

The Department of Agriculture administers the Quarantine Act now known as the Bio-security Act. Their role is to inspect all incoming and outgoing ships to ensure that invasive species are not introduced. Due to increase in invasive species in Fiji, a committee on invasive species exists and comprises of Department of Quarantine/Bio-security, Department of Immigration, Department of Fisheries, Department of Environment, National Trust, and Nature Fiji.

The committee is currently working on eradication programs for *Green iguana* and termites present in the Northern and Western side of Fiji. The committee works very closely with the Ministry of Provincial Development and Indigenous Affairs. from the Secretariat of the Pacific Community and the Department of Agriculture have been tirelessly working also on finding ways of eradicating African tulips, an invasive species from Africa. Currently operations have commenced on the eradication of the termite species that is posing to be a threat to Fiji's biodiversity.

The Ministry is also responsible for administering the Fisheries Act and Forest Decree, which have sections on environment and resource management.

3.2.2 Ministry of Lands, Mineral Resources & Energy

There are several legislations on Environment and Resource Management administered by the Ministry of Lands and Mineral Resources. These are;

- Mining Act (Cap. 18)
- Rivers & Streams Act (Cap. 136)
- Quarries Act (Cap.128)

These legislations spells out ways of extracting Fiji's natural resources and ensuring such activities are conducted in a sustainable manner.

3.2.3 Ministry of Public Works Department.

The Ministry of Public Works Department housed some of the most vital departments to Fiji's infrastructure development. The Ministry consists of the Department of National Roads, Department of Water & Sewerage and Electrical. Since infrastructural development is vital to Fiji's economic development, legislations administered by this ministry contain sections of environment and Natural Resource Management approach. Some of the legislations included;

- Sewerage Act (Cap. 128)
- Water Supply Act (Cap.144)

3.3.4 Ministry of Health

The Ministry of Heath is responsible for administration of the Public health Act which has a portion on Environment and Natural Resource Management. The legislation outlines procedures in terms of physical development and ways of minimizing impacts on the environment and natural resources. This legislation is implemented by Inspection officers through the Central Board of Health. All development will have to comply with the requirements under this Act, prior to approving the construction phase.

The Central Board of Health is a multi-disciplinary committee with members comprising of different representatives from the different approving agencies.

3.3.5 Ministry of Transport

The Ministry of Transport is a regulatory agency in terms of land and sea transport. The Ministry is responsible for the following departments;

- Land & Transport Authority
- Fiji Islands Maritime & Safety Authority

The Marine Spaces Act administered and implemented by FIMSA[48] has a section on Environment and Natural Resource Management.

3.3.6 Ministry of Local Government, Urban Development, Housing and Environment

This Ministry housed some of the relevant departments responsible for Environment and Natural Resources Management. The ministry consists of the following departments;

- Department of Environment
- Department of Town & Country Planning
- Department of Local Government and;
- Department of Housing

The most crucial department to Environment and Natural resources Management is the Department of Environment due to relevant legislations it administers and implements. Listed are legislations administered by Department of Environment;

[48] Fiji islands Maritime & Safety Authority

- ***Environment Management Act 2005 –*** for the protection of the natural resources and for the control and management of developments, waste management and pollution control and for the establishment of a natural environment council and for related matters.
- ***Environment Management Regulations (EIA) 2007***
- ***Endangered and Protected Species Act 2002 –*** to regulate and control the international trade, domestic trade, possession and transportation of species and wildlife fauna and flora (CITES) and for related matters.
- ***Endangered and Protected Species Regulation 2003***
- ***Ozone Depleting Substance Act 1998 –*** phasing out of controlled substances and management of controlled substances
- ***Ozone Depleting Substance Regulation 2000***
- ***National Air Pollution Control Strategy***
- ***Climate Change Policy Paper for Fiji 2007***
- ***Fiji National Liquid Waste Management Strategy and Action Plan 2006***
- ***National Solid Waste Management Strategy and Action***

The Department of Town & Country Planning administered and implements the Town Planning Act, and in the course of implementation required the assistance of Department of Environment since all constructions and development has to comply with the EIA regulations prior to approval.

3.3.7 Department of Tourism

In the absence of a legislation to guide and regulate tourism development, the department has finalized a 10 year Fiji Tourism Development Plan. The plan recognizes the important role biological diversity played on its development, and thus based the plan on a managed growth scenario. This scenario was selected after analysis and assessment of current trends. This is assumed to be at a sustainable level considering Fiji's vulnerable environment and natural resources.

The strategies included eco-tourism as a type of tourism to be encouraged and that certain areas have been selected with the type of tourism development that will ensure the carrying capacity is not exceeded thus remaining within an environmental sustainable state. Accreditation standards and tax incentives based on environmentally friendly operations is also included in the strategies.

3.4 Tools for mainstreaming

Fiji has employed a few tools to assist in mainstreaming, these tools involved few agencies decision making in regards to biodiversity and the environment. Environment Impact Assessments (EIA) is one of the commonest tool used in Fiji for mainstreaming biodiversity issues and to be reflected in the decision making process. EIA is a mandatory mainstreaming tool under the Environment Management Act 2005. The EMA Act requires that all development will undergo an EIA prior to any development of an area or site. There are other tools that are used in programs which are voluntarily. The following tools associated with streamlining utilized so far in certain programs by Government agencies and NGO partners;

- Ecosystem Based Management
- Integrated Coastal & Marine Management
- Tax incentives

3.5 Challenges to NBSAP implementation

The main challenges for Fiji were:

- Political and societal obstacles such as lack of political will and political instability that resulted in difficulties in mainstreaming. The political instability brought about by the events of 2000 and 2006 challenged cooperation between stakeholders in government and NGOs and the community.
- Institutional, technical and capacity-related obstacles such as lack of human resources, inadequate capacity and lack of technology transfer. Many requests from the community could not be addressed because of the lack of personnel.
- Economic and financial obstacles including lack of financing. Financial constraints limited travels to do fieldwork in the community.
- Lack of accessible knowledge/information such as lack of scientific and traditional knowledge on status of biodiversity. This has been a concern for terrestrial ecosystems and in the gathering of data on both fauna and flora.
- Lack of collaboration and co-operation between partners and stakeholders.

3.5.1 Addressing challenges and identifying opportunities:

- ***Mainstreaming***: Strong networking and collaboration between the different ministries of government that are involved in the conservation and sustainable use of biological resources is vital for the successful implementation of NBSAP. In Fiji's situation, for example, the ministries of tourism, agriculture, fisheries, forest, mining, Fijian Affairs, Native Land Trust Board together with the local communities and the NGOs have to work together. FLMMA has achieved a considerable level of success in getting together these different parties and achieving success as a result.

  Gathering of data and information, analysis and dissemination is vital for success. It is much easier to identify problems and solutions and priorities when information is readily available. Synergy in information systems, data management and reporting go a long way in ensuring that Fiji meets its obligations under the Convention.

  Gathering available data from appropriate and up to date information was a major constraint in writing this report.

- ***Community Participation***: Members of the community at the village level are directly involved in planning and decision making, collecting data as well as protection of their resources. There is an increased awareness in adults and children about conserving their resources. Knowledge transfer through conducting workshops or seminars, knowledge management, encouraging research, developing associations and forums for discussion would greatly enhance the level of synergy.

- ***Traditional Knowledge***: The traditional hierarchy of the Fijian village and provincial system is being used to help in the implementation of NBSAP. Some of the Fijian chiefs have been instrumental in the setting up of marine protected areas or *tabu.* This was a custom observed as a sign of respect in mourning for chiefs. As the communities observe the benefit of increased biodiversity from such a practice many are lengthening the duration of the *tabu* period.

- ***Upskilling of personnel***: Even though DoE facilitated much of the activities, there is a need for more skilled personnel since the officers at DoE already are inundated with work.

- ***Funding****:* Funding from international donor agencies and NGOs has greatly supplemented government contribution towards environmental issues.

The review of the NBSAP for Fiji as outlined in this report showed that the development of the document though completed in 1999, was not endorsed until 2007. However, implementation of the NBSAP for Fiji was well underway before 2007. Furthermore the NBSAP has undergone a review which has resulted in adapting the document to actionable framework and priorities.

Measuring the progress of the implementation of NBSAP has been dependent on reports of work and outcomes carried out by NGOs, as well as case studies. NBSAP is a dynamic, responsive process and changes will continue to happen. The review of the NBSAP has streamlined and clarified targets and framework to be followed. This should see a clearer and faster progress of implementation.

A meaningful progress towards 2010 biodiversity targets, goals of strategic plans needs the co-operation of all stakeholders including government agencies, NGOs and members of the community. The full participation of communities, who are resource owners in a majority of cases, ensures ultimate conservation of biological diversity. Evidence of this phenomenon is being observed in successful cases some of which are mentioned in this report.

Mainstreaming or cross-sectoral integration has worked well towards the protection of biodiversity in Fiji. This has seen networking between all stakeholders including resource owners and the community, government ministries, NGOs and academic institutions such as University of the South Pacific.

This report has documented only a representative portion of all that has been happening in Fiji as far as implementation of the National Biodiversity Strategies and Action Plans is concerned. A more comprehensive audit of projects, activities and relevant data would need to be done in the future.

3.6 Collaboration activities between different agencies

Table 3.6: *The table below is a summary of what particular stakeholders are doing*[49]

Stakeholders	Activities & participating partners
1. GOVERNMENT	• NLTB, DoE, Forestry, Fisheries have collaborated in certain programs such as assessing Sovi Basin, management plans in nature reserves, forest policy and timber identification, integrated resource management plans, studies on fisheries resources, enabling legislation, production of awareness material and inventories of resources • Department of Health (Nutrition Section), Town Planning, Lands, Education (Curriculum Development Unit-CDU), Rural Development, Tourism and Commerce also carry out conservation activities as minor parts of their major function • Department of Agriculture carries out programmes with farmers on planting of native fruit trees and vegetables. It also regulates the clearing of land in agricultural areas. The Department also carries out awareness programs on safe use of agricultural chemicals. • The Quarantine section of the department inspects incoming and outgoing shipments and passenger luggage for potentially harmful diseases and organisms and is an intercepting agency under CITES. Fiji Quarantine section has a bilateral quarantine agreement (BQA) with Australia and New Zealand pertaining to quality assurance for exported agricultural products such as mango, breadfruit, eggplant and pawpaw. • The Forestry Department carries out timber certification process. Fiji has a Code of Practice for logging and this Code has been undergoing review. The Code is allied to a legally-binding Forestry Decree, while the Forestry Policy was revised in

[49] Adapted from *Thematic Assessment: The Convention on Biological Diversity &Cartegena Protocol on Biosafety. Final Report. 2007 (*Report author Dr Patricia Kailola; Reviewed and edited by NCSA Project Steering Committee, NCSA Project & UNDP Fiji.

	2007. • The Department of Forestry works actively with several non-government organizations including WCS, WWF, Birdlife International, Conservation International and the South Pacific Herbarium. • The Fisheries Department is an active participant in the FLMMA. It works with SPREP, SPC and other local and regional organizations in raising awareness (eg "Year of the Turtle", "Year of the Coral Reef") and surveying. • The Department of Enviroment performs a coordinating role with other environment-associated department and with their help develops and supports legislations and conventions to the environment and conservation activities.
2. NGOs	• 3 NGOs already included in the report under case studies are **FLMMA, WCS** and **Mamanuca Environment Society.** • **Birdlife International** established its secretariat in Suva in 2003. Activities have included bird surveys at 20 forested sites in Viti Levu in 2003-2006; at 8 forested sites in Vanua Levu in 2003-2004. Developed Management Plans for Ravilevu Nature Reserve, Tomaniivi Nature Reserve. Carried out biodiversity surveys. Developing proposals with other NGOs such as IUCN to consider addressing legal impediments to establishing a network of protected areas in Fiji in 2008. Developing a proposal for empowering local people in their rights • **Live and Learn Environment Education Inc** opened its offices in Suva in 1998. Some of its collaborative efforts are listed below. Developed HOPE (Helping Our Planet Earth) toolkit and program for primary schools in 2008. ".HOPE for Peace" teacher training in 2006-2007. River Care Program for secondary schools (Vodafone Fiji Foundation) in 2008; Water quality and waste management with FAB in 2007-2008; Developing ' Sustainable Communities' programs with SPC, Department of Agriculture and National Centre for Small Micro-Enterprises Development in 2007
	• **World Wide Fund for Nature (WWF South Pacific and Fiji Country Programme).** Its Pacific

	programme aims 'to support Pacific Island people in conserving and sustainably managing our natural inheritance for present and future generations.' Some of its notable activities have been in their study of Wetland ecosystems in Fiji: uses and distribution in 2000; sustainable livelihoods on Kabara Island in 2006-2008; Self Help Tool Kit for marine protected areas for coastal communities of Fiji to encourage sustainable livelihoods in 2005-2007; Conservation & sustainable use of globally outstanding biodiversity in marine environment of Fiji in 2005-2007; The South Pacific Marine Program – Fiji activities, 2004-2007 South Pacific Whale Sanctuary, 2005-07; South Pacific Marine Turtles Program of Work, 2005-07; Report of the mangrove flora & fauna surveys conducted within Lomawai Reserve, Bole Reserve & Lotonaluya Reserve, Tikina Wai, Nadroga, 2003; Inventory of wetlands-kuta growing areas, 1999; Gau Island & Macuata Province protected areas project, 2007-08; community natural resource management and enhancement in Ono-i-Lau for biodiversity conservation and sustainable livelihoods, 2006-07.
3. ACADEMIC	• **University of the South Pacific-** - **Geography Department:** MSc project (Takeda), flora of Sigatoka Sand Dunes and the impact of invasive species (with support from National Trust), 2008; MSc project (Kuruyawa), women in fisheries on Beqa, 2008 - **Institute of Marine Resources:** Turtle tagging project (with WWF), 2007-ongoing, Shark finning project (proposal), 2008 - **Institute of Applied Sciences:** community based closed areas in Fiji: a case study in the fishery effects of marine reserves and fishery closures, 2002; Marine-protected areas (MPAs), 2004-ongoing - **Biology, Chemistry, Mathematics, Physics:** Studies have included water quality of the Sigatoka River catchment, sediment circulation and metal loading in the Rewa River estuary, biology of the Fiji ground frog, study of local populations of an invasive ant species, studies of biology and ecology of beetles, butterflies, honey-eater birds, comparison of bird populations in degraded and pristine forest areas, study of persistent organic pollutants in freshwater and inshore marine edible mollusks, contamination

	levels in market fish and shellfish, an economic appraisal of MPAs and vegetative propagation of sandalwood and determination of sandalwood hybrids.
4. STATUTORY BODY	- National Trust of Fiji-It has maintained its care of the Sigatoka Sand Dune National Park and the Waisali Rainforest Reserve.It also has a Kadavu Bird Awareness project, the Kacau ni Gau awareness project and the Global Mangrove Information System (GLOMIS) project.
5.COMMUNITY-BASED ORGANISATIONS	- Biasevu Tourism Committee: community biodiversity conservation and ecotourism support project – forest ecosystems, Korolevu, 2006-07. Funded by UNDP-GEF.
	- Wainimate: its missionis to ensure that promotion, conservation and protection of safe and effective traditional knowledge and medicinal plant - Sovi Bay Working Group: Pacific –Asia Biodiversity Transect Network(PABITRA) survey, Sovi Workshop
6.BUSINESS/PRIVATE ORGANISATION	- Clean Up Fiji: Its main activity is to is annual 'Clean Up Day' Fiji Times (News Limited): setting up of 'One degree' Climate change initiative nation-wide. Using the daily newspaper Fiji Water Foundation: Use of Sustainable Growth Initiative intended to make Fiji Water products 'carbon negative' - VODAFONE ATH Fiji Foundation: partners with credible NGOs to fund projects that will benefit communities in Fiji.

Chapter 4.0: PROGRESS TOWARDS 2010 TARGETS

The table analyses activities, programs that have contributed towards the 2010 CBD targets

Goals and targets	***Progress towards the Target (highlighting key actions, outcomes and levels of progress)***
Protect the components of biodiversity	
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes	
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved. *Marine targets; LMMA considered targets achieved, Tabu or no take zone considered targets not achieved.* *Terrestrial targets; Programs have not been really analyzed to gauge effectiveness. Targets partially achieved.*	• Over 100 Locally Managed Marine Protected Areas (LMMAs). • 216 tabu areas. • 1 potential World Heritage site in the process to be listed. • Sovi Basin largest area of land to be declared a reserved area. • Forest areas have been identified as reserved and protected need to analysis.
Target 1.2: Areas of particular importance to biodiversity protected *Key biodiversity areas, Important Bird areas, Wetlands Nationals Significant sites, Fish aggregations and spawning sites have all been identified with conservation programs carried out, however, needs analysis of programs and research of sites to gauge effectiveness of conservation programs and their contribution to target 1.2. Target achieved.*	• Key Biodiversity Areas identified. • Identified hotspots for biodiversity. • IUCN Red listed species. • IBAS indentified. • Coral Triangle Initiative. • Taveuni Bouma and Tavoro sites have been identified as special biodiversity areas. • Spawning aggregates sites for marine identified. • Kadavu identified as largest bird breeding site.

Goals and targets	*Progress towards the Target (highlighting key actions, outcomes and levels of progress)*
Goal 2. Promote the conservation of species diversity	
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups. *Program ongoing in this area but needs effective analysis. Target partially achieved.*	• IUCN Red listed species • Recovery programmes e.g. mangroves, clams, various native trees spp. replanting • Ongoing studies and programs implemented by Nature Fiji on Sago palm and other species.
Target 2.2: Status of threatened species improved. *EPS Act in force and rate of enforcement accelerated. Work programs should be diverted to improve the status of threatened species. Target partially achieved.*	• Identification of the threatened species (IUCN Red listed species) and population surveys and threat analysis. Samoa: Giant clam restocking. • Annual export Quota reduction in tabua[50], and live coral, and phasing out process of live coral export commenced. • EPS Act needs analysis on implementation to gauge the effectiveness, all trading companies registered, with permits issued and quotas determined annually, but the analysis is still a missing link. • Needs in depth analysis on programs with objective of improving threatened species.
Goal 3. Promote the conservation of genetic diversity	
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.	• Koronivia research station responsible for crop and livestock verification and available programs on reproduction for plants and animals and the maintenance of Fiji's diversity for plants and livestock. • Work with individual famers and SPC in combating pests that are harmful to Fiji's

[50] Whales tooth

Goals and targets	***Progress towards the Target (highlighting key actions, outcomes and levels of progress)***
More research and publication of findings to be conducted. Target partially achieved.	diverse plants. • Ministry of Education through Culture & Heritage department is conducting a survey and mapping of traditional knowledge. (Complete 2 province)
Promote sustainable use	
Goal 4. Promote sustainable use and consumption.	
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity. *Programs are running in parallel to address these issues but critical analysis of the program outcome is needed to gauge effectiveness. Target partially achieved.*	• Indigenous trees/plant for wood carving/handicrafts. • Coral farming conducted by Aquarium trading companies to reduce wild coral harvesting. • Traditional taboo areas for species and ecosystems. • Fiji Soga Palm management Plan available, local communities encouraged to harvest sustainably.
Target 4.2. Unsustainable consumption, of biological resources, or those impacts upon biodiversity, reduced.	• Banning of using poisonous substances. • Introduction of traditional fishing wardens to police fishing ground.

Goals and targets	***Progress towards the Target (highlighting key actions, outcomes and levels of progress)***
With the existence of programs, local communities have highlighted success stories, however no formal analysis conducted. Target partially achieved.	• Monitoring of subsistence catches by villagers. • Gear restrictions e.g. banning of fishing nets with less than3cm in diameter. • Licensing system for fishing boats and fishing vessels. • Quota systems for marine and terrestrial export commodities as in CITES & EPS Act 2002. • Giant clams restocking programs conducted by Department of Fisheries. • Work of NGOs such as WCS, with communities e.g. Kubulau.
Target 4.3: No species of wild flora or fauna endangered by international trade. *Fiji is complying with international and national legal instruments and wild fauna and flora is not endangered by international trade. Target partially achieved.*	• List of all native species available. • EPS Act, ensures all species of wild flora and fauna are protected, Act enforced in 2008. • All exports of native species and CITES listed species are monitored. • Enforcement officers trained to identify activities that qualify as international trading and to combat. • Border control CITES information guide books for enforcement available. • Awareness programs to communities on issues of trading wild flora and fauna.
Address threats to biodiversity	
Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.	
Target 5.1. Rate of loss and degradation of natural habitats decreased.	• Ministry of Agriculture works on Land and Water Resource Management Project, to

Goals and targets	***Progress towards the Target (highlighting key actions, outcomes and levels of progress)***
Development has been the major cause of loss and habitat degradation, the most threatened habitat s coastal areas as development concentrates mostly within these areas. With the introduction of EIA and FTDP 2007 – 2016, these problems will be minimized. Target partially achieved.	address solution of flooding and habitat loss within the Nadi basin. • Improved enforcement of EIA Regulations. • Identification of tourism development type for instance, Vanua Levu, small boutique type of development to ensure the natural settings of the area is not disturbed. • Fiji Tourism Development 2007 – 2016 introduces tax incentives for environmental friendly operations. • Ecotourism policy document to guide the development of ecotourism in Fiji. • Mangrove Management Plan available but not implemented accordingly. • Establishment of
Goal 6. Control threats from invasive alien species	
Target 6.1. Pathways for major potential alien invasive species controlled. *This is one of the challenges to Fiji with past and current activities in trying to eradicate past invasive species still unsuccessful, newly identified invasive species have added to the challenge. Target partially achieved.*	• Biosecurity Act in force. • Committee on invasive species established. • Training workshops conducted to customs, biosecurity and police officers to effectively enforce CITES. • Eradication programmers for termites and Green iguana. • Giant African snail management plans & awareness. • Identifications of all pathways for potential species.
Target 6. 2. Management plans in place for major alien species that threaten ecosystems, habitats or species. *Work in progress, target not achieved.*	• A committee is established. • Enforcement of bio-security protocols and legislations. • Not aware of any management plans.

Goals and targets	***Progress towards the Target (highlighting key actions, outcomes and levels of progress)***
Goal 7. Address challenges to biodiversity from climate change, and pollution	
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change. *Effectiveness of programs yet to be highlighted. Target partially achieved.*	• Establishment of a Climate Change project in Fiji under the Department of Environment. • Water resource catchment management (Integrated water resource mgt), still in phase II. • REDD initiatives to encourage communities and landowners to maintain forest and get financial returns from carbon trading still in discussion. • Promotion of ecosystem based approach to biodiversity conservation or species protection (PICs) e.g. integrated watershed management includes protected areas. • Best agriculture practices communicated to famers. • Fiji Forest certification standards.
Target 7.2. Reduce pollution and its impacts on biodiversity. *Work and programs on waste and pollution is still ongoing. This is another area that is very challenging to Fiji. Needs technology improvement and changing the attitudes of the community at large. Target not achieved.*	• A National Solid Waste Management Strategy and Action Plan available. • Environment Management Regulations endorsed and came into effect in 2008. • A pilot project on 3Rs reduces, reuse, and recycle in Lautoka municipality which will eventually be introduced to the other municipalities. • Strict Environment Management and Monitoring Plans for logging, quarry and sewage treatment plans • Enforcement of EMA 2005 saw operation compliance, issuing of notification to all commercial buildings and industries for the need to acquire a permit to generate waste. • Combating waste and pollution issues is still a challenge, thus Environment Week 2010 saw Fiji coming up with the theme "Stop pollution save our Plants and Animals" aligning it with the IYOB theme and at the same time highlighting Waste and pollution as an issue.
Maintain goods and services from biodiversity to support human well-being	
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods	

Goals and targets	***Progress towards the Target (highlighting key actions, outcomes and levels of progress)***
Target 8.1. Capacity of ecosystems to deliver goods and services maintained. *Rehabilitation programs to repair ecosystems are ongoing. Target partially achieved.*	• Establishment of Kubulau reserve using the Ecosystem based management. Thriving programs that ranges from terrestrial ecosystems to marine ecosystems, positive outcomes identified by communities. • Mangroves replanting in most PICS
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained. *Programs have assisted local communities. Target partially achieved.*	• Eco tourism grants supporting local communities to venture into tourism entrepreneurship, utilizing local natural resources as attraction site for tourism thus conserving sites at the same time. • Community based tourism; community owned operations involved the reviving of traditional knowledge and using them for tourism attraction.
Protect traditional knowledge, innovations and practices	
Goal 9 Maintain socio-cultural diversity of indigenous and local communities	
Target 9.1. Protect traditional knowledge, innovations and practices. *Work still in progress. Target partially achieved.*	• UNESCO World Heritage documentation of traditional knowledge • Mapping of traditional knowledge and introducing a project known as human treasures, i.e. local people that have traditional knowledge no longer available within their generation.
Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing. *Not much being done in this area. Target not achieved.*	• Draft legislations for Culture and Heritage still in the finalization process. • Benefit Sharing is not mandatory in Fiji but is reflected in some policies.

Goals and targets	*Progress towards the Target (highlighting key actions, outcomes and levels of progress)*
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources	
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources	
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions. *Not mandatory as the practice is an understanding between organization and the government. This target partially achieved.*	• A requirement for researchers either individual or institutional to have MOUs with the government and share their findings. • Permits issued to researchers wanting to take species overseas for further studies, which has a portion where findings will made available to Government if the need arises.
Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions	• Ministry of Primary industries involved in utilization of genetic resources. • Not much has been done in this area in regards to access benefit sharing. *Not much being done in this area, a legislation is has been drafted by Department of Culture & Heritage.*
Ensure provision of adequate resource	
Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention	
Target 11.1. New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20. *Funds are available; Community capacity building has been a key output of government agencies in collaboration with NGOs The level of understanding has increased on biodiversity issues as indicated by the number of complaints*	• GEF Small Grants in PICs help finance a lot of community biodiversity conservation activities. • GEF-PAS projects: energy efficiency, EBAM as in CTI Project. • PoWPA funds activities in protected areas and conservation areas. • EU project on water management. • EU project on Biofuel. • Integrated Human Resource Training and Development, ILO funded provided training and funding for projects that are environmental friendly, e.g. Molituva project inclusive of piggery, catering and sites attractions for tourists.

Goals and targets	*Progress towards the Target (highlighting key actions, outcomes and levels of progress)*
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4. *Technological advancement is needed to effectively implement commitments under CBD, this target partially achieved as Fiji still lacks relevant technologies to effectively implement CBD requirements.*	• Mapping technology based on GIS/GPS, mapinfo. • Turtle monitoring/tagging using satellites. • Promotion of eco-tourism and eco-friendly technologies e.g. aquaculture and agro-farming. • Promotion of solar system usage and waste treatment plants for tourism operations.

4.1 Goals and Objectives of the Convention of Biological Diversity

With the ratification of the Convention on Biological Diversity, Fiji pledged to be guided by the Convention's principles, to ensure that it complies with the Conventions requirements to achieve its obligation under CBD.

The Convention has its objective as;

"The conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies and by appropriate funding".

A number of measures that obligates parties under the Convention and can be utilized as indicators include;

Table 4.1: Assessment of Objective of CBD

Obligation/Indicator	*Remarks*
Monitoring and identification of biodiversity.	Fiji has identified its key biodiversity areas (KBAs) and IBAs, national wetland significant sites, fish aggregation and spawning sites.
Environmental Impact Assessment.	Fiji has enforced the Environment Management Act (EMA) 2005, with its Environment Impact Assessment Regulations.
National Strategies, plans or programs to conserve and use the components of biological diversity sustainably.	Fiji has a National Environment Strategy (NES), State of the Environment Report (SOE), National Solid Waste Management Strategy, Fiji Forest Policy Statement, Fiji Tourism Development Plan etc.
Integration of biodiversity policies into relevant sectoral or cross sectoral plans, programs and policies.	The Fiji National Strategic Plan incorporates biodiversity policies, the new Fiji Roadmap; policy document of the current Government has included biodiversity and environmental policies.

4.2 Conclusion

The Fiji Government in signing and ratifying the Convention on Biological Diversity signaled that there is a realization of the importance of biodiversity conservation to Fiji's overall development and more importantly to its economical, social and physical wellbeing. Because of this the Fiji National Biodiversity & Action Plan has become a living document

within the relevant key government and non-government agencies, where different programs of works are aligned to the objectives and goals of the FNBSAP.

Fiji has progressed well to achieving the 2010 targets, as witnessed from the level of awareness on biodiversity issues from local communities and the number of programs implemented on the national and local level. Although a thorough assessment of the different programs is yet to be conducted to identify a qualitative and scientific analysis result of the programs, traditional knowledge and daily experiences can guarantee the effectiveness of programs at the ground level.

Fiji is blessed with the presence of renowned international non-government conservation organizations and effective, proactive local non-government organizations. The assistance received from these organizations has seen Fiji achieved thus far in her conservation programs.

There are also underlying issues that have been a challenge to the achievement of the 2010 targets, and the major one is "striking the balance between development and conservation". This has been a long standing issue within the implementation of the FNBSAP and progress towards the 2010 target. Fiji is committed to finding solutions to this challenge, witnessed through the vigorous implementation of programs one of which is the establishment of Integrated Coastal Management framework and plan, and the Mangrove Ecosystems for Climate Change and Livelihoods (MESCAL) currently in progress.

The objective of the ICM framework is the development of an ICM Plan, to minimize the loss of biodiversity and ecosystems within the coastal areas. The MESCAL is concentrated mainly on saving Fiji's Mangrove ecosystems which will be a part of the overarching ICM framework.

These initiatives are an indication of Fiji's commitment to the Convention and to halting biodiversity loss in Fiji.

APPENDIX 1: Submission Template

Contracting Party	**Department of Environment, Ministry of Local Government, urban Development, Housing & Environment**
N A T I O N A L F O C A L P O I N T	
Full name of the institution	Ministry of Local Government, Urban Development, Housing & Environment.
Name and title of contact officer	Sarah Tawaka, Senior Environment Officer
Mailing address	P.O Box 2109, Government buildings, Suva.
Telephone	(679) 331 1699
Fax	(679) 331 2879
E-mail	sarah.joseph@govnet.gov.fj
Signature	
CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)	
Full name of the institution	Ministry of Local Government, Urban Development, Housing & Environment
Name and title of contact officer	Eleni Tokaduadua, Principal Environment Officer
Mailing address	P.O box 2109, Government Buildings, Suva
Telephone	(679) 331 1699
Fax	(679) 331 2879
E-mail	eleni2tokaduadua@environment.gov.fj
Signature	
S U B M I S S I O N	
Signature of officer responsible for submitting national report	
Date of submission	
Signature	

APPENDIX 2: Final Expenditure Statement

FINAL EXPENDITURE STATEMENT (US$)					
Project title:		"Support to GEF eligible CBD parties for carrying out 2010 Biodiversity Targets National Assessments - Phase III - (National Reporting 4)"			
Project number:		GFL-2328-2716-4A82-2201			
Project executing partner:					
Project implementation period:		From:	Sept, 2009	To:	January, 2011
Reporting period:		From:	Sept, 2009	To:	June 2010
UNEP Budget Line		GEF-approved budget	Actual expenditures incurred*	EXPLANATION { Clarification on Expenditure done along each budget line. EXAMPLE on BL-3301 - Meeting held for 15 participants for 1 day including facilitation at XYX Hotel - Total Meeting costs were $6,550}	
1201	Local Consultants		USD14,218.65	4NR and Natural Resource Inventory compilation consultants.	
1601	Travel on official business		USD 498.90	Travel and logistical in course of the consultation.	
3301	Group Stakeholder Consultations		USD 2,120.33.	Roundtable workshop for 20 pax	
5301	Office Operations/Correspondence		USD 498.90	Communication, printing etc.	
GRAND TOTAL		**USD 15,000**	**USD 17,336.78**		

*The actual expenditures should be reported in accordance with the specific budget lines of the approved budget in Annex B

Name: Jope Davetanivalu
Duly authorized official of Executing Agency

Title: Director Environment

Date: 16/06/10

Signature:

APPENDIX 3: FNBSAP 2010 Implementation Priorities

1. (I) 2010 Implementation Priorities for Forestry Conversion[51]

(Extracted from Forestry Conversion results framework for 2010-2014)

a) Mainstream EIAs into the planning and approval processes of all major sectors
b) Consolidate current databases on forest conversion & other land-use to guide policy development.
c) Enforce permits and monitoring for all forest conversion activities eg logging.
d) Develop zoning for forest use and biodiversity protection? and biodiversity research.
e) Regulate forest and biodiversity research – Clarify roles of DoE, MIA? What is reached? Who gets benefits? Need for registry?
f) Develop an evaluation framework on forest and biodiversity management
   - Criteria
   - Researching/ promoting culturally appropriate biodiversity management
   - Code of conduct for stakeholder operation
g) develop management and recovery plans for sites of national significance
h) develop programme for environment education and awareness for school and tertiary education systems
i) develop collaboration mechanism between Roundtable and private sectors for forestry and biodiversity conservation

(II) 2010 Implementation Priorities for Invasive Species

(Extracted invasive species results framework 2010-2014)

a) Establish a coordinating committee and a focal point for Invasive Species (IS)- the purposes include clarifying accountability, sharing information, stock take of current effort, better coordination and monitoring. (Establish links with Quarantine and regional institutions such as SPREP, PII)
b) Identify at least 6 priority IS (3 –terrestrial, 3-marine) of which 2 should relate to prevention. Take account of economic, social, environmental, trade effects and threats.
c) Develop and implement management programs for the above 6 IS. The programs should include policy framework, co-ordinate action plans, capacity and skills building awareness raising and monitoring
d) Develop and implement public awareness program for 6 IS. This should include focus on the education system.

[51] Cited in *Report on Fiji's Environment (Biodiversity) Priorities for 2010*

e) Develop regional, national and inter-island initial response guidelines/system for accidental introduction of invasive species.
f) Sensitize and involve biosecurity/quarantine staff on IS and biodiversity concerns. Implement related capacity building program for border control.

(III) 2010 Implementation Priorities for Inshore Fisheries

(Extracted from Inshore Fisheries Results Framework for 2010-2014)

a) Formalize coordinating committee and focal point for biodiversity of inshore fisheries (consider FLMMA) to guide NBSAP implementation.
b) Develop framework for FLMMA (Others) to address biodiversity
c) Develop strategy to work with Department of Fisheries to address unsustainable fishing practices (influence formulation of new Act; consolidate best practice).
d) Identify and promote alternative sources of income linked to a healthy marine ecosystem.
e) Identify community capacity needs to manage inshore fisheries and support related capacity development.
f) Ensure that traditional ecological knowledge (TEK) survey of Department of Culture includes practices related to fisheries management.
g) Update Green Book of Fiji (School Education System)
h) Include inshore fisheries in Awareness Campaign for 2010 Year of Biodiversity
i) Collate currently decentralized biodiversity information into a Natural Resource Inventory.

(IV) 2010 Implementation Priorities for Coastal Development

a) EIA integration into sectoral policy, regulation and guidelines
b) Set up of the Environment Management Units in coastal development planning and approval authorities (Town Councils, Provincial Councils, Sector agencies).
c) Establish effective monitoring and enforcement system for all coastal development and land use.
d) Establish an Information hub and awareness strategy on coastal development related to information/data. (Includes appointment of Coastal Development Officer in DoE)
e) Establish a Framework for Integrated Coastal Management Plan (ICMP) which includes Mangrove Management Plan.
f) Evaluate Upstream Impacts on Coastal/Marine environment.
g) Tourism objectives for 2010.

(V) 2010 Implementation priorities for Species Conservation

(Extracted from species conservation results framework for 2010-2014)

a) Establish a Coordinating Committee and Focal point to streamline work partners.
b) Create an info hub and central operational data base.

c) Develop a species red list with IUCN support.
d) Streamline approval process of research work on species.
e) ID 6 Target Species (3 terrestrial; 3 marine from National Red list.
f) Develop framework and guidelines for management, recovery, monitoring.
g) Update species red list under EPS Act (Cites).
h) Establish guidelines for effective monitoring.

APPENDIX 4: Protected Area Workshop to refine marine conservation targets for Fiji

Sharks

Important facts:

- Coastal/reef sharks more threatened by habitat degradation than finning
- Most sharks caught as bycatch are oceanic/pelagic, though many indigeneous fishers using short-longlines in coastal areas for fins
- No legislation to protect sharks, though in proposal in preparation by Fisheries to completely protect sharks in Fiji waters. Pio Manoa of FFA rewriting our Fisheries regulations.
- Under new rules (2009) of ??? International Commission, only supposed to offload ratio of 1:20 fins: shark meat by weight, however statistics presented show much higher ratio of fins: meat
- Shark Management Plan will be finished in 2009

Important localities:

- Shark Reef/Lake Reef/CMR
- Pupping grounds in Nadi Bay. Hammerhead sharks pupping in Laucala Bay.

Data:

- Maps of shark movements from researchers affiliated with Beqa Adventure Divers might help define protected area size requirements for sharks in Beqa area

Sea Turtles

Important facts:

- Proposal tabled by Fisheries to extend moratorium for 10 years. Waiting for cabinet response
- Feeding grounds may be upwards of 1000 km away from nesting grounds
- Fiji National Turtle Recovery Plan: By 2026, sea turtle populations in Fiji have measurably recovered to levels allowing for sustainable harvesting and traditional use
- Subtidal seagrass areas below 5 m most important for feeding

Important localities:

- Yadua Taba
- Namena (Kubulau corridor)
- Yasawas
- Kadavu
- Areas highlighted on map (digitized into GIS)

Data:

- Obtain density of nests from WWF to prioritize turtle nesting sites for protection
- Ensure that all important nesting and foraging sites have been digitized into GIS

Seabirds

Important facts:

- Still developing High Seas IBAs
- Looking at seaward extensions to terrestrial breeding colonies
- 19 species breed in Fiji (10 forage in coastal waters; 9 are pelagic feeders); 29 migrant species of seabirds through Fiji; 22 migrant waders
- Literature review and fieldwork ID'd 64 islands or island groups hosting nationally or internally important seabird colonies (see map from presentation)

Important localities:

- Suva point and Saweni flats (for waders)
- Gau (for Fiji petrel, Tahiti petrel and Collared petrel)
- Vatu-i-Ra Island (for black noddies)
- Rotuman offshore islets of Ha'atana, Hofliua and Hatawa (seabird colonies)
- Taveuni (for Tahiti petrel)
- Kadavu (for Collared petrel, Polynesian storm petrel)
- Ovalau, Vanuabalavu (historic nesting sites for Collared petrel)
- Vatu-iLami, Mavualau, Namenalala, Cikobia, Nukubasaga, Nukusimanu, Vetaua, Yabu, Sovu, Wailagilala Atoll, Naiabo, Vanuamasi, Reid Reef, Lateviti, Kibobo Island, Nuku Cikobia, Vekai Island, Nukusoge, Yasaga Levu Island, White Rock, Kadomo Island, Monoriki Island, Nanuyaira Island, Vanuivadra Island (seabird colonies)

Data:

- Get seabird information (e.g. nest density) from BirdLife into GIS
- Get sites of national significance for seabirds from BirdLife into GIS

Cetaceans

Important facts:

- 17 whales/dolphin in Fiji (Verified: Minke whale, Bryde's whale, Humpback whale, Short-finned pilot whale, False killer whale, Pantropical spotted dolphin, Spinner dolphin, Bottlenose dolphin, Sperm whale; Dated/questionable records: Blue whale, Fin whale, Common dolphin, Fraser's dolphin, Orca, Rough-toothed dolphin, Dwarf/pygmy sperm whale, Blainville's beaked whale)
- Oceania subpopulation of Humpback whales now listed as Endangered in IUCN red-list; breeding/calving areas often sheltered locations
- Sperm whales culturally significant: preferred food deep water squid
- Spinner dolphins can be indicator of healthy reef system: rests on reef during day and feeds offshore at night
- Short-finned pilot whales: prefers deep waters mainly at edge of continental shelf and over deep canyons

- National Whale and Dolphin Plan is in progress

Important localities:

- Passage around Levuka to Vatu-i-Ra
- Bligh Waters / near Savusavu (Kubulau corridor)

(Cetaceans cont.)

Data:

- www.wdcs.org/publications. Can spatially reference sighting from regional report

Marine/estuarine fish

Important facts:

- At least 15 endemics (though a couple of these found in association with Tonga or New Caledonia, and more likely to be discovered)
- *Pseudanthias flavicauda*, *Cirrhilabrus marjorie*, *Siganus uspi*, *Ecsenius fijiensis*, *Ecsenius pardus*, *Meiacanthus oualaensis*, (*Plagiotremus laudanus flavis* – Fiji-Tonga), *Meiacanthus bundoon*, *Pomacanthus microspilus*, *Gorgassia thamani*, *Heteroconger tomberua*, *Synchiropus springeri*, *Bryaninops diannae*, *Parioglossus triquertrus*, *Vanderhorstia atriclypea*, *Plesiops polydactylus*, *Mesopristes kneri; Neoglyphidodon carlsoni* (see habitat requirements in presentation. Species in red are protected under Endangered and Protected Species Act 2002)
- Other species protected under Endangered and Protected Species Act 2002: *Plectranthias fijiensis*, *Rotuma lewisis*, *Thamnaconus fijiensis*, *Cheilinus undulatus*, *Epinephelus lanceolatus*, *Hippocampus kuda*, *Bathygobius petrophilus*, *Parmops echinatus.* Fish 1, 3, and 8 are deepsea.
- *Bolbometon muricatum* (species of cultural significance)
- Key habitats for endemics include: deep and shallow forereefs, deep coral rubble, seagrass, *Porites* dominated reefs, riverine mangroves, mangrove islands, deep sand patches with high current

Important localities:

- Tongan trench/Lau group
- Moala Island (Lau)
- Vatu-i-Ra/Bligh waters passage
- Nadaku Bay
- Mangrove islands (e.g. in Macuata qoliqoli)
- Koro Island
- Tomberua passage
- Malolo Island (Mamanucas)
- Mangroves around Lauri
- Naviti Island (Yasawas)

Data:

- Digitize type specimen localities and important habitat areas for endemics (info from Aaron Jenkins)
- Sort through Helen Syke's data to look for hotspots for marine fish biodiversity; Compare with records from Great Sea Reef and Vatu-i-Ra

Spawning Aggregations [CONFIDENTIAL]

Important facts:

- Majority of known spawning aggregations in Fiji rated as declining
- Reef channels and outer reef slopes are important not only for spawning, but also for the deep reef snapper-grouper assemblage and might be a last remaining refuge for shallow water species overfished inshore. They might also be important migration areas for fish moving to aggregations. A number of papers are coming out now that strongly supports the protection of such habitats for a variety of regions.
- Grouper often seen in multi-species aggregations

Important localities:

Data:

- Identification of all channels and deep outer forereef from comprehensive reef habitat maps (Millenium Coral Reef Map data)

Geomorphological features and demersal fish

Important facts:

- IUCN looking at impacts of Pacific longlines on seamounts by interviews with fishers
- Deepwater fish of the Fiji Islands are a diverse group of fishes found on the continental slope, pinnacles and seamounts at depths between 70 and 250 fathoms (100 – 500 m)
- *Pristipmoides filamentous*: Opakapaka, Benthopelagic; marine; depth range 40 – 400 m, juveniles featureless silty bottom 70-100m Adults: rocky bottoms, slopes pinnacles, 100-200 m
- *Etelis coruscans*: Onaga, Benthopelagic; marine; depth range 40 – 400 m, reef-associated; marine; depth range 90 – 400 m
- Etelis carbunculus: Benthopelagic; marine; depth range 40 – 400 m , rocky bottoms ; marine; depth range 90 – 400 m
- *Aphareus rutilans*: known depth range 100-330 m, reef and rocky bottoms to depth of 100 m

Important localities:

- Deep submarine terraces and canyon around Naviti island
- List of other known seamounts in EEZ (see below)

Data:

- Yasawa Islands Multibeam Survey
  and Hydrographic Survey

- South Viti Levu High Resolution Bathymetry Survey
- Charts Draunibota bay, Sedimentation survey
- Coral Coast IKONOS Image
- Nadi-Ba Pan-sharpened Quickbird Image
- Emalu Pan-sharpened Quickbird Image
- Nadi Radar Image
- Vitilevu IKONOS image
- List of known seamounts from SPC (Robert Smith at SOPAC has lat/lon coordinates and associated depths)
- Satellite altimetry/gravity map
- Deepsea shrimp info found in Michael King's PhD thesis in USP library

Coral reefs

Important facts:

- GCRMN long term data from 15 sites in 3 regions
- Fiji reefs exhibited high resilience from 2000 and 2002 bleaching, with increase in the diversity of life forms
- 2006-07 surveys: Namena had highest hard coral, Vatu-i-Ra second highest; Kadavu also very resistant to bleaching
- Cyclones reduce temperature and clear coral rubble to allow space for coral recruits
- Yasawas exhibited fast recovery; slow recovery from Taveuni
- Disease was prominent after bleaching but mostly died away

Important localities:

- Namena
- Vatu-i-Ra
- Yasawas
- Kadavu
- Taveuni

Data:

- Investigate regions of highest coral diversity from Lovell and McLardy 2008 report
- Coral reef geomorphic maps from Millenium Coral Reef Map data

Mangroves

Important facts:

- Mangroves providing connectivity between adjacent freshwater and marine systems
- Mangroves are also natural barriers and may prove to be an effective adaptive measure against storm surges, coastal erosion and higher tides associated with climate change

Important localities:

- Ba Delta: Nawaqarua – Natutu (NBSAP)
- Rewa Delta: Muanicake – Nasoata R. (NBSAP)

- Labasa Delta: Labasa R.; Labasa Delta Mouth (NBSAP)
- Mangrove Islands
- Connectivity areas: Sawakasa, Naikorokoro (Viti Levu); Kubulau, Dama, Wainunu, Qelewara, Udu Point, Natewa (Vanua Levu), N and E Taveuni

Data:

- Use national mangrove maps from 2001 Landsat
- Revisit Mangrove Action Plan to revise mangrove target

Marine algae

Important facts:

- 448 algal species are known from the Fiji, mostly found in the green (Chlorophyta - 136), brown (Phaeophyceae - 46) and red (Rhodophyta - 266) groups
- Only 20 of 332 islands been visited
- Reef fronts are rich in species but poorly collected because of dangerous conditions
- Deep water poorly collected beyond recreational scuba range
- Surveyed sites include: Coral Coast, Suva, Kadavu, Narikoso, Bligh Water, Namena Barrier Reef, Wakaya Is., Buliya, Mamanuca, Dravuni, Deuba, Savusavu, Cakaulevu Reef
- Unsurveyed or poorly collected sites include: Taveuni, Yasawas, Lau Group. Northern Viti Levu, Bligh Waters, including Southern Vanua Levu; Kadavu, Gau, Koro

Data:

- Data on algae compiled by Robin South, Antoine N'Yeurt, and Posa Skelton (get publications listed in Posa's presentation). See if there is enough diversity information to create hotspots

Seagrass

Need information

- Maps of important seagrass areas. Do they exist? Will they be a class in Millenium Coral Reef Maps?
- Recommendations of species/size
- Info from Seagrass Watch sites in Fiji http://www.seagrasswatch.org/fiji.html

Revised Marine Conservation Targets for Fiji

100% of highest quality feeding ground for marine turtles known from 2009

100% of priority nesting ground for marine turtles and seabirds known from 2009

50% of estuaries from high priority connectivity areas where rivers meet the sea

??% of mangrove area, with highest protection and enforcement around mangrove islands and intact riverine mangrove habitats[52]

30% of seagrass areas, with priority to seagrass habitats adjacent to mangroves and coral reefs and essential turtle feeding grounds (subtidal beds <5 m)

50% of permanent sandy cays

10% of soft-bottomed lagoons, particularly connecting seagrass and reefs

30% of coral reef habitat, ensuring that protection is equitably distributed among offshore as well as nearshore areas, with special focus on pristine, resilient and/or remote areas

25% of seamounts known from 2009[53]

100% of deep trenches known from 2009[54]

50% of deep passages

100% of major reef channels known to have spawning aggregations[55]

100% of coastal littoral forests in near-pristine condition

100% of intertidal mud-flats known from 2009 to be important feeding grounds for waders

[52] Percentage(s) to be extracted from Mangrove Action Plan

[53] Consider recommending gear restrictions (e.g. bans on bottom-fishing, trawling & mining) or seasonal closures instead of total fishing ban. Or combination of sites with no-take access and others with gear restrictions or seasonal closures. Or ban when CPUE falls below a certain threshold or catches fall below a certain size. Management could include combination of above strategies.

[54] Consider gear restrictions or closures during seasonal migrations

[55] Closures during seasonal spawning periods

APPENDIX 5: List of Protected Species under EPS Act 2002

The following species are legally protected throughout Fiji. Possessing, selling or exporting these species without a permit is a criminal offence.

PART 1 – PROTECTED MARINE AND FRESHWATER FAUNA

SCIENTIFIC NAME	COMMON NAME	FIJIAN NAME	LEGISLATION
FISH SPECIES			
Bryaninops dianneae	Species of goby		*Endangered and Protected Species Act 2002*, s.3(d)
Ecsenius fijiensis	Species of blenny		*Endangered and Protected Species Act 2002*, s.3(d)
Mesopristes kneri		Reve	*Endangered and Protected Species Act 2002*, s.3(d)
Plagiotremus laudandus flavus	Species of blenny		*Endangered and Protected Species Act 2002*, s.3(d)
Plectranthias fijiensis	Species of sea bass		*Endangered and Protected Species Act 2002*, s.3(d)
Rotuma lewisi	Species of common wriggler		*Endangered and Protected Species Act 2002*, s.3(d)
Thamnaconus fijiensis	Species of filefish		*Endangered and Protected Species Act 2002*, s.3(d)
Cheilinus undulatus	Humphead wrasse		*Endangered and Protected Species Act 2002*, s.3(e)
Epinephelus lanceolatus	Giant Grouper		*Endangered and Protected Species Act 2002*, s.3(e)
Bathygobius petrophilus			*Endangered and Protected Species Act 2002*, s.3(e)
Hippocampus kuda	Spotted seahorse		*Endangered and Protected Species Act 2002*, s.3(e)
Lairdina hopletupus			*Endangered and Protected Species Act 2002*, s.3(e)
Meiacanthus bundoon			*Endangered and Protected Species Act 2002*, s.3(e)
Parmops echinatus			*Endangered and Protected Species Act 2002*, s.3(e)
Redigobius leveri			*Endangered and Protected Species Act 2002*, s.3(e)
Redigobius sp			*Endangered and Protected Species Act 2002*, s.3(e)
Siganus uspi			*Endangered and Protected Species Act 2002*, s.3(e)
MARINE REPTILES			
Cheloniidae spp.	Green turtle		*Endangered and Protected Species Act 2002*, s.3(a)
Dermochelys coriacea	Leatherback turtle		*Endangered and Protected Species Act 2002*, s.3(a)

Eretmochelys imbricate	Hawksbill turtle		
Caretta caretta	Loggerhead turtle		
Natator depressus	Flatback turtle		

MARINE MAMMALS			
Phocaena spp.	Dolphin		*Fisheries Regulations*, r.25
Delphis spp.	Porpoise		*Fisheries Regulations*, r.25
MARINE INVERTEBRATES			
Charonia tritonis	Davui shell		*Fisheries Regulations*, r.22
Cassis cornuta	Giant helmet shell		*Fisheries Regulations*, r.23
CORALS			
Antipatharia spp.	Black corals		*Endangered and Protected Species Act 2002*, s.3(b)
Helioporidae spp.	Blue corals		*Endangered and Protected Species Act 2002*, s.3(b)
Scleractinia spp.	Stony corals		*Endangered and Protected Species Act 2002*, s.3(b)
Tubiporidae spp.	Organ pipe corals		*Endangered and Protected Species Act 2002*, s.3(b)
Milleporidae spp.	Fire corals		*Endangered and Protected Species Act 2002*, s.3(b)
Stylasteridae spp.	Lace corals		*Endangered and Protected Species Act 2002*, s.3(b)
SEABIRDS			
Fregata ariel	Lesser frigatebird	Manumanunicagi	*Endangered and Protected Species Act 2002*, s.3(d)
Nesofregetta albigularis	Polynesian storm-petrel		*Endangered and Protected Species Act 2002*, s.3(d)
Phethon lepturus	White-tailed tropicbird	Lawedua	*Endangered and Protected Species Act 2002*, s.3(d)
Procelsterna cernula	Blue noddy		*Endangered and Protected Species Act 2002*, s.3(d)
Pseudobulweria macgillivrayi	Fiji petrel	Kacau ni Gau	*Endangered and Protected Species Act 2002*, s.3(d)
Pseudobulweria rostrata	Tahiti petrel	Kacau ni Taiti	*Endangered and Protected Species Act 2002*, s.3(d)
Puffinus inherminieri	Audubon's shearwater		*Endangered and Protected Species Act 2002*, s.3(d)
Sula dactylatra	Masked booby	Toro	*Endangered and Protected Species Act 2002*, s.3(d)
Sula leucogaster	Brown booby	Toro	*Endangered and Protected Species Act 2002*, s.3(d)
Sterna anaethetus	Bridled tern		*Endangered and Protected Species Act 2002*, s.3(d)
Sterna bergii	Crested tern	Idre	*Endangered and Protected Species Act 2002*, s.3(d)
Sterna fuscata	Sooty tern		*Endangered and Protected Species Act 2002*, s.3(d)
Lepidochelys olivacea	Olive Ridley turtle		

PART 2 – PROTECTED TERRESTRIAL FAUNA

SCIENTIFIC NAME	COMMON NAME	FIJIAN NAME	LEGISLATION
MAMMALS			
Emballonura semicaudata	Polynesian sheath tailed bat		*Endangered and Protected Species Act 2002*, s.3(d)
Notopteris macdonaldi	Fijian blossom bat		*Endangered and Protected Species Act 2002*, s.3(d)
Pteralopex acrodonta	Taveuni flying fox		*Endangered and Protected Species Act 2002*, s.3(d)
Chaeropon bregullae	Fijian mastiff bat		*Endangered and Protected Species Act 2002*, s.3(e)
BIRDS			
Clytorhynchus nigrogularis	Black-faced shrikebill	Kiro	*Endangered and Protected Species Act 2002*, s.3(d)
Dendrocygna arcuata	Wandering whistling-duck	Gadamu	*Endangered and Protected Species Act 2002*, s.3(d)
Erythrura kleinschmidti	Pink-billed parrotfinch	Sitibatitabua	*Endangered and Protected Species Act 2002*, s.3(d)
Gallicolumba stairii	Friendly ground-dove	Qilu	*Endangered and Protected Species Act 2002*, s.3(d)
Lamprolia victoria	Silktail	Sisi	*Endangered and Protected Species Act 2002*, s.3(d)
Mayrornis versicolor	Ogea monarch		*Endangered and Protected Species Act 2002*, s.3(d)
Myzomela chermesina	Rotuma myzomela	Armea	*Endangered and Protected Species Act 2002*, s.3(d)
Nesoclopeus poecilopterus	Barred-wing rail	Saca	*Endangered and Protected Species Act 2002*, s.3(d)
Poliolimnas cinereus	White-browed crake		*Endangered and Protected Species Act 2002*, s.3(d)
Porzana tabuensis	Spotless crake	Mo	*Endangered and Protected Species Act 2002*, s.3(d)
Trichocichla rufa	Long-legged warbler	Manu Kalou	*Endangered and Protected Species Act 2002*, s.3(d)
Aerodramus spodiopygia	White rumped swiftlet	Kakabacea	*Endangered and Protected Species Act 2002*, s.3(e)
Anas superciliosa	Pacific black duck	Ganiviti	*Endangered and Protected Species Act 2002*, s.3(e)
Aplonis tabuensis	Polynesian starling	Vocea	*Endangered and Protected Species Act 2002*, s.3(e)
Ardea novaehollandiae	White faced heron	Belomatavula	*Endangered and Protected Species Act 2002*, s.3(e)
Artamus mentalis	Fiji woodswallow	Kiro	*Endangered and Protected Species Act 2002*, s.3(e)
Butorides striatus	Mangrove heron	Gadamu	*Endangered and Protected Species Act 2002*, s.3(e)
Cacomantis pyrrophanus	Fan tailed cuckoo	Sitibatitabua	*Endangered and Protected Species Act 2002*, s.3(e)
Cettia ruficapilla	Fiji bush warbler	Qilu	*Endangered and Protected*

			Species Act 2002, s.3(e)
Clytorhynchus vitiensis	Lesser shrikebill	Sisi	*Endangered and Protected Species Act 2002*, s.3(e)
Columba vitiensis	White throated pigeon		*Endangered and Protected Species Act 2002*, s.3(e)
Ducala latrans	Barking pigeon	Armea	*Endangered and Protected Species Act 2002*, s.3(e)
Cucula pacifica	Pacific pigeon	Saca	*Endangered and Protected Species Act 2002*, s.3(e)
Egretta sacra	Reef heron		*Endangered and Protected Species Act 2002*, s.3(e)
Erythrura pealii	Fiji parrotfinch	Mo	*Endangered and Protected Species Act 2002*, s.3(e)
Foulehaio carunculata	Wattled honeyeater	Manu Kalou	*Endangered and Protected Species Act 2002*, s.3(e)
Gallirallus philippensis	Banded rail	Kakabacea	*Endangered and Protected Species Act 2002*, s.3(e)
Gymnomyza viridis	Giant forest honeyeater	Ganiviti	*Endangered and Protected Species Act 2002*, s.3(e)
Halcyon chloris	White collared kingfisher	Vocea	*Endangered and Protected Species Act 2002*, s.3(e)
Hirundo tahitica	Pacific swallow	Belomatavula	*Endangered and Protected Species Act 2002*, s.3(e)
Lalage maculosa	Polynesian triller	Kiro	*Endangered and Protected Species Act 2002*, s.3(e)
Mayrornis lessoni	Slaty monarch	Gadamu	*Endangered and Protected Species Act 2002*, s.3(e)
Myiagra azureocapilla	Blue crested broadbill	Batidamu	*Endangered and Protected Species Act 2002*, s.3(e)
Myiagra vanikorensis	Vanikoro broadbill	Matayalo	*Endangered and Protected Species Act 2002*, s.3(e)
Myzomela jugularis	Orange breasted myzomela	Delakula	*Endangered and Protected Species Act 2002*, s.3(e)
Pachycephala pectorulis	Golden whistler	Ketedromo	*Endangered and Protected Species Act 2002*, s.3(e)
Petroica multicolor	Scarlet robin	Diriqwala	*Endangered and Protected Species Act 2002*, s.3(e)
Phigys solitarius	Collared lorry	Kula	*Endangered and Protected Species Act 2002*, s.3(e)
Ptilinopus layardi	Whistling dove	Soqeda	*Endangered and Protected Species Act 2002*, s.3(e)
Ptilinopus luteovirens	Golden dove	Bunako	*Endangered and Protected Species Act 2002*, s.3(e)
Ptilinopus perousii	Many coloured fruit dove	Kuluvotu	*Endangered and Protected Species Act 2002*, s.3(e)
Ptilinopus porphyraceus	Crimson crowned fruit dove	Kuluvotu	*Endangered and Protected Species Act 2002*, s.3(e)
Ptilinopus victor	Orange dove	Bune	*Endangered and Protected Species Act 2002*, s.3(e)
Rhipidura personata	Kadavu fantail		*Endangered and Protected Species Act 2002*, s.3(e)
Rhipidura spilodera	Streaked fantail	Sasaira	*Endangered and Protected*

			Species Act 2002, s.3(e)
Turdus poliocephalus	Island thrush	Tola	*Endangered and Protected Species Act 2002*, s.3(e)
Xanthotis provocator	Kadavu honeyeater	Kikou	*Endangered and Protected Species Act 2002*, s.3(e)
Zosterops exploratory	Fiji white eyes	Qiqi	*Endangered and Protected Species Act 2002*, s.3(e)
Zosterops lateralis	Silvereye	Qiqi	*Endangered and Protected Species Act 2002*, s.3(e)
REPTILES			
Hemiphyllodacrylus typus	Indo pacific tree gecko		*Endangered and Protected Species Act 2002*, s.3(d)
Emoia Campbelli	Montane tree skink		*Endangered and Protected Species Act 2002*, s.3(d)
Emoia mokosariniveikau	Turquoise tree skink		*Endangered and Protected Species Act 2002*, s.3(d)
Emoia nigra	Pacific black skink		*Endangered and Protected Species Act 2002*, s.3(d)
Leiolopisma alazon	Lauan ground skink		*Endangered and Protected Species Act 2002*, s.3(d)
Gehyra mutilata	Stumped toed gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Gehyra oceanica	Oceanic gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Gehyra vorax	Giant forest gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Hemidactylus frenatus	House gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Hemidactylus garnotii	Fox gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Lepidodactylus gardineri	Rotuman gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Lepidodactylus lugubris	Mourning gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Lepidadactylus manni	Mann's forest gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Nactus pelagicus	Pacific slender toed gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Cyptablepharus eximius	Pacific snake eyed gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Emoia caeruleocauda	Blue tailed gecko		*Endangered and Protected Species Act 2002*, s.3(e)
Emoia concolor	Green tree skink		*Endangered and Protected Species Act 2002*, s.3(e)
Emoia cyanura	Browntail copper striped skink		*Endangered and Protected Species Act 2002*, s.3(e)
Emoia impar	Bluetail copper striped skink		*Endangered and Protected Species Act 2002*, s.3(e)
Emoia parkeri	Fijian copper headed skink		*Endangered and Protected Species Act 2002*, s.3(e)
Emoia trossula	Dandy skink		*Endangered and Protected Species Act 2002*, s.3(e)

Lipinia noctua	Moth skink		*Endangered and Protected Species Act 2002*, s.3(e)
Ramphotoyhplops flaviventer	Flowerpot snake		*Endangered and Protected Species Act 2002*, s.3(e)
AMPHIBIANS			
Platymantis vitiensis	Fiji tree frog		*Endangered and Protected Species Act 2002*, s.3(e)

PART 3 - Protected plants

SCIENTIFIC NAME	COMMON NAME	FIJIAN NAME	LEGISLATION
PLANTS			
Polyalthia angustifolia			*Endangered and Protected Species Act 2002*, s.3(d)
Agathis vitiensis		Dakua / Dakua Makadre	*Endangered and Protected Species Act 2002*, s.3(d)
Kingiodendron platycarpum		Moivi	*Endangered and Protected Species Act 2002*, s.3(d)
Storckiella vitiensis		Vesida	*Endangered and Protected Species Act 2002*, s.3(d)
Garcinia pseudoguttifera		Bulu	*Endangered and Protected Species Act 2002*, s.3(d)
Garcinia myrtiflora		Laubu	*Endangered and Protected Species Act 2002*, s.3(d)
Terminalia vitiensis			*Endangered and Protected Species Act 2002*, s.3(d)
Geissois ternate var 2		Vuga	*Endangered and Protected Species Act 2002*, s.3(d)
Vupaniopsis leptobotrys		Malawaci	*Endangered and Protected Species Act 2002*, s.3(d)
Weinmannia spiraeoides			*Endangered and Protected Species Act 2002*, s.3(d)
Weinmannia vitiensis			*Endangered and Protected Species Act 2002*, s.3(d)
Debeneria vitiensis		Masiratu	*Endangered and Protected Species Act 2002*, s.3(d)
Bischofia javanica		Koka	*Endangered and Protected Species Act 2002*, s.3(d)
Gonystylus punctatus		Mavota	*Endangered and Protected Species Act 2002*, s.3(d)
Endiandra elaeocarpa		Dabi	*Endangered and Protected Species Act 2002*, s.3(d)
Hibiscus storckii			*Endangered and Protected Species Act 2002*, s.3(d)
Medinilla kandavuensis			*Endangered and Protected Species Act 2002*, s.3(d)
Astronidium floribundum			*Endangered and Protected Species Act 2002*, s.3(d)
Astronidium kasiense		Rusila	*Endangered and Protected Species Act 2002*, s.3(d)
Acacia richii		Qumu	*Endangered and Protected*

			Species Act 2002, s.3(d)
Mimosaceae spec.div		Vavai-loa	*Endangered and Protected Species Act 2002*, s.3(d)
Mimosaceae spec.div		Vavai-vula	*Endangered and Protected Species Act 2002*, s.3(d)
Veitchia vitiensis			*Endangered and Protected Species Act 2002*, s.3(d)
Veitchia filifera			*Endangered and Protected Species Act 2002*, s.3(d)
Acmopyle sahniana		Drautabua	*Endangered and Protected Species Act 2002*, s.3(d)
Dacrycarpus imbricatus		Amunu	*Endangered and Protected Species Act 2002*, s.3(d)
Decusscicarpus vitiensis		Dakua salusalu	*Endangered and Protected Species Act 2002*, s.3(d)
Podocarpus neriifolius		Kuasi	*Endangered and Protected Species Act 2002*, s.3(d)
Dacrydium nidulum		Yaka	*Endangered and Protected Species Act 2002*, s.3(d)
Turrillia ferruginea		Kauceuti	*Endangered and Protected Species Act 2002*, s.3(d)
Turrillia vitiensis		Kauceuti	*Endangered and Protected Species Act 2002*, s.3(d)
Alphitonia zizyphoides		Doi	*Endangered and Protected Species Act 2002*, s.3(d)
Gardenia vitiensis		drega, Meilago	*Endangered and Protected Species Act 2002*, s.3(d)
Mastixiodendron robustum		Duvula	*Endangered and Protected Species Act 2002*, s.3(d)
Gardenia vitiensis		drega meilago	*Endangered and Protected Species Act 2002*, s.3(d)
Santatum yasi		Yasi	*Endangered and Protected Species Act 2002*, s.3(d)
Manikara spec.div		Bausagali-damu	*Endangered and Protected Species Act 2002*, s.3(d)
Manikara spec.div.		Bausagali-vula	*Endangered and Protected Species Act 2002*, s.3(d)
Planchonella garberi		Sarosaro	*Endangered and Protected Species Act 2002*, s.3(d)
Planchonella umbonata		Bauloa	*Endangered and Protected Species Act 2002*, s.3(d)
Sterculia vitiensis		Waciwaci	*Endangered and Protected Species Act 2002*, s.3(d)
Gmelina vitiensis		Rosawa	*Endangered and Protected Species Act 2002*, s.3(d)
Barringtonia asiatica		Vutu	*Endangered and Protected Species Act 2002*, s.3(e)
Boodia brackenridgei			*Endangered and Protected Species Act 2002*, s.3(e)
Cordia subcordata		Nawanawa	*Endangered and Protected Species Act 2002*, s.3(e)
Canarium harveyi var 1		Kaunicina	*Endangered and Protected*

			Species Act 2002, s.3(e)
Cynometra insularis		Cibicibi	*Endangered and Protected Species Act 2002*, s.3(e)
Intsia bijuga		Vesi	*Endangered and Protected Species Act 2002*, s.3(e)
Gymnostoma vitiensis		Velau	*Endangered and Protected Species Act 2002*, s.3(e)
Parinari insularum		Sa	*Endangered and Protected Species Act 2002*, s.3(e)
Calophyllum inophyllum		Dilo	*Endangered and Protected Species Act 2002*, s.3(e)
Calophyllum vitiensis		Damanu	*Endangered and Protected Species Act 2002*, s.3(e)
Lumnitzera littorea		Sagali	*Endangered and Protected Species Act 2002*, s.3(e)
Terminalia capitanea		Tiviloa	*Endangered and Protected Species Act 2002*, s.3(e)
Terminalia luteola		bausomi tivi	*Endangered and Protected Species Act 2002*, s.3(e)
Terminalia psilantha		bausomi	*Endangered and Protected Species Act 2002*, s.3(e)
Terminalia pterocarpa		Tivi	*Endangered and Protected Species Act 2002*, s.3(e)
Terminalia simulans			*Endangered and Protected Species Act 2002*, s.3(e)
Terminalia strigillosa.		Tivi losi	*Endangered and Protected Species Act 2002*, s.3(e)
Acsmithia vitiense			*Endangered and Protected Species Act 2002*, s.3(e)
Geissois imthurnii		Vure	*Endangered and Protected Species Act 2002*, s.3(e)
Geissois stipularis		Vure	*Endangered and Protected Species Act 2002*, s.3(e)
Geissois superba		Vure	*Endangered and Protected Species Act 2002*, s.3(e)
Geissois ternate			*Endangered and Protected Species Act 2002*, s.3(e)
Spiraeanthemum graeffei		Katakata, Kutukutu	*Endangered and Protected Species Act 2002*, s.3(e)
Spiraeanthemum serratum			*Endangered and Protected Species Act 2002*, s.3(e)
Weinmannia exigua			*Endangered and Protected Species Act 2002*, s.3(e)
Cyathea micropelidota			*Endangered and Protected Species Act 2002*, s.3(e)
Cyathea plagiostegia			*Endangered and Protected Species Act 2002*, s.3(e)
Cycas seemannii			*Endangered and Protected Species Act 2002*, s.3(e)
Degeneria roseiflora		Karawa yaranqele	*Endangered and Protected Species Act 2002*, s.3(e)
Endospermum robbieanum		Kauvula	*Endangered and Protected*

			Species Act 2002, s.3(e)
Ischaemum byrone			*Endangered and Protected Species Act 2002*, s.3(e)
Calophyllum amblyphyllum		damanu	*Endangered and Protected Species Act 2002*, s.3(e)
Calophyllum leueocarpum			*Endangered and Protected Species Act 2002*, s.3(e)
Garcinia adinantha		Rauba, bulumaqo	*Endangered and Protected Species Act 2002*, s.3(e)
Geniostoma calcicola			*Endangered and Protected Species Act 2002*, s.3(e)
Geniostoma clavigerum			*Endangered and Protected Species Act 2002*, s.3(e)
Geniostoma stipulare			*Endangered and Protected Species Act 2002*, s.3(e)
Neuburgia macroloba		Vacea	*Endangered and Protected Species Act 2002*, s.3(e)
Astronidium degeneri			*Endangered and Protected Species Act 2002*, s.3(e)
Astronidium inflatum			*Endangered and Protected Species Act 2002*, s.3(e)
Astronidium lepidotum			*Endangered and Protected Species Act 2002*, s.3(e)
Astronidium palladiflorum			*Endangered and Protected Species Act 2002*, s.3(e)
Astronidium saulae			*Endangered and Protected Species Act 2002*, s.3(e)
Astronidium sessile			*Endangered and Protected Species Act 2002*, s.3(e)
Mediniila deeora			*Endangered and Protected Species Act 2002*, s.3(e)
Medinilla kambikambi		Kambikambi	*Endangered and Protected Species Act 2002*, s.3(e)
Medinilla spectabilis			*Endangered and Protected Species Act 2002*, s.3(e)
Medinilia waterhousei		Tagimoucia	*Endangered and Protected Species Act 2002*, s.3(e)
Vavaea amicorunt		Cevua	*Endangered and Protected Species Act 2002*, s.3(e)
Xylocarpus granatum		Dabi	*Endangered and Protected Species Act 2002*, s.3(e)
Samanea saman		Raintree	*Endangered and Protected Species Act 2002*, s.3(e)
Myristica castaneifolia		Kaudamu	*Endangered and Protected Species Act 2002*, s.3(e)
Cleistocalyx decusssatus		Yasimoli	*Endangered and Protected Species Act 2002*, s.3(e)
Cleistocalyx eugenioides		Yasiyasi	*Endangered and Protected Species Act 2002*, s.3(e)
Alsmiltia longipes			*Endangered and Protected Species Act 2002*, s.3(e)
Balaka longirostris			*Endangered and Protected*

			Species Act 2002, s.3(e)
Balaka macrocarpa			*Endangered and Protected Species Act 2002*, s.3(e)
Balaka microcarpa			*Endangered and Protected Species Act 2002*, s.3(e)
Balaka seemannii			*Endangered and Protected Species Act 2002*, s.3(e)
Calamus vitiensis			*Endangered and Protected Species Act 2002*, s.3(e)
Clincistigma exorrhizum			*Endangered and Protected Species Act 2002*, s.3(e)
Cyplhosperma tangs			*Endangered and Protected Species Act 2002*, s.3(e)
Cyplhosperma trichospatdix			*Endangered and Protected Species Act 2002*, s.3(e)
Gulubia microcarpa			*Endangered and Protected Species Act 2002*, s.3(e)
Neuveitchia storckii			*Endangered and Protected Species Act 2002*, s.3(e)
Physokentia rosea			*Endangered and Protected Species Act 2002*, s.3(e)
Physeikentia thurstunii			*Endangered and Protected Species Act 2002*, s.3(e)
Pritchardia thurstanii			*Endangered and Protected Species Act 2002*, s.3(e)
Veitchia joannis			*Endangered and Protected Species Act 2002*, s.3(e)
Veichia pedionoma			*Endangered and Protected Species Act 2002*, s.3(e)
Veitchia petiolata			*Endangered and Protected Species Act 2002*, s.3(e)
Veitchia simulans			*Endangered and Protected Species Act 2002*, s.3(e)
Dacrydium nausoriense		*Yaka, tagitagi*	*Endangered and Protected Species Act 2002*, s.3(e)
Podocarpus affinis			*Endangered and Protected Species Act 2002*, s.3(e)
Gardenia anapetes		*Tirikiloki*	*Endangered and Protected Species Act 2002*, s.3(e)
Gardenia candida			*Endangered and Protected Species Act 2002*, s.3(e)
Gardenia grievei		*deladrega*	*Endangered and Protected Species Act 2002*, s.3(e)
Gardenia hillii			*Endangered and Protected Species Act 2002*, s.3(e)
Guetcarda speciosa		*Buabua*	*Endangered and Protected Species Act 2002*, s.3(e)
Bruguiera gymnorhiza		*Dogo*	*Endangered and Protected Species Act 2002*, s.3(e)
Pommetia pinnata		*Dawa*	*Endangered and Protected Species Act 2002*, s.3(e)
Palayuium hornei		*Sacau*	*Endangered and Protected*

			Species Act 2002, s.3(e)
Palayuium purphyreum		*Bauvudi*	*Endangered and Protected Species Act 2002*, s.3(e)
Trichospermum richii		*Mako*	*Endangered and Protected Species Act 2002*, s.3(e)

Source: FLMMA Handbook 2009 (final draft)

APPENDIX 6: Land Tenure in Fiji, Categories & Legalities

LAND TENURE IN FIJI, ITS CATEGORIES & LEGALITIES

	Category - Tenure	Description	Reference
1	Crown Land (Titled) *State Land*	i. All crown land or public lands, Land acquired excepting in Category 3. ii. Unclaimed property reverted to state	Crown Land Act Cap 132 Sect 4 (1) Public Trustees Act Cap 64 Section 31
2	Crown land (Without Title) *State Land*	(i.) Land Reverting to State due to non taking up of original grants or CT. (ii) Freehold land acquired by Crown where title is cancelled by the Registrar of Titles on transfer of title to the Director of Lands. (iii) Freehold land transferred to State (by negotiation). (iv) Native Land acquired by Crown and transferred to crown absolutely. (utility)	Public Trustees Act Cap 64 Section 31 Crown Land Act Cap 132 Section 4(2) Crown Lands Act Cap 132. Sect 4 (1) Crown Acquisition of Lands Department Cap 135 Sec. 3
3	Reclaimed Land	Reclaimed Land	Crown lands Act. Cap 132. Sect.(23.2)
4	Freehold Land or Native land acquired for a term of years	Acquisition procedures carried out.	Crown Lands Act. Cap 132. Sect. Sec. 5
5	Crown Land Utilities	Native Land acquired for roads, reservoirs, pipelines, quays, wharves, railways, aerodromes, burial grounds, sewage, and other public utility purposes	Crown acquisition of Land Act. Cap 135. Sec (3)

	Category - Tenure	Description	Reference
6	Crown *Tiri* and Foreshore	Land permanently under water and rivers and streams.	Rivers & Streams Act. Cap 136 Sec. (2)
7	*Schedule "A" Land*	*Extinct mataqali land*	*Native Land Trust Act, Cap 134, Sec. 19 (1)*
8	*Schedule "B" Land*	*Land unclaimed at time of Native Land Commission Surveys.*	*Native Land Act, Cap 133, Sec. 19*
9	Crown Land leased as Parks and Open Space	Crown land leased to Public Bodies for Parks, Playing fields. Etc. and designated open space or green strip reserve.	Crown Land Act. Cap 132. Sec. 10.
10	Freehold (Private)	Land privately owned being subject to Crown Grant or Native Grant or Certificate of Title.	Land Transfer Act. Cap. 131, Sec. 10 & 11
11	Freehold (Private) dedicated park	Land privately owned dedicated as Park or Public Reserve to Crown.	Crown Lands Act Cap 132, Sec 4(1) & (2)
12	Freehold (Private)	Land privately owned being Crown Grant to Religious Body etc.	Crown lands Act Cap 132. Sec. 9
13	Leased Land	Crown, Native or Freehold land leased	Crown lands Act Cap 132, Sec. 10 Native land Trust Act Cap 134, Sec 8 (1) Property Law Act Cap 131, Sec 54 (1 & 2)
14	Native Reserve	Crown Land Proclaimed as Native Reserve	Native Land Trust Act Cap 134, Sec 19
15	Roads	Roads, Access and Access Reserve (Surveyed) Roads, Access and Access Reserve (Unsurveyed),	Roads Act Cap. 175

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REFERENCES

Unpublished Natural Resource Inventory 2010, Compiled by Professor Biman Prasad.

Department of Environment Annual Reports 2006-2008.

FLMMA Handbook (draft), 2010

National Biodiversity Strategies & Action Plans – Pacific Regional Review 2007

National Biodiversity Strategy and Action Plan for Fiji Islands 2007

The National State of the Environment Report 1992, Department of Environment.

NatureFiji-MareqetiViti Newsletter, February, 2009

Hugh Govan (2009), Technical Report on Locally Managed Marine Areas, in the South Pacific.

Jupiter, Mills, Comley, Batibasaga, Jenkins; (2010), Fiji's Marine Ecological Gap Assessment: Interim Progress Report

Department of Tourism (1999), Principles of Eco-tourism in Fiji

Department of Tourism (2007), Fiji Tourism Development Plan 2007 – 2016, & Regional Strategies.

Fiji Tourism Development Plan 2007 – 2016.

Department of Lands (2006), Land Tenure Report in Fiji.