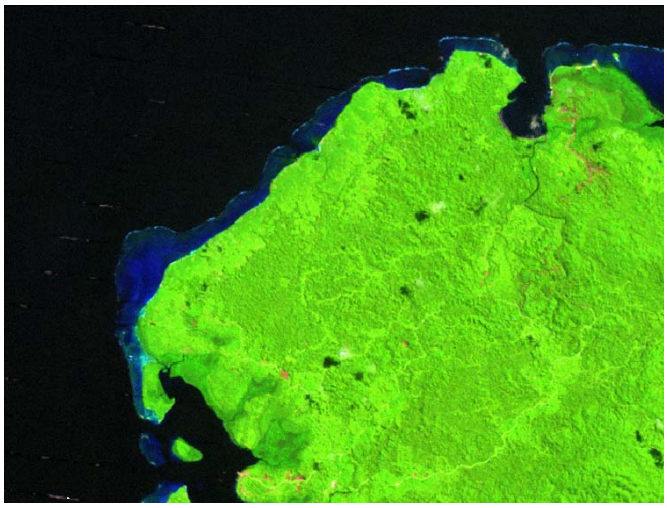
S O L O M O N I S L A N D S F O R E S T R Y M A N A G E M E N T P R O J E C T I I (S I F M P I I)

National Forest Resource Assessment Update 2006



Landsat satellite image of northern Choiseul, showing roading networks associated with logging

Prepared for

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1 November 2006

42443987

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Glossary

AIDAB	Australian International Development Assistance Bureau
AusAID	Australian Agency for International Development
dbh	Diameter measured at breast height (1.3m or above buttress)
CBSI	Central Bank of Solomon Islands
FD	Forestry Division (of the Department of Forests, Environment and Conservation, Ministry of Natural Resources)
Gross volume	The volume of the merchantable tree bole assessed as it stands in the forest
Logged over-natural forest	Natural forest that has been logged and is regenerating with the potential to produce another harvest yield
m^3	Cubic metres
Merchantable volume	The gross volume reduced by 7.5% to account for unsighted internal and external defects, felling damage and trees missed by harvesting operations
GIS	Geographical Information System
ha	Hectare (10,000 m^2)
SBD (or SI$)	Solomon Islands dollar
Semi-commercial forest	Forests with low standing volumes of commercial timber that were assumed to produce 40% of the volumes harvested from fully commercial areas
SI	Solomon Islands
SIG	Solomon Islands Government
SIFMP I	Solomon Islands Forestry Management Project I (1999-2004)
SIFMP II	Solomon Islands Forestry Management Project II (2004-2008)
SOLFRIP	Solomon Islands National Forest Resource Inventory Project
SOLFRIS	Solomon Islands Forest Resource Information System
Unlogged natural forest	Natural forest with potential for commercial logging, but that has not been logged
USD	United States dollar

Executive Summary

Introduction

In 2003 the Solomon Islands Forestry Management Project I (SIFMP I) assessed the then current condition of natural and plantation forest resources in the Solomon Islands. The assessment highlighted both the non-commercial benefits that forests provide Solomon Islanders and the pressure of ongoing commercial forest exploitation (URS, 2003).

URS (2003) concluded that the natural forest resource could be exhausted by 2015 if harvesting continued at the then current rate of 645,000m^3/yr and that planted and regrowth forests were unlikely to make a significant contribution to the national commercial woodflow until 2025.

Due to the ongoing importance of forests to the social, environmental and economic well-being of the Solomon Islands, the Solomon Islands Forestry Management Project II (SIFMP II) initiated an update of the resource assessment undertaken in 2003. The update is the subject of this report.

Key findings

Commercial forest area

URS reassessed logging extent and status to the end of 2005 and noted that since 2003, a number of recently issued licences overlap existing licence areas. Overlaps occurred in most provinces and generally applied to areas already logged once before.

The SIFMP II (2006) Forestry Division (FD) Licensing Audit report, prepared in December 2005, documents overlapping licence boundaries as a key issue, finding that of 219 pending applications, 39 applications overlap other concessions or applications. The audit report makes a number of recommendations to address these issues.

A new emerging forest management issue within the Solomon Islands is the increasing number of landowner applications seeking to re-enter previously logged areas before the forests have a chance to recover from previous harvesting activities. Burgess (1971), Tabudar (1984) and Wagner and Cobbinah (1993) all reported on the dangers of prematurely re-logging forests, due to their increased accessibility following the first harvest, as the demand and prices for timber rose and unlogged forests became scarcer. They urged forest managers to resist the temptation to re-enter areas too early. Burgess states that early re-logging of an already harvested forest disrupts the plant succession process and that the forest is in danger of becoming progressively poorer in desirable timber species and richer in “weed species”. There is a distinct risk that the same destructive operations will happen in the Solomon Islands, thus further jeopardising the chances of forest recovery and consequently will dramatically affect the future natural forest woodflow projections.

Landsat 7 satellite imagery was used to determine the extent of logging since October 2003 and to check for logging activities outside known licence boundaries. Despite uncertainties associated with image interpretation, URS noted 36 potential logging

activities outside known licence boundaries of which 10 appeared to affect areas greater than 100 ha in size. These areas were removed from the current commercial area calculation and have been reported to the SI Commissioner of Forests for further investigation.

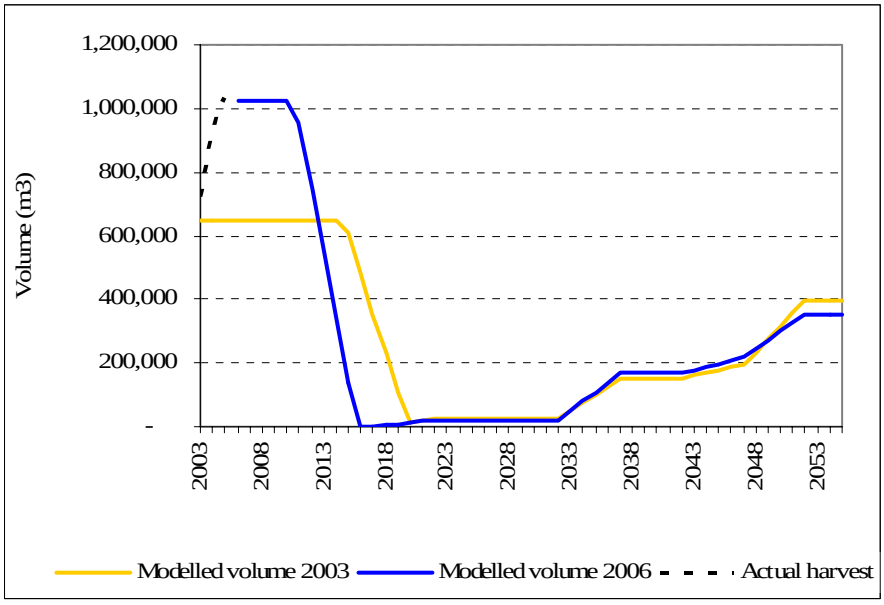
Natural forest woodflow assessment

The flow of wood over time from forests, commonly known as woodflow, can be estimated from a schedule of future harvesting operations, the areas available for harvest and estimated harvest yields per hectare.

URS has used the same methodology it used in 2003 to model potential woodflows for the Solomon Islands from 2006. The woodflow model simulates harvesting of the current standing volume of 7.8 million m^3 at an annual rate equivalent to the average annual logging rate for 2004 and 2005 of approximately 1.02 million m^3/yr.

Figure ES-1 highlights the effect of the unrestrained increase in logging activity over the last three years by comparing the forecast of woodflow presented by URS in 2003 and the revised forecast for 2006.

Figure ES-1: Comparison of natural forest woodflows predicted by URS in 2003 and 2006



Source: URS

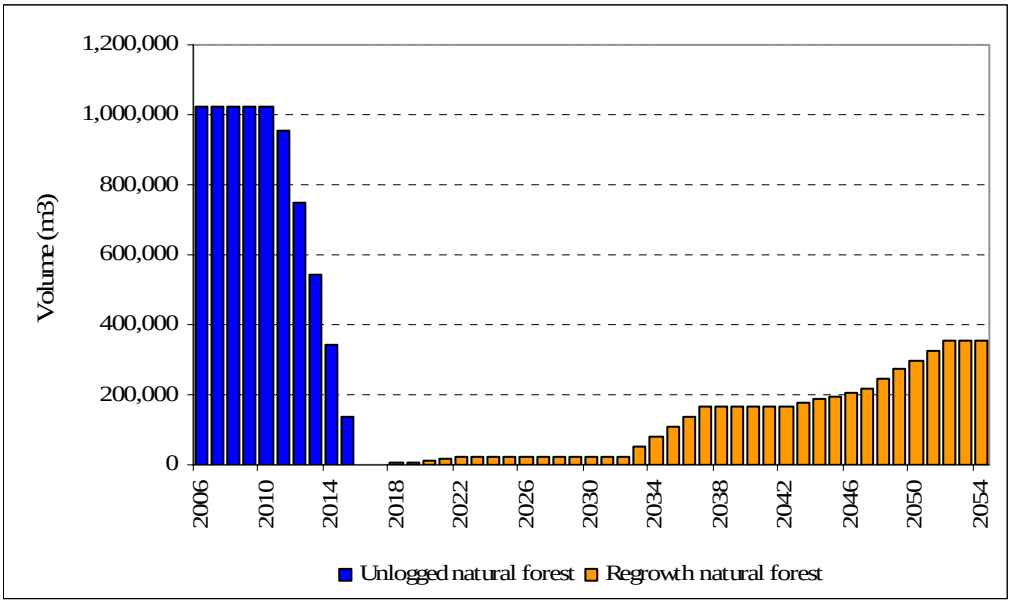
URS considers it unlikely that the current rate of harvesting will drop significantly before 2010. Licences have already been issued which would allow companies to harvest at significantly more than the current harvest rate. This is coupled with strong international demand for logs and easy access to relatively cheap harvesting equipment and labour in the Solomon Islands.

Woodflow for the natural forests are presented in Figure ES-2. The dramatic exhaustion of the natural forests is predicted to begin to occur in 2011, continue to taper off until 2014 and then it is expected that total exhaustion will have occurred by the end of 2015.

The forecast dramatic decline in the natural forest woodflow will have a significant fiscal impact on the Solomon Islands Government (SIG) and landowners, given the current reliance on round log exports to generate 60-70 % of the total foreign export earnings and as the national government's major source of non-donor income (in the form of export duties).

Also predicted by these trends is the demise of the natural forest logging industry, despite warnings to all stakeholders over the last decade of the likely impact of unsustainable annual logging rates, which will have a significant impact on rural employment. Currently it is estimated that the industry employs 1 in 6 people.

Figure ES-2: Predicted natural forest woodflows 2006-2054



Source: URS

Plantation forest woodflow assessment

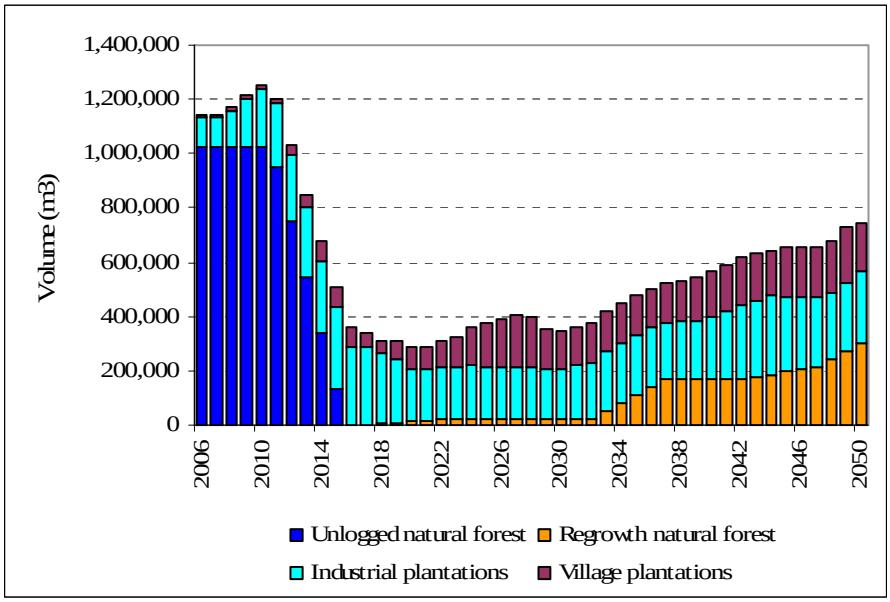
Large scale, "industrial" plantations are located at Alu in the Shortland Islands, Gizo, Kolombangara, New Georgia, Isabel and on Nendo in Temotu Province. The area planted as reported in 2003 totalled 35,000ha, however large areas have failed or have been harvested and the current commercial area is estimated to be 22,200 ha.

Since 2003, villagers have continued to establish significant areas of their own plantations with the support of FD and SIFMP II extension services. A joint FD-SIFMP II database indicates over 9,000 individual plantings have occurred to date.

Combined national woodflow assessment

Figure ES-3 represents a combined woodflow model, including plantations, to produce a woodflow summary of the National forest estate. The summary highlights that if harvesting in natural forests were to continue at current rates, the natural forest estate is likely to be exhausted before regrowth natural forests and plantations (including industrial and village plantings) can make a significant contribution to the combined national wood flow.

Figure ES-3: Potential combined woodflows from natural forests and plantations



Source: URS

URS has assessed that it is theoretically possible to manage the current native forest resource on a non-declining yield basis if the annual cut was capped at 248,000 m^3/yr to 2050, after which the Solomon Islands could support an estimated non-declining annual cut of 353,000 m^3/yr.

Implications arising from the assessment

Natural Forests Sector

Based on the expected scenario outlined above, the current export-based harvesting of the natural forests is a 'sunset industry'. The anticipated demise of this sector has significant and potentially severe implications for the national economy, government revenue streams and rural employment.

Expected implications if logging rates exceed recommended sustainable levels would include:

- Loss of a significant part of the national forest estate, its biodiversity and the medium-term sacrifice of forest conservation opportunities;
- Negative social impacts on forest-dependent communities through loss of forest cover and traditional products and uses;
- Loss of rural employment (estimated to employ 1 in 6 people in 'formal employment');
- Loss of foreign earnings (currently round log export contributes 60-70% of the annual foreign earnings);
- Loss of government revenue (via export and import duties, income tax on companies and individuals etc); and
- Reduced revenue opportunities for rural landowners.

Plantation Sector

By contrast, the plantation sector is an important 'sunrise industry', especially in the smallholder sub-sector. The industrial sub-sector, consisting of Eagon Pacific Plantations Limited (EPPL) and Kolombangara Forest Products Limited (KFPL), is maturing and has limited expansion opportunities due to a finite land-base. However, the smallholder sub-sector has the potential to make a positive contribution to the Solomon Islands via an increased plantation estate, direct rural income and employment in growing, harvesting and processing of plantation timbers.

Expected benefits include:

- Increased tree-cover and subsequent wood volumes on previously degraded sites (i.e. old garden sites, logged-over forests returned to productive use);
- Direct revenue to the actual tree-growers and rural communities;
- High returns for owners of well-managed high-value species (i.e. teak and mahogany) plantations; and
- Purposeful rural employment, especially for the growing and relatively unskilled youth population.

Key recommendations arising from the assessment

The following recommendations are made to minimise the impact of the exhaustion of the commercial natural forests:

- New national legislation (based on the Draft 2004 Forestry Bill) be passed to ensure improved sector sustainability and better reflect the needs of the current and future forestry sector.
- SIG and provincial governments consider methods to reduce harvesting levels to more sustainable levels to mitigate the expected mid next decade exhaustion of the natural forests including:
  - Limiting annual provincial harvesting levels.
  - Introduction of a moratorium on the issue of new felling licences.
  - Cancellation of existing licences for non-compliance or the breach of licence conditions.
- Development of a communications strategy by the Forestry Division (with SIFMP II support) in relation to publication and wide distribution to the public and to key government decision-makers of this report and its potential implications for SIG and landowners.
- Development of new, and enforcement of existing, 'standard operating procedures' for forest management practices by the Forestry Division e.g. no re-entry logging, conversion of degraded forests to plantations etc.
- Encouragement of the private sector plantation industry (both large scale industrial and smallholder estates) by:
  - Promoting policies which encourage a steady increase of the smallholder estate on an annual basis.
  - Removal of legislative impediments and current government taxation arrangements related to plantation investment to improve viability of plantation investments.

- Provision of technical advice to smallholders via a dynamic rural extension network.

- Commence re-structuring of the Forestry Division and its role to better reflect the changing nature of the forestry sector i.e. away from compliance and revenue collection towards ‘ rural extension and advisory’ services.

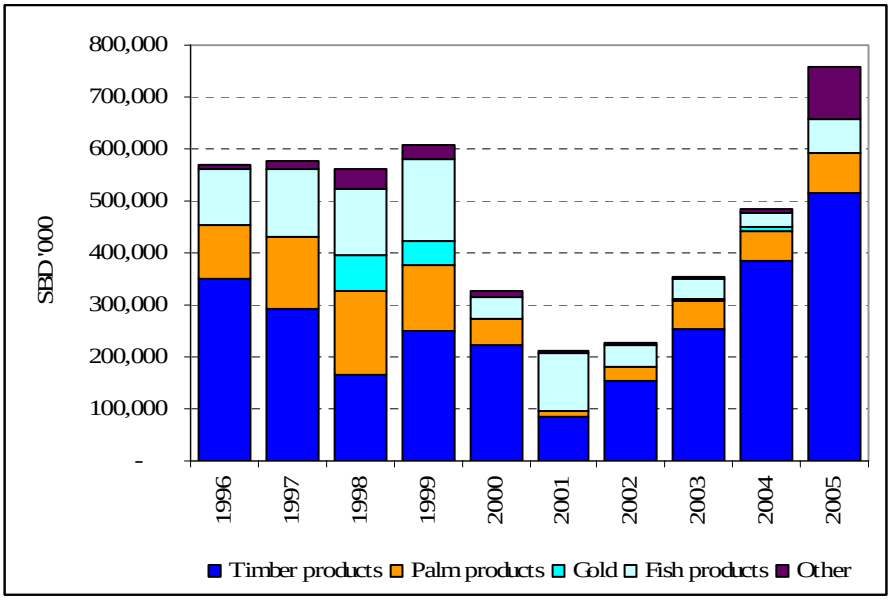
1 Introduction

In 2003 the Solomon Islands Forestry Management Project I (SIFMP I) assessed the then current condition of natural and plantation forest resources in the Solomon Islands. The assessment highlighted both the non-commercial benefits that forests provide Solomon Islanders and the pressure of ongoing commercial forest exploitation (URS, 2003).

URS (2003) found that forests provided wood for cooking, timber for domestic housing, habitats for wildlife, a range of non-wood products such as food and medicines, and protect land and marine water quality. Commercial logging in natural forests provided significant income to Government through export duties and to landowners through royalties, and forest plantations had the potential to deliver significant incomes to landowners from 2025 onwards.

Given the ongoing importance of forests to the social, environmental and economic well being of the Solomon Islands (Figure 1-1), the Solomon Islands Forestry Management Project II (SIFMP II) initiated an update of the resource assessment undertaken in 2003. The update is the subject of this report.

Figure 1-1: Value of Exports by Commodity, 1996-2005



Source: CBSI (2005)

2 Background

The principal forest resource data for forestry planning purposes in Solomon Islands (SI) was collected between 1992 and 1995 as part of the Solomon Islands National Forest Resource Inventory Project (SOLFRIP), funded by the Australian International Development Assistance Bureau (AIDAB).

The goal of SOLFRIP was to establish a system that would improve the capacity of the SIG to develop strategies for forest resource use (ACIL, 1995a).

The project developed computer based maps (MapInfo GIS) of forest types and land-uses together with a database of forest inventory results. In 1995 these systems were used to estimate a non-declining annual commercial forest yield[1] for the nation of approximately 320,000m^3/yr.

Between 1995 and 2000 logging continued at rates of over 600,000m^3/yr and in 2000 the estimate of the potential non-declining annual yield was revised to 200,000 m^3/yr (FORTECH, 2000).

In June 2000, widespread civil unrest broke out and a number of businesses were abandoned or disrupted. When civil order returned, forestry and fishing became almost the sole sources of income for the Solomon Islands Government (SIG). To better understand the implications on forest resources, SIFMP I initiated a national forest resource assessment in 2003 (URS, 2003). The assessment included:

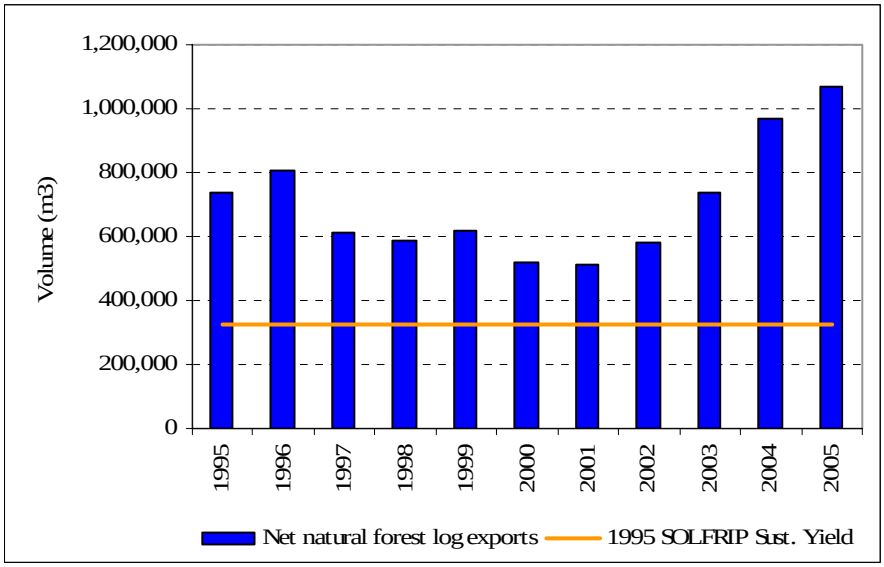
- A revised estimate of the total potential commercial forest area within each province;
- An estimate of commercial and village based plantation areas;
- Mapping of all licensed logging concessions and recording their status as finished, current or not started;
- The use of satellite imagery to verify logging extent; and
- An estimate of potential woodflows.

URS (2003) concluded that the natural forest resource could be exhausted by 2015 if harvesting continued at the then current rate of 645,000m^3/yr and that planted and regrowth forests were unlikely to make a significant contribution until 2025. The estimate of the potential non-declining annual level of cut was revised to 255,000 m^3/yr for the period 2004 to 2049, followed by 398,000 m^3/yr in perpetuity.

From 2003 to 2005 the average annual cut from natural forests further increased to a point where it is now over 1,000,000m^3/yr (Figure 2-1).

[1] Non-declining yield is a forestry term used to describe a pattern of planned sustainable harvesting.

Figure 2-1: Annual log export volumes and the 1995 SOLFRIP estimate of sustainable yield



Source: SI Forestry Division log export database & ACIL (1995)

To review the current status of forest resources in the Solomon Islands, URS has:

- Updated GIS maps identifying licensed logging concessions;
- Used 2006 Landsat satellite imagery to verify logging extent;
- Updated estimates of commercial and village based plantation areas;
- Revised potential woodflows based on current harvest levels and revised the estimate of the potential non-declining annual level of cut; and
- Revised potential SI Government revenues from royalties and village revenues from plantations based on current log prices.

In undertaking this review, URS has made judgements about what is the most likely pattern of future land-use and used this to derive the wood and revenue flows detailed in this report. This includes continued logging of all accessible lowland rainforest areas. It should be noted that URS does not advocate this pattern of land-use. On the contrary, URS believes there is a compelling case for the creation of conservation estates in lowland areas.

3 Natural Forests

3.1 Current Commercial Forest Area

URS (2003) made a quantitative estimate of the area of commercial forest available for harvest using forest condition information gathered by SOLFRIP. The assumptions made and analyses undertaken in 2003 are still considered valid and hence the estimate of total commercial area of 600,000 ha remains unchanged.

Key 2003 assumptions included the removal of the following areas:

- Where slope was greater than 30 degrees (Code of Logging Practice exclusion);
- Where elevation was greater than 400m (Code of Logging Practice exclusion);
- Where forests were located within a one kilometre radius of a village (to account for agricultural activities); and
- Where conventional logging was unlikely because of stand size or poor access.

Areas were further adjusted as follows:

- Reduced by 40% for forests types classified as semi-commercial, which were assumed to produce 40% of the volumes harvested from fully commercial areas;
- Reduced by 50% where slope was 15-30 degrees, which were assumed to produce 50% of the volumes harvested from 0-15 degree slopes, due to the difficulty of access;
- Reduced by 50% for forests within licence areas where harvesting was classified as current, based on the assumption that harvesting may be anywhere from just beginning to nearing completion; and
- Reduced by 7% to account for stream and river buffers.

Where more than one area reduction classification applied, the reductions were applied cumulatively.

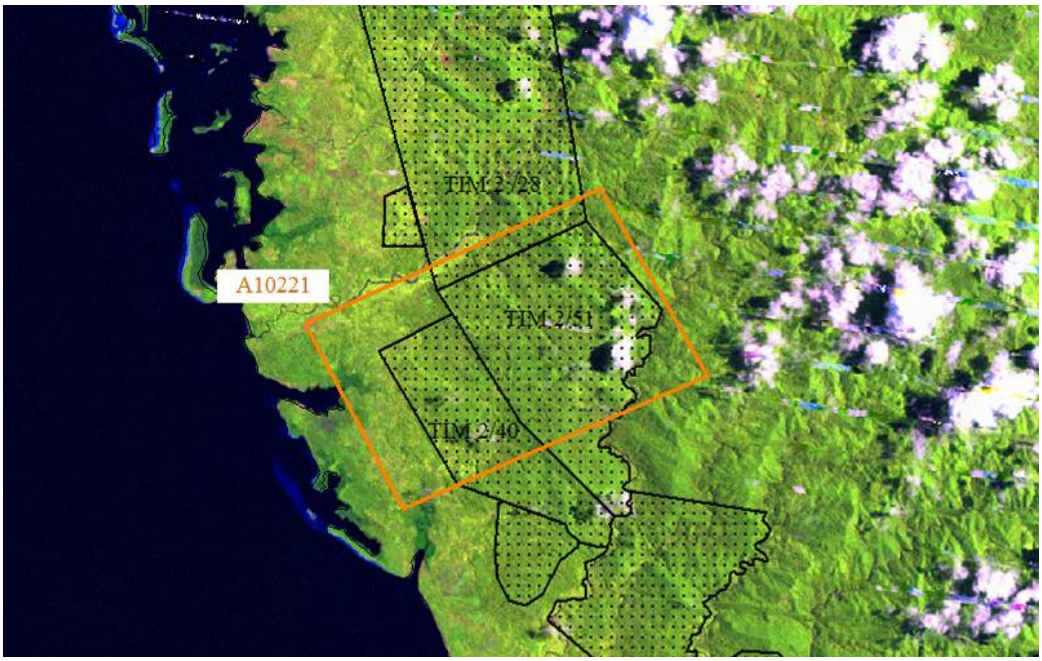
For each province, URS then classified all commercial forest areas as unlicensed with an operational status of logged or unlogged, or licensed with an operational status of logged, current or not started.

The SI Forestry Division (FD) monitors logging status through logging concession applications, approvals and subsequent site inspections. The system in use is paper based and is difficult to analyse at a national level. URS (2003) entered all know concession areas and their operational status into a computer based mapping system (GIS).

To reassess logging extent and status to the end of 2005, URS updated the 2003 GIS data using information collated by SIFMP II and FD through the 2005 License Audit.

URS notes that since 2003, a number of new licences issued overlap existing licence areas. Overlaps occurred in most provinces and were generally for areas already logged once before. An example for Malaita is presented in Figure 3-1 where an approved license A10221 (yellow) overlaps the completed concessions (black) of license numbers TIM 2/40 (expired) and TIM 2/51 (current).

Figure 3-1: Example of an overlapping harvest licence in central Malaita



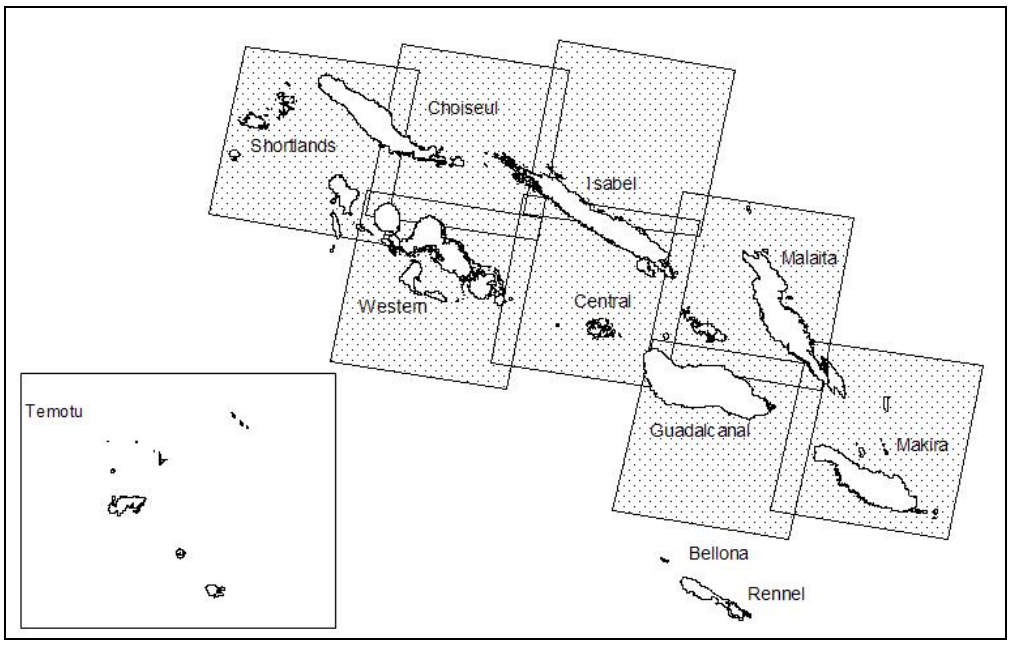
Source: Landsat 7 imagery, URS

The SIFMP II 'Forestry Division (FD) Licensing Audit' report, prepared in December 2005, documents overlapping licence boundaries as a key issue, finding that of 219 pending applications, 39 applications overlap other concessions or applications. The audit report makes a number of recommendations to address these issues.

A new emerging forest management issue within the Solomon Islands is the increasing number of landowner applications seeking to re-enter previously logged areas before the forests have a chance to recover from previous harvesting activities. Burgess (1971), Tabudar (1984) and Wagner and Cobbinah (1993) all reported on the dangers of prematurely re-logging forests, due to their increased accessibility following the first harvest, as the demand and prices for timber rose and unlogged forests became scarcer. They urged forest managers to resist the temptation to re-enter areas too early. Burgess states that early re-logging of an already harvested forest disrupts the plant succession process and that the forest is in danger of becoming progressively poorer in desirable timber species and richer in "weed species". There is a distinct risk that the same destructive operations will happen in the Solomon Islands, thus further jeopardising the chances of forest recovery and consequently will dramatically affect the future natural forest woodflow projections.

Landsat 7 satellite imagery was used to determine the extent of logging since October 2003 and to check for logging activities outside known licence boundaries. Despite uncertainties associated with image interpretation, URS noted 36 potential logging activities outside known licence boundaries of which 10 appeared to affect areas greater than 100 ha in size. These areas were removed from the current commercial area calculation and have been reported to the SI Commissioner of Forests for further investigation.

Figure 3-2: Extent of Landsat 7 coverage used to check recent logging activity



Source: URS

The estimate of current commercial forest area by logging status is summarised by Province in Table 3-1, and maps are presented in Appendix A.

Table 3-1: Summary of current forest areas (ha)

Province	Non commercial forest and cleared land	Unlogged commercial natural forest	Conservation areas	Logged over commercial natural forest	Plantations	Total area
Guadalcanal	460,600	40,200	0	37,600	300	538,700
Western	359,500	49,500	0	120,700	21,800	551,500
Isabel	297,000	56,700	0	68,800	300	422,800
Malaita	373,200	28,900	0	18,600	1,300	422,000
Choiseul	228,300	82,900	0	18,600	400	330,200
Makira	295,400	17,400	0	9,000	100	321,900
Temotu	63,100	19,900	0	1,500	3,200	87,700
Rennell	41,900	24,000	0	0	0	65,900
Central	55,100	5,700	0	3,600	100	64,500
Total (ha)	**2,174,000**	**325,200**	**0**	**278,400**	**27,600**	**2,805,200**
Total (%)	*77%*	**12%**	**0%**	**10%**	**1%**	*100%*

Source: URS

3.2 Future Commercial Forest Area

Unlogged natural forest, once logged, will become logged-over natural forest. Under the right conditions these areas can regenerate and produce another crop of commercially harvestable trees. Hence, logged-over natural forest areas are important for determining future wood flows. The period (or cutting cycle) over which this is likely to occur in Solomon Islands was estimated by ACIL (1992) to be 40-45 years.

The main sources of land for commercial logging operations in the future are likely to come from:

- Land harvested in the mid 1970s and 1980s when the first large-scale commercial logging operations commenced in Western and Isabel Provinces. These have the potential to come back into production from 2020 onwards;
- Land logged, using modern methods, between the early 1990's and 2006. These have the potential to come back into production from 2035 onwards;
- Land supporting a current harvest operation. These have the potential to come back into production from 2045; and
- Land likely to support a new harvesting operation in the next five to ten years. These have the potential to come back into production from 2050.

To estimate the future net commercial area, the definition used for current commercial forest types was broadened. For example, it was assumed that most forests classified by SOLFRIP as being moderately disturbed would develop into relatively undisturbed forests over time. Semi-commercial forests were reclassified as commercial for the same reason.

In 2003, areas were also divided into those with or without export potential. The assumption was that Guadalcanal, Western, Isabel, Choiseul and Makira provinces could support export operations because they had infrastructure in place, economies of scale, and relatively small populations. The remaining provinces of Malaita, Central, Temotu and Rennell were considered to have low export potential due to low economies of scale and large populations relying on local forest products.

However, since 2003, Malaita and Central provinces have consistently exported timber and therefore have been reclassified as having export potential for this update. The estimate of future commercial forest area is summarised by province and potential harvest period in Table 3-2.

Table 3-2: Summary of potential future forest areas (ha)

Province	Gross Area	Logging history and likely recruitment period				
		Logged 70's & 80's[1]	Logged 90's to 2006[2]	Current operations[2]	New operations[2]	Total
		(2010-20 +)	(2025-35 +)	(2035-45 +)	(2040-50 +)	
Export						
Guadalcanal	538,700	7,410	30,200	8,100	35,600	81,310
Western	551,500	22,720	98,000	18,200	24,000	162,920
Isabel	422,800	960	67,800	16,300	44,700	129,760
Choiseul	330,200	0	18,600	24,000	67,300	109,900
Makira	321,900	100	8,900	12,100	12,500	33,600
Malaita	422,000	0	10,400	1,500	29,500	41,400
Central	64,500	0	3,600	1,700	5,800	11,100
Sub-total	*2,651,600*	*31,190*	*237,500*	*81,900*	*219,400*	*569,990*
Domestic						
Temotu	87,700	1,240	300	0	22,700	24,240
Rennell	65,900	0	0	0	29,500	29,500
Sub-total	*153,600*	*1,240*	*300*	*0*	*52,200*	*53,740*
National	**2,805,200**	**32,430**	**237,800**	**81,900**	**271,600**	**623,730**

Source: 1 SOLFRIP air photo interpretation
2 URS

A number of logging companies are seeking permission to re-enter areas logged in the last 10 to 15 years (as noted in Section 3.1). It is unlikely that these areas have regenerated sufficiently to ecologically sustain another harvest operation. URS has not incorporated re-entry logging into its woodflow model.

3.3 Logging Yields from Natural Forests

URS (2003) used annual logging plans submitted by logging companies to estimate an average commercial harvest yield of 32m^3/ha for the Solomon Islands.

URS (2003) compared logging plan data with an estimate of harvest volumes derived by dividing the total provincial export volumes by the estimated commercial area logged for 1994 to 2002. URS has updated this assessment based on export data to the end of 2005 (Table 3-3). Based on total exports of 8.4 million m^3, export data suggests that the average commercial volume is approximately 31m^3/ha. The revised assessment supports the data presented by logging companies and is slightly less than 32m^3/ha per hectare modelled by URS in 2003, principally due to a revision of harvest areas in Choiseul.

Table 3-3: Export harvest volumes per hectare

Province	Export Volume[1] 1994-2005	Logged Area[2]	Volume m^3/ha
	1	2	(1)/(2)
Guadalcanal	367,800	30,400	12
Western	4,954,600	117,800	42
Isabel	1,439,800	67,800	21
Malaita	286,900	10,900	26
Choiseul	773,500	24,900	31
Makira	301,200	10,900	28
Central	0	4,900	0
Temotu	0	300	0
Rennell	239,000	0	49
National	***8,362,800***	**267,600**	***31***

Source: 1 FD log export database
2 URS

The impact of the revised current commercial forest area and revised forest yield on the standing commercial harvest volume is summarised in Table 3-4. The revised calculations indicate that the current standing volume of commercial timber has fallen by 2.5 million m^3, equivalent to 24%, between the end of 2002 and the end of 2005. This is consistent with the 2.8 million m^3 recorded in the FD export database for the same period.

Table 3-4: Summary of merchantable volumes for unlogged natural forests with export potential

Province	2003 assessment[1]		2006 assessment[2]	
	(m^3/ha)	(m^3)	(m^3/ha)	(m^3)
Guadalcanal	14	623,000	12	481,200
Western	41	2,632,200	42	2,079,000
Isabel	23	1,796,300	21	1,190,700
Choiseul	41	3,653,100	31	2,573,000
Makira	35	735,000	28	487,200
Malaita	22	655,600	26	751,400
Central	43	288,100	49	279,300
National		**10,383,300**		*7,841,800*

Source: 1 URS (2003), note that Malaita and Central have been included to allow for a direct comparison with 2006 data
2 URS

3.4 Woodflow Assessment

3.4.1 Woodflow Estimate Based on Current Harvest Rates

The flow of wood over time from forests, commonly known as woodflow, can be estimated from a schedule of future harvesting operations, the areas available for harvest and estimated harvest yields per hectare.

URS has used the same methodology it used in 2003 to model woodflows for the Solomon Islands into the future. URS again treated the provinces as a single resource, which assumes that as wood availability decreases in one province, logging companies will move to other provinces to maintain supply.

The woodflow model simulates harvesting of the current standing volume of 7.8 million m^3 at an annual rate equivalent to the average annual logging rate for 2004 and 2005 of 1.02 million m^3/yr (Table 3-5). Modelling of the harvesting of areas previously cut is based on the likely recruitment periods described in Section 3.2, assuming a 45 year cutting cycle.

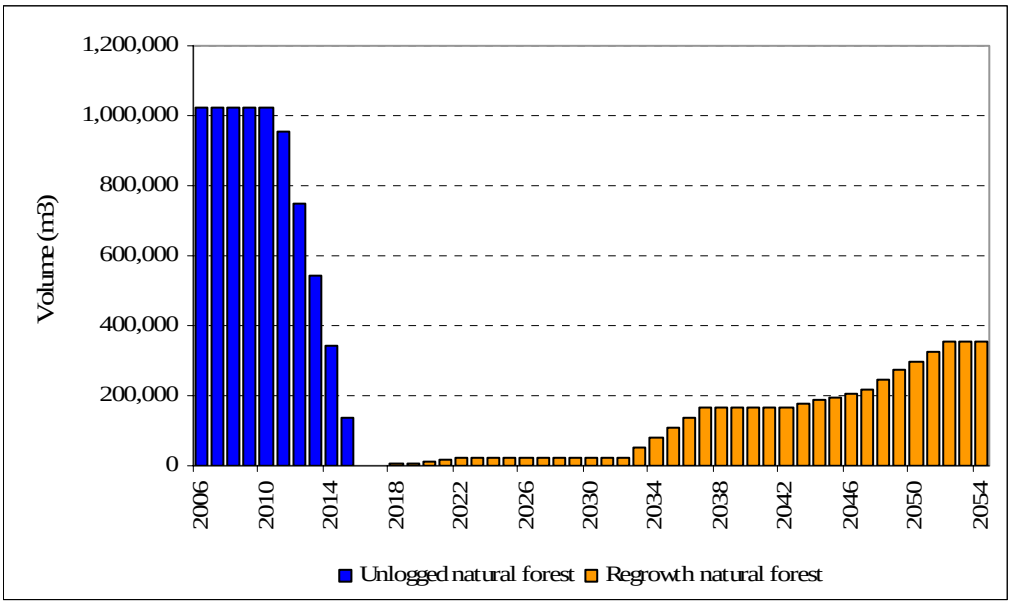
Table 3-5: Historic natural forest round log exports by province 1995-2005 (m^3)

Year	Central	Choiseul	Guadal - canal	Isabel	Makira	Malaita	Western	Total*
1995	19,900	88,400	55,100	102,700	40,300	38,400	392,200	**737,000**
1996	34,000	87,500	76,500	81,200	31,000	37,900	457,800	**805,900**
1997	16,700	83,000	75,200	126,100	11,500	12,300	284,800	**609,600**
1998	17,000	89,100	99,900	130,200	11,600	4,500	234,500	**586,800**
1999	41,900	35,700	21,800	82,600	23,100	13,100	397,700	**615,900**
2000	5,100	44,100	14,100	101,300	16,100	17,700	322,900	**521,300**
2001	15,900	8,200	0	167,400	1,500	34,100	282,300	**509,400**
2002	9,500	21,000	0	171,800	7,200	17,400	357,300	**584,200**
2003	14,100	46,000	0	188,500	19,300	0	471,000	**738,900**
2004	30,600	113,200	0	144,300	35,200	20,000	625,500	**968,800**
2005	34,300	76,400	9,800	93,600	77,500	50,200	725,500	**1,067,300**
Total	**239,000**	**692,600**	**352,400**	**1,389,700**	**274,300**	**245,600**	**4,551,500**	**7,745,100**
Average 04 /05	*32,450*	*94,800*	*9,800*	*118,950*	*56,350*	*35,100*	*675,500*	*1,018,100*

* Averages apply only to those years in which exports took place
Source: FD export database 2006

The resulting woodflows (Figure 3-3) show that current harvest rates can be maintained until 2010 after which time yields are likely to decline. This sharp drop in volumes is a direct consequence of harvesting the forests more quickly than they can regenerate.

Figure 3-3: Projected national woodflow from natural forests: 2006 – 2055



Source: URS

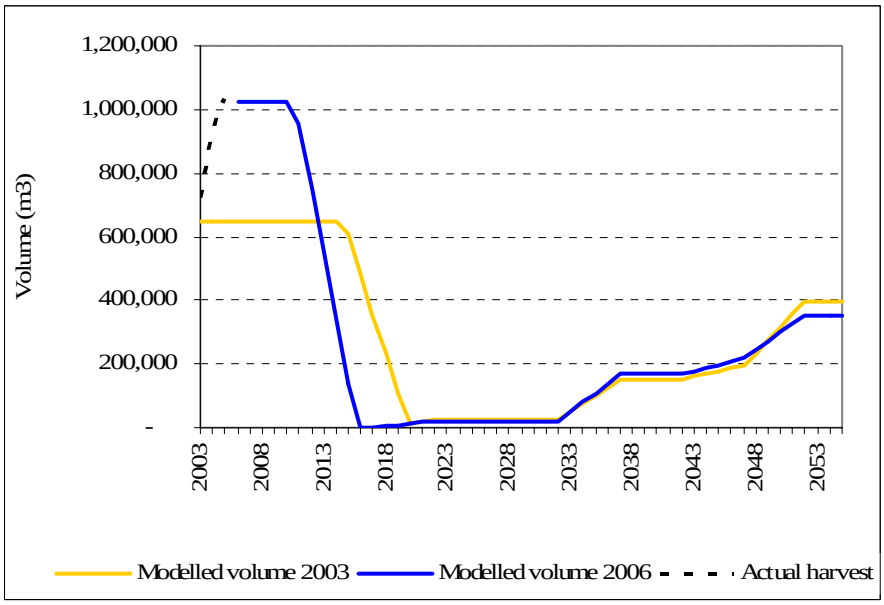
URS considers it unlikely that the current rate of harvesting will drop significantly before 2010. Licences have already been issued which would allow companies to harvest at significantly more than the current harvest rate. This is coupled with the strong international demand for round logs and relatively easy access to cheap logging equipment and labour in the Solomon Islands.

Figure 3-4 highlights the effect of the unrestrained increase in logging activity over the last three years on forecasts of woodflow made by URS in 2003.

The forecast dramatic decline in natural forest woodflows will have a significant fiscal impact on the SIG and landowners, given the current reliance on round log exports to generate 60-70 % of the total foreign export earnings and as the national government's major source of non-donor income (in the form of duties).

Also it indicates the demise of the natural forest logging industry, despite warnings to all stakeholders over the last decade of the likely impact of unsustainable annual logging rates, which will have a significant impact on rural employment. Currently it is estimated that the natural forest industry employs 1 in 6 people.

Figure 3-4: Comparison of woodflows predicted by URS in 2003 and 2006



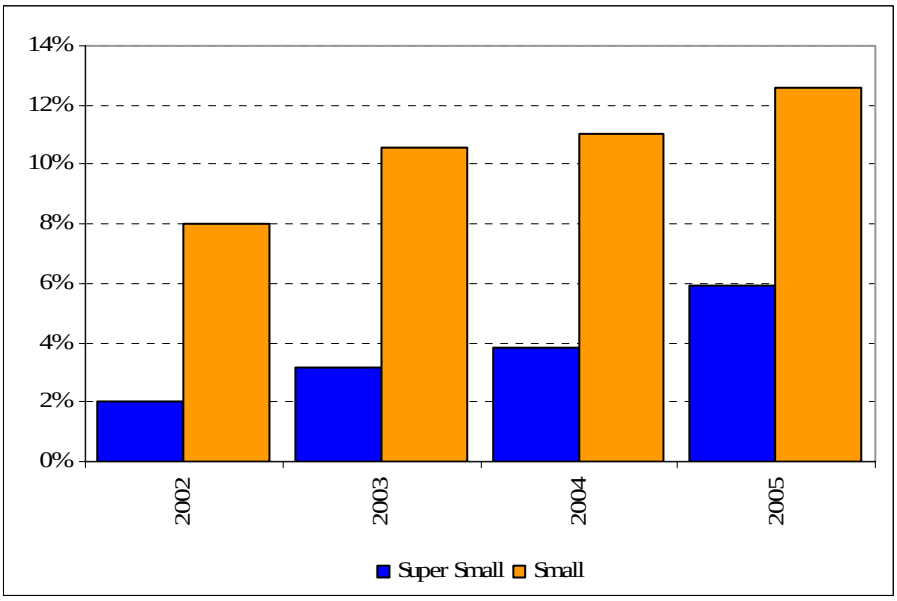
Source: URS & URS (2003)

3.4.2 Log Size Trends

The recovery of the natural forests from 2035 onwards (refer Figure 3-3) is predicated on the assumption that forests are allowed to recover. As indicated in Section 3.1, there is already evidence of logging companies seeking to re-enter previously logged forests, which can only delay forest recovery and could lead to a collapse of forest structure.

Analysis of the size distribution of logs harvested between 2002 and 2005 indicates there has been a 9% increase in the harvest of Small and Super Small log sizes as a proportion of total annual sales (Figure 3-5), and an increase from 54,000m^3 harvested in 2002 to 196,000 m^3 in 2005. Harvesting of these logs in most instances contravenes the conditions of the felling licences, which only allows trees greater than 60 cm in diameter at breast height (1.3m) to be harvested, except where corridors are cleared for road construction.

Figure 3-5: Change in proportion of Small & Super Small logs from 02-05

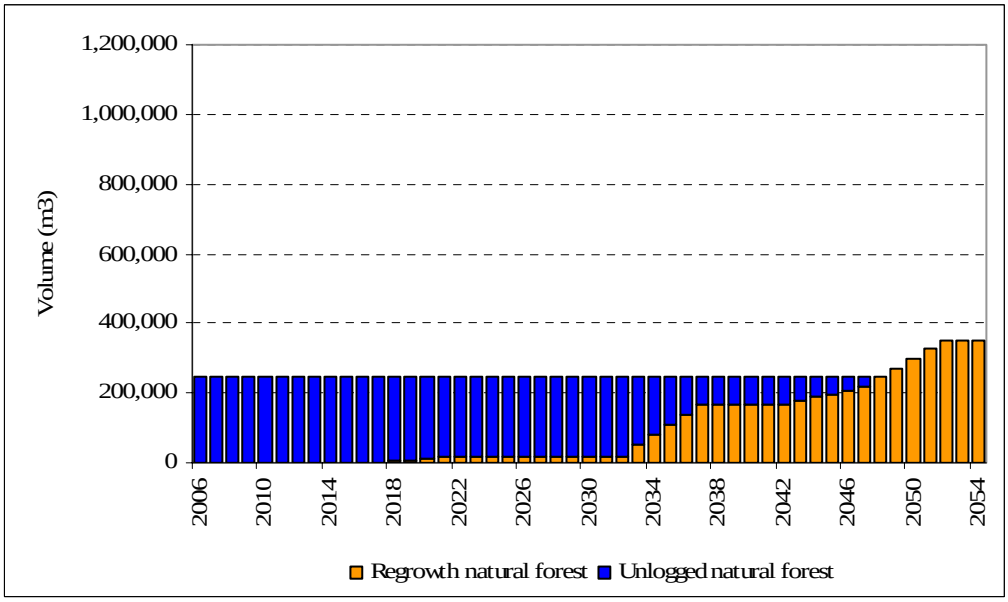


Source: FD log export database

3.4.3 Estimate of Non-declining Woodflow Potential

It is theoretically possible to manage the current resource on a non-declining yield basis if the harvest from natural forests was capped at 248,000 m^3/yr to 2050 (Figure 3-6), after which the Solomon Islands could support an estimated non-declining annual cut of 353,000 m^3/yr. This is based on the assumption that the previously logged forests are allowed to fully recover (over a 45 year period) and are not prematurely re-logged.

Figure 3-6: Non-declining annual national woodflow for natural forests



Source: URS

3.5 Revenue Forecast

Natural forests contribute revenue to both Government and landowners.

Government receives revenue through duties payable on log exports. The export value (in US dollars) on which the duty is payable (in SI dollars) is called the Determined Price. This is a value set by FD on the basis of log sales of similar species in the Asia Pacific region (adjusted for differences in transportation costs). By using this fair market price to set the value on which duty is payable, the Government protects itself from transfer pricing (i.e. when the declared value of exported logs does not reflect their destination's landed price). The SBD/USD exchange rate is set by Customs from time to time.

The amount of duty payable is determined using a sliding scale, where:

- Any log with a Determined Price listed below SBD680 has duty levied at 25% of the log value;
- Any log with a Determined Price listed between SBD680 and SBD1040 has duty levied at 25% for the first SBD 680, plus 40% of the remaining log value above SBD680; and
- Any log with a Determined Price listed above SBD 1040 has duty levied at 25% for the first SBD680, plus 40% of SBD360, plus 60% of the remaining log value above $1040.

The Schedule of Determined Prices was last set in December, 2003 and at the time of this report was still current (Table 3-6).

Table 3-6: Determined price schedule (USD/m^3) for log exports – December 2003

Group	Species	Grade							
		Regular		Small		Super Small		Low	
		Aug-03	Dec-03	Aug-03	Dec-03	Aug-03	Dec-03	Aug-03	Dec-03
I	Intsia bijuga (kwila)	95	100	85	90	75	81	57	
	Vitex (Vasa)	95	100	85	90	75	81	57	
	Palaquim (pencil cedar)	95	81	85	73	75	66	57	53
	Calophylum	95	81	85	73	75	66	57	53
	Pometia (Taun, Akwa)	95	81	85	73	75	66	57	53
	Plachonella	95	81	85	73	75	66	57	53
II	Schizomeria (beabea)	80	71	70	65	65	58	55	48
	Dillenia	80	71	70	65	65	58	55	48
	Gonostylus (ramin)	80	71	70	65	65	58	55	48
	Terminalia brassii	80	71	70	65	65	58	55	48
	Terminalia spp. (ex. T bassii)	70	67	70	60	65	54	55	48

Group	Species	Grade							
		Regular		Small		Super Small		Low	
		Aug-03	Dec-03	Aug-03	Dec-03	Aug-03	Dec-03	Aug-03	Dec-03
III	Terminalia calamansanai	70	62	60	56	55	51	52	48
	Canarium	70	62	60	56	55	51	52	48
	Burkella	70	62	60	56	55	51	52	48
	Celtis	70	62	60	56	55	51	52	48
	Alstonia (milky pine)	70	62	60	56	55	51	52	48
	Dysoxylum	70	62	60	56	55	51	52	48
	Eugenia (water gum)	70	62	60	56	55	51	52	48
	Endorspermmu	70	62	60	56	55	51	52	48
	Amoora	70	62	60	56	55	51	52	48
	Campnosperma	70	62	60	56	55	51	52	48
IV	Maranthes	60	54	55	50	52	47	50	45
	Mixed species	60	54	55	50	52	47	50	45
	Parinari	60	54	55	50	52	47	50	45

Source: FD, 2006

To forecast the duty payable on predicted woodflows, the distribution of export volumes by species group and grade was estimated for 2005 using data from the FD log export database (Table 3-7). Using the species distribution data and the current determined price schedule, the average duty currently payable is estimated to be a weighted average of SBD 130/m^3.

Table 3-7: Distribution of log export grades for 2005

	Class			
Group	Regular	Small	Super small	Low
1	24%	5%	2%	7%
2	18%	2%	1%	7%
3	14%	4%	2%	3%
4	5%	2%	1%	4%
Average	*61%*	*13%*	*6%*	*21%*

Source: FD log export database

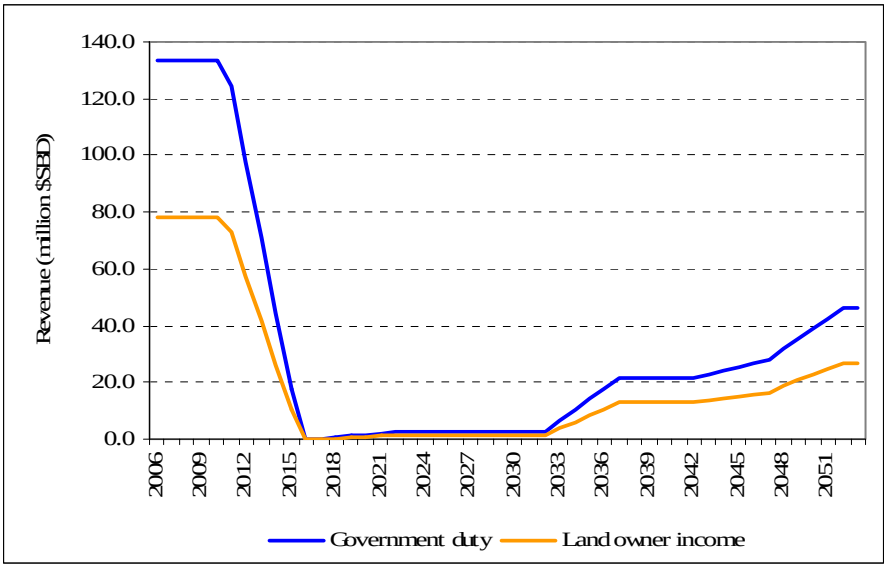
The amount of revenue received by landowners is negotiated with logging companies on a concession by concession basis and often includes promises to develop infrastructure such as schools, clinics, and community halls. In general it is thought that landowners receive about 15% of the total log value, which is estimated to be equivalent to SBD 76/m^3.

Based on the estimated SBD 130/m^3 average duty payable (2005 calendar year figures), URS estimates that current duties payable should total approximately SBD 133 million/yr before duty remissions and that this is expected to sharply decline from 2010 in line with a predicted sharp decline in forecast natural forest woodflow (Figure 3-7). This estimate

includes only direct revenue and does not include indirect revenues from sources such as company tax, income tax, GST and duties on imported equipment.

Similarly, based on the estimated royalty paid to landowners of SBD 76/m^3, the current royalties received by landowners are estimated to total SBD 78 million/yr.

Figure 3-7: Estimated revenue from log exports from natural forests



Source: URS

If natural forests were managed on a non-declining yield basis (as described in Figure 3-6), forests could generate SBD 32 million/yr in duty revenue for the SIG based on the current determined log price.

4 Plantation Forests

4.1 Current Commercial Plantations

Large scale, "industrial" plantations are located at Alu in the Shortland Islands, Gizo, Kolombangara, New Georgia, Isabel and on Nendo in Temotu. The area planted as reported in 2003 totalled 35,000ha, however large areas have failed or have been harvested and the current commercial area is estimated to be 22,200 ha (Table 4-1).

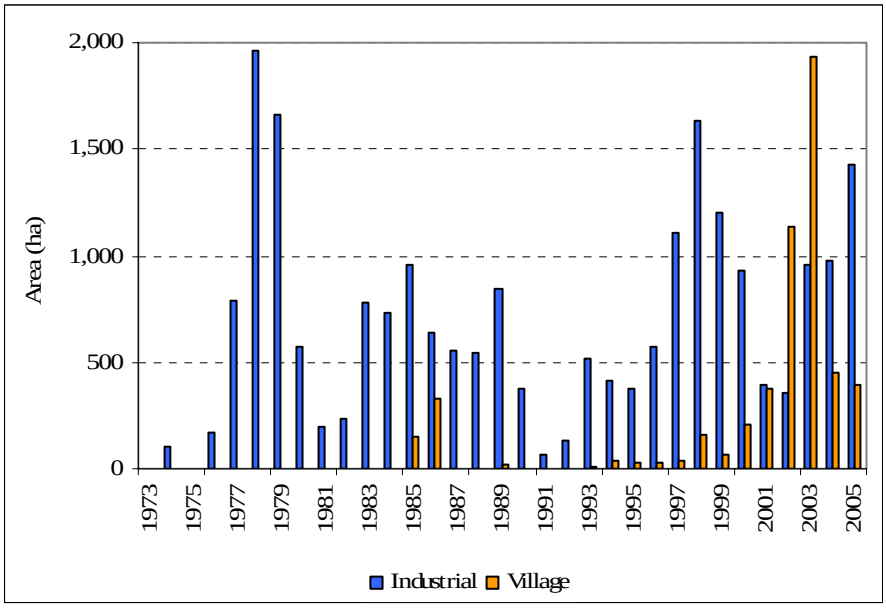
Table 4-1: Summary of industrial scale plantations

Province	Owner	Location	Planted Area[1]	Commercial Area[2] 2003	Commercial Area[3] 2005
Western	KFPL	Kolombangara	12,000	12,000	7,600
	Eagon (EPPL)	Viru Harbour	12,500	8,900	10,600
	FD	Shortland Is	2,100	1,200	800
	FD	Gizo	600	200	0
Choiseul	Eagon (ERC)	Choiseul Bay / Moli	3,200	300	300
Isabel	FD	Allardyce	2,300	2300	0
Temotu	FD	Santa Cruz	2,900	2,900	2,900
Total			**35,600**	**27,800**	**22,200**

Source: 1 Plantation owners, 2003
2 URS (2003)
3 SIFMP II & company data

Since 2003, villagers have continued to establish significant areas of their own plantations with the support of FD and SIFMP II extension services. A joint FD-SIFMP II database indicates over 9,000 individual plantings have occurred to date.

Figure 4-1: Estimated plantation forest areas by year of planting



Source: FD

The industrial plantations consist mainly of *Gmelina arborea*, *Campnosperma brevipetiolatum*, *Eucalyptus deglupta*, *Terminalia* spp and mahogany (Table 4-2). When replanting after harvesting it is common for Campnosperma to be replaced by *Gmelina* and *Eucalyptus*, and *Acacia* and "other" species to be replaced by a mix of teak, mahogany and *Gmelina*. Villagers have preferred to plant high value and relatively easy to grow teak and mahogany.

Table 4-2: Summary of plantation species

Industrial		Village	
Species	**Proportion**	**Species**	**Proportion**
Eucalyptus deglupta	28%	Teak	67%
Gmelina	19%	Mahogany	12%
Campnosperma	14%	*Eucalyptus deglupta*	11%
Mahogany	14%	*Gmelina*	9%
Terminalia	9%	Other	1%
Agathis	7%		
Teak	3%		
Acacia	2%		
Other	4%		

Source: SIFMP II

4.2 Plantation Woodflow Predictions

URS has used the same methodology it used in 2003 to model plantation woodflows into the future.

The assessment is based on a general management regime and yield table for each main species or group of species (Table 3-1). For species such as teak and mahogany, management includes one or two thinning operations where a proportion of the smaller and more poorly formed trees are removed to promote the growth of the remaining higher value trees. At the clearfelling stage i.e. the final stage in the crop rotation, all trees are harvested.

Table 4-3: Standard plantation management regimes

Species	Operation	Year of Operation	Harvest Volume (m^3/ha)
Teak	1st thinning	14	50
	2nd thinning	20	50
	Clearfell	25	150
Mahogany, Cedrela	1st thinning	20	50
	Clearfell	30	180
Campnosperma, Terminalia	Clearfell	30	60
Balsa	Clearfell	4	50
Eucalyptus, Octomeles	Clearfell	15	200
Gmelina, Acacia	Clearfell	10	100
Agathis	Clearfell	40	200
Other	Clearfell	40	100

Source: SIFMP, KFPL, 2003

The assessment also assumes that each site is replanted following harvest and takes into account opportunities for expansion.

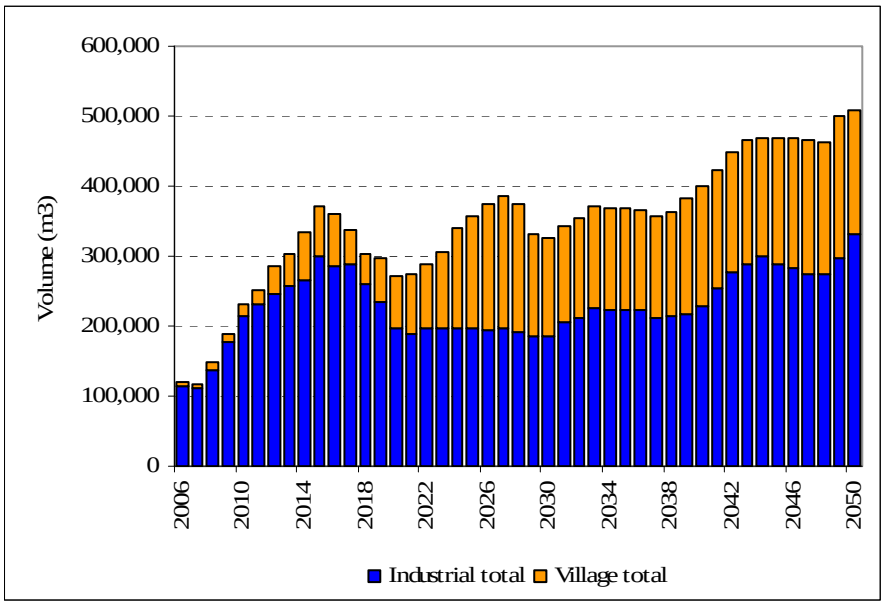
In the case of industrial scale plantations, opportunities for expansion appear limited. In the past these were developed on alienated Government land, however much of this land is now being returned to traditional owners or provincial governments.

In contrast, the opportunity for plantation expansion at the village level continues to be significant. Traditional approaches to subsistence agriculture can be equally well applied to small, family-based plantation development. The infrastructure required is minimal, and if no roads exist, small portable mills can be used to cut the timber on-site.

URS (2003) estimated that the FD's forest extension service, with support from local NGOs, could support a planting rate of at least 1,000 ha/yr for some time into the future. Since these initial estimates were made, joint FD and SIFMP II data collection efforts have recorded over 1,100 ha of plantings in 2002, 1,900 ha in 2003 and approximately 400 ha/yr for 2004 and 2005. URS has modelled an ongoing conservative establishment rate of 500 ha/yr to predict likely future woodflows from village based plantations.

The resulting woodflows modelled for industrial and village plantations are shown in Figure 4-2.

Figure 4-2: Potential woodflow from plantations by ownership



Source: URS

4.3 Revenue Forecast

There is currently no duty payable on the export of plantation grown logs, so all proceeds, after deducting harvesting and transport costs, go directly to the forest owner (Table 4-4).[2]

Table 4-4: Estimated landowner revenues after costs for the main SI plantation species

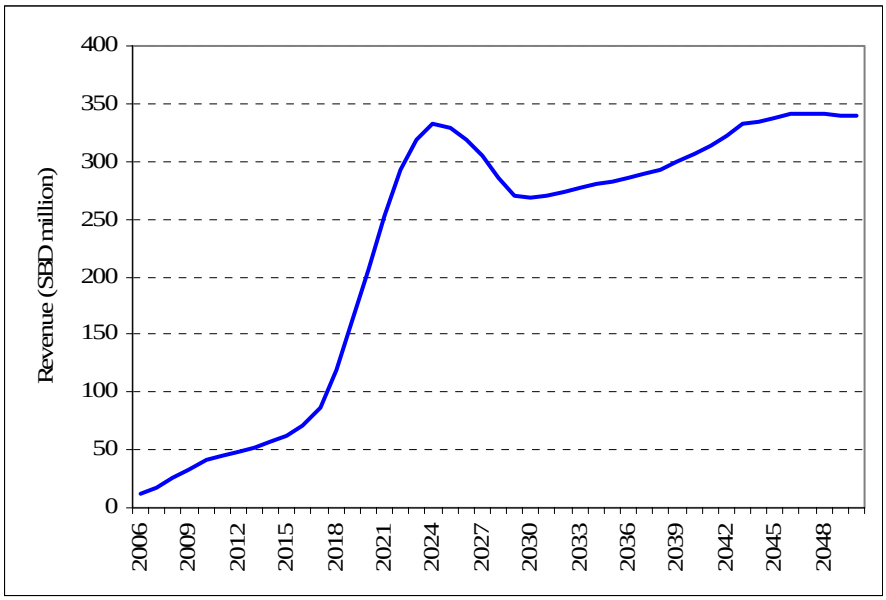
Trade name (botanical name)	Operation	FOB* USD/m^3	Harvest cost USD/m^3	Revenue USD/m^3	FOB* SBD/m^3	Harvest cost SBD/m^3	Revenue SBD/m^3
Teak	1st thinning	150	55	95	1,179	432	747
	2nd thinning	220	52	168	1,729	409	1,320
	Clearfall	380	50	330	2,986	393	2,593
Mahogany	1st thinning	220	52	168	1,729	409	1,320
	Clearfall	300	48	252	2,357	377	1,980
Eucalyptus deglupta	Clearfall	75	47	28	589	369	220
Gmelina	Clearfall	60	50	10	471	393	79
Campnosperma	Clearfall	55	50	5	432	393	39
Other	Clearfall	55	50	5	432	393	39

* FOB – acronym used to describe the Free on Board price paid for logs once loaded onto a ship.
Source: URS (2006)

The market for village plantation logs is still being established, but initial indications show that relatively high prices are achievable and could equate to a potential direct income of SBD 300 million/yr (Figure 4-3). This estimate is significantly greater than the URS (2003) estimate of SBD 200 million/yr, primarily due to higher than expected plantation establishment rates between 2003 and 2005, and better than expected net revenues received by landowners for their logs.

[2] Note that under current legislation the industrial plantations owners operate under a special exemption from export duty, however, while exports from landowner plantations are currently not dutiable, there is no certainty that this position will be maintained in the long-term. Recommendations to clarify the legislation in this regard have been made, however are as yet un-acted upon.

Figure 4-3: Potential revenue generated by village plantations



Source: URS

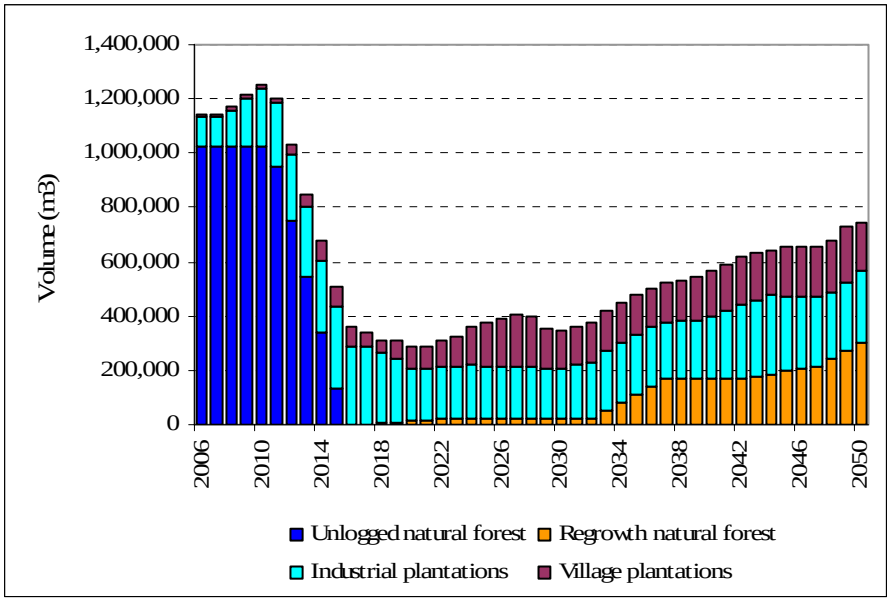
5 National Woodflow and Revenue Summary

5.1 Combined National Woodflow Assessment

Woodflows for natural forests and plantations were combined to produce a woodflow summary of the national forest estate, presented in Figure 5-1. The summary highlights that if harvesting in natural forests were to continue at current rates, the natural forest estate is likely to be exhausted before regrowth natural forests and village plantations can make a significant contribution.

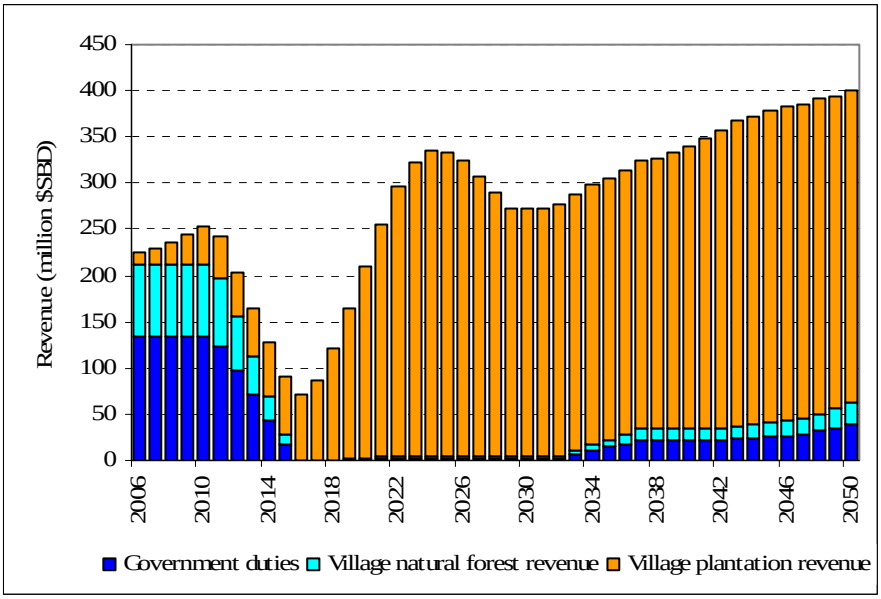
For the period 2015 to 2038 insignificant volumes will be produced from the natural forests. Industrial woodflows will remain relatively static at around 200,000 m³/year due to a finite industrial plantation estate. Village plantations will begin to contribute to the national woodflow in the early 2020's.

Figure 5-1: Potential woodflow from natural forests and plantations



Source: URS

Figure 5-2: Potential revenues from natural forests and village based plantations



Source: URS

Direct revenues from Government duties (before duty remissions) and royalties to landowners will drop significantly between 2012 and 2034 (Figure 5-2).

Figure 5-1 and Figure 5-2 also show that while woodflows for village plantations, industrial plantations and regrowth forests each contribute around one third to the national log harvest; village plantations have the potential to make a significant contribution to the Solomon Islands economy, in particular the rural economy. As indicated in Figure 5-2 village plantations are estimated to produce in dollar terms approximately SBD 300 million annually due to potential international demand for the high value species such as teak and mahogany.

5.2 Key Issues and Recommendations

Implications arising from the assessment

Natural Forests Sector

Based on the expected scenario outlined above, the current export-based harvesting of the natural forests is a 'sunset industry'. The anticipated demise of this sector has significant and potentially severe implications for the national economy, government revenue streams and rural employment.

Expected implications if logging rates exceed recommended sustainable levels would include:

- Loss of a significant part of the national forest estate, its biodiversity and the medium-term sacrifice of forest conservation opportunities;
- Negative social impacts on forest-dependent communities through loss of forest cover and traditional products and uses;

- Loss of rural employment (estimated to employ 1 in 6 people in 'formal employment');
- Loss of foreign earnings (currently round log export contributes 60-70% of the annual foreign earnings);
- Loss of government revenue (via export and import duties, income tax on companies and individuals etc); and
- Reduced revenue opportunities for rural landowners.

Plantation Sector

By contrast, the plantation sector is an important 'sunrise industry', especially in the smallholder sub-sector. The industrial sub-sector, consisting of Eagon Pacific Plantations Limited (EPPL) and Kolombangara Forest Products Limited (KFPL), is maturing and has limited expansion opportunities due to a finite land-base. However, the smallholder sub-sector has the potential to make a positive contribution to the Solomon Islands via an increased plantation estate, direct rural income and employment in growing, harvesting and processing of plantation timbers.

Expected benefits include:

- Increased tree-cover and subsequent wood volumes on previously degraded sites (i.e. old garden sites, logged-over forests returned to productive use);
- Direct revenue to the actual tree-growers and rural communities;
- High returns for owners of well-managed high-value species (i.e. teak and mahogany) plantations; and
- Purposeful rural employment, especially for the growing and relatively unskilled youth population.

Key recommendations arising from the assessment

The following recommendations are made to minimise the impact of the exhaustion of the commercial natural forests:

- New national legislation (based on the Draft 2004 Forestry Bill) be passed to ensure improved sector sustainability and better reflect the needs of the current and future forestry sector.
- SIG and provincial governments consider methods to reduce harvesting levels to more sustainable levels to mitigate the expected mid next decade exhaustion of the natural forests including:
  - Limiting annual provincial harvesting levels.
  - Introduction of a moratorium on the issue of new felling licences.
  - Cancellation of existing licences for non-compliance or the breach of licence conditions.
- Development of a communications strategy by the Forestry Division (with SIFMP II support) in relation to publication and wide distribution to the public and to key government decision-makers of this report and its potential implications for SIG and landowners.

- Development of new, and enforcement of existing, 'standard operating procedures' for forest management practices by the Forestry Division e.g. no re-entry logging, conversion of degraded forests to plantations etc.
- Encouragement of the private sector plantation industry (both large scale industrial and smallholder estates) by:
  - Promoting policies which encourage a steady increase of the smallholder estate on an annual basis.
  - Removal of legislative impediments and current government taxation arrangements related to plantation investment to improve viability of plantation investments.
  - Provision of technical advice to smallholders via a dynamic rural extension network.
- Commence re-structuring of the Forestry Division and its role to better reflect the changing nature of the forestry sector i.e. away from compliance and revenue collection towards ' rural extension and advisory' services.

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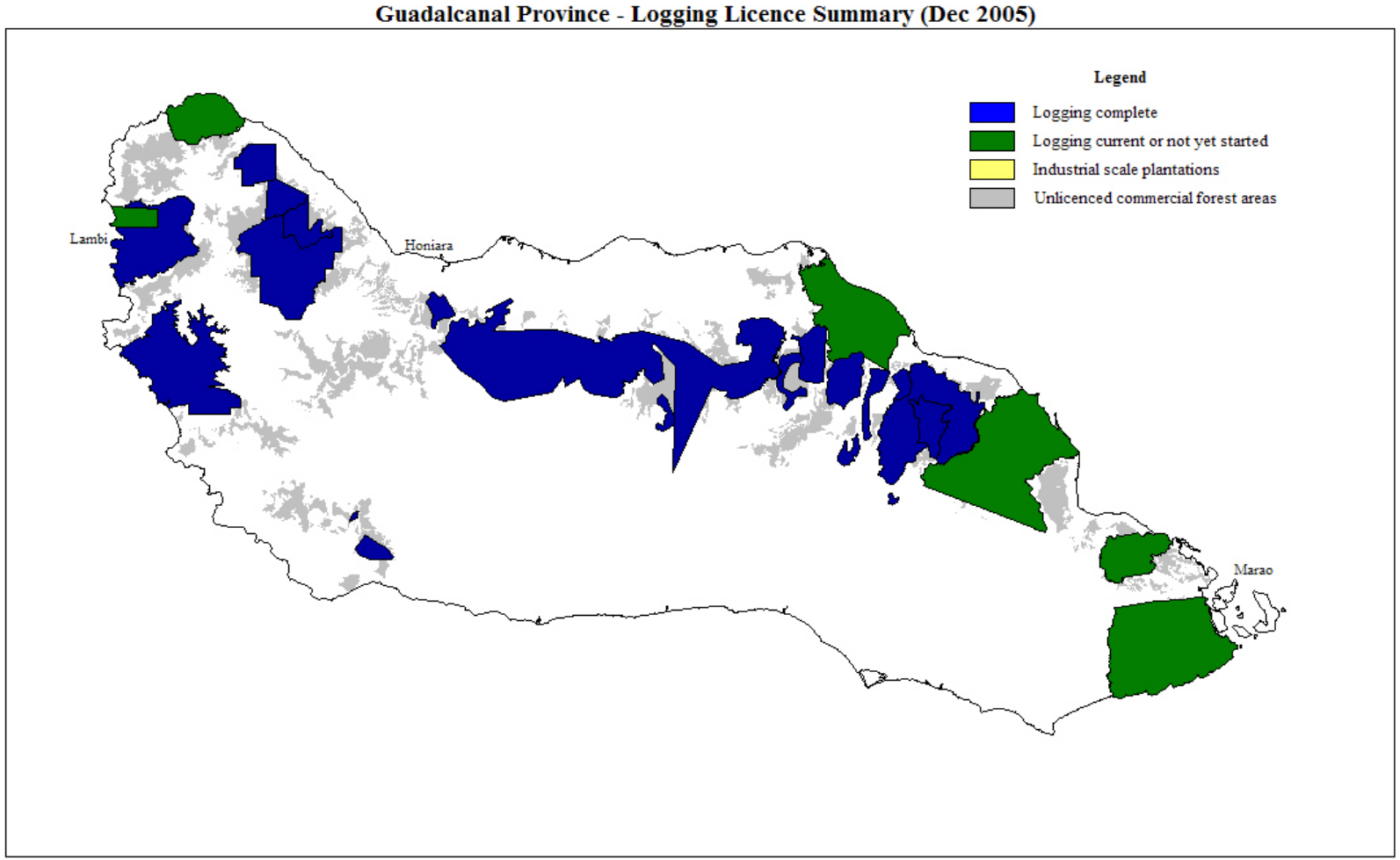
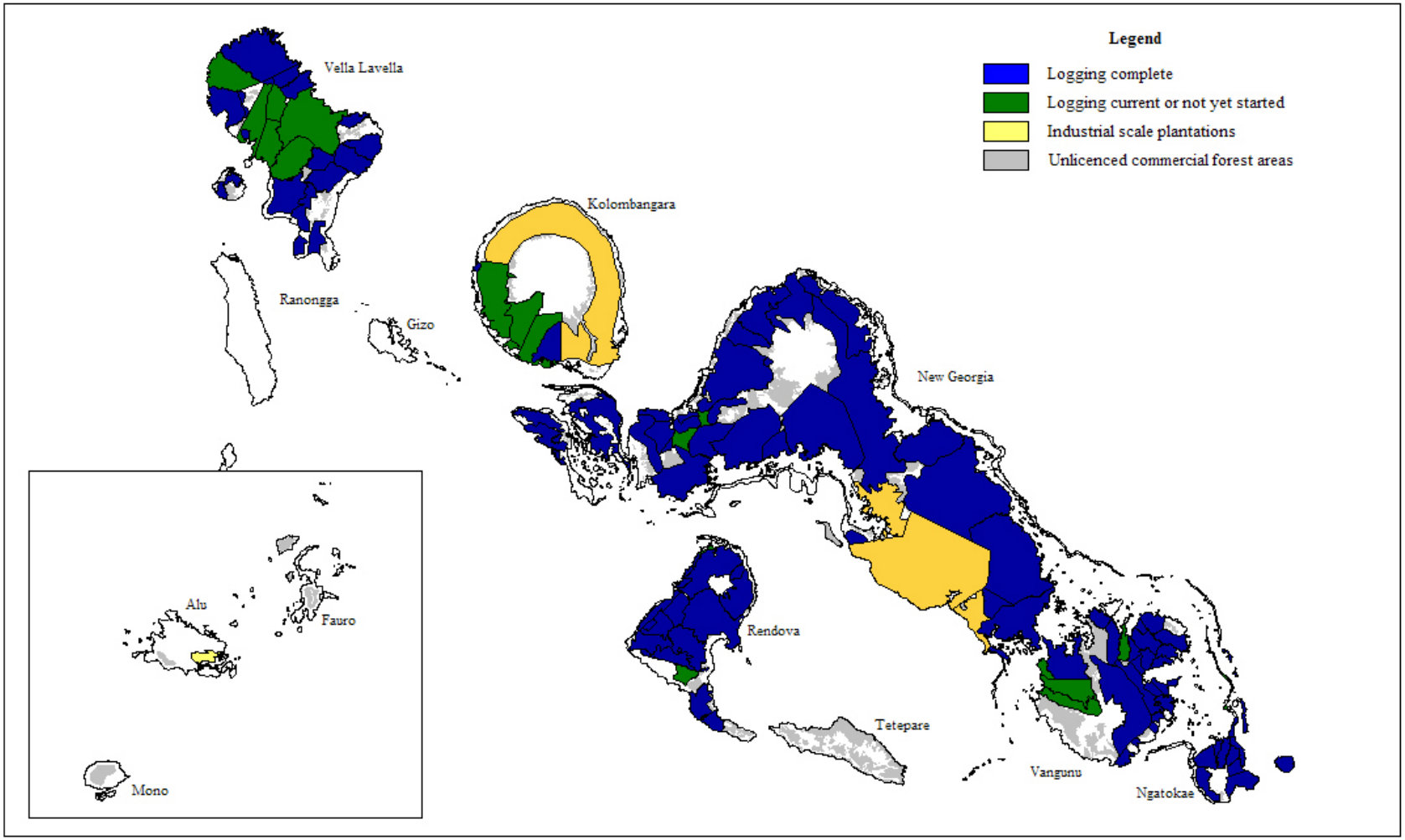
Appendix A

Provincial Maps

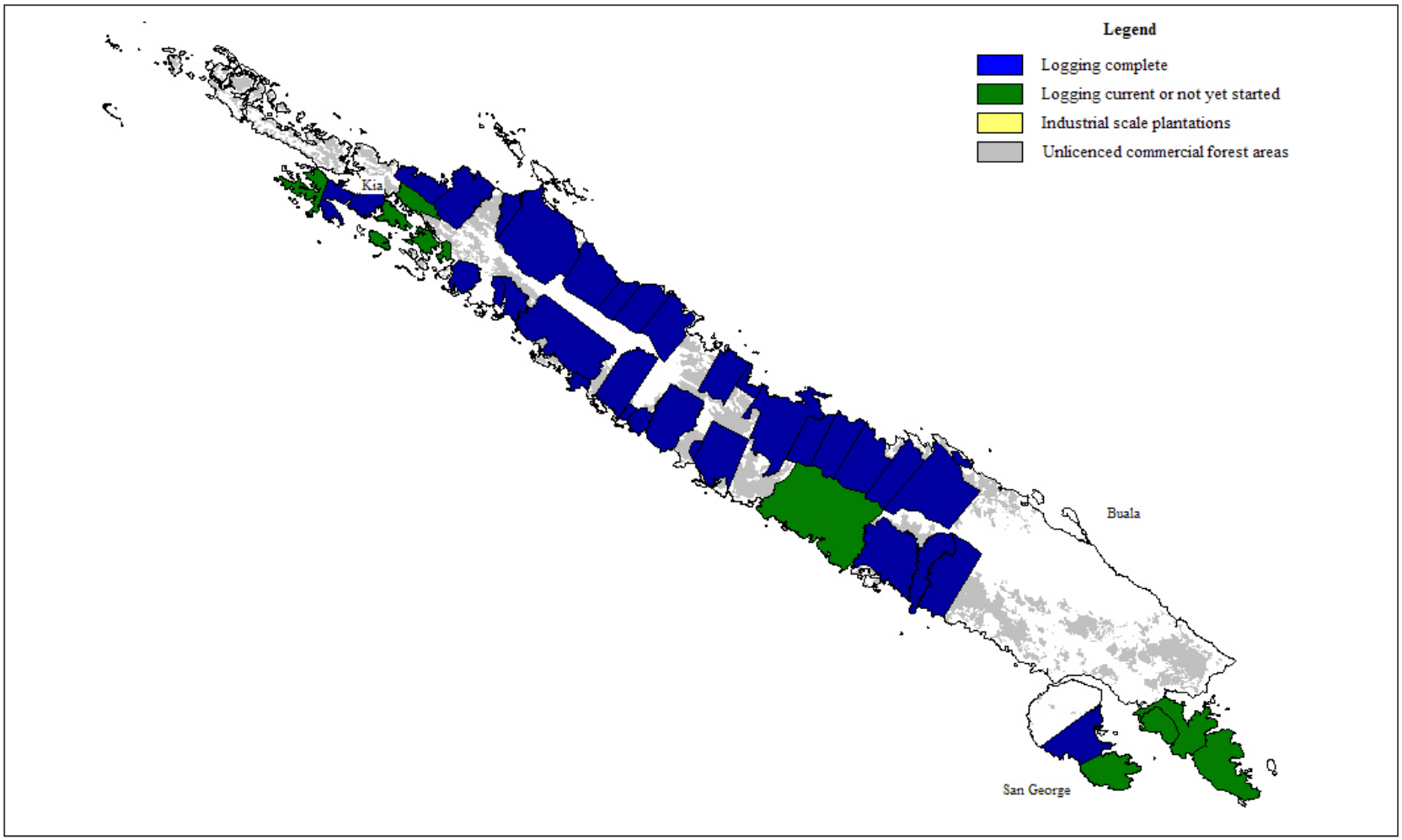
Appendix A: Provincial Maps



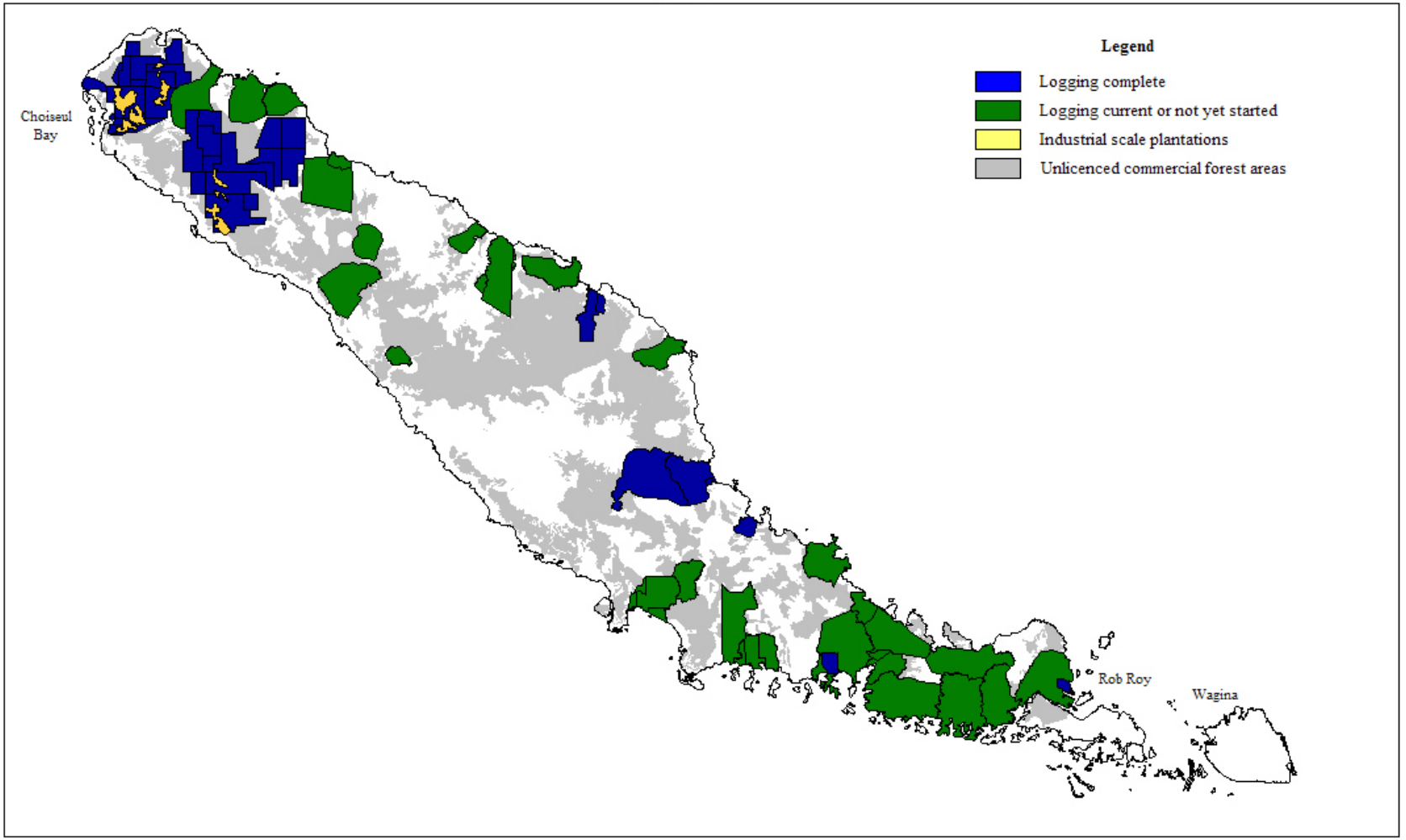
Western Province - Logging Licence Summary (Dec 2005)



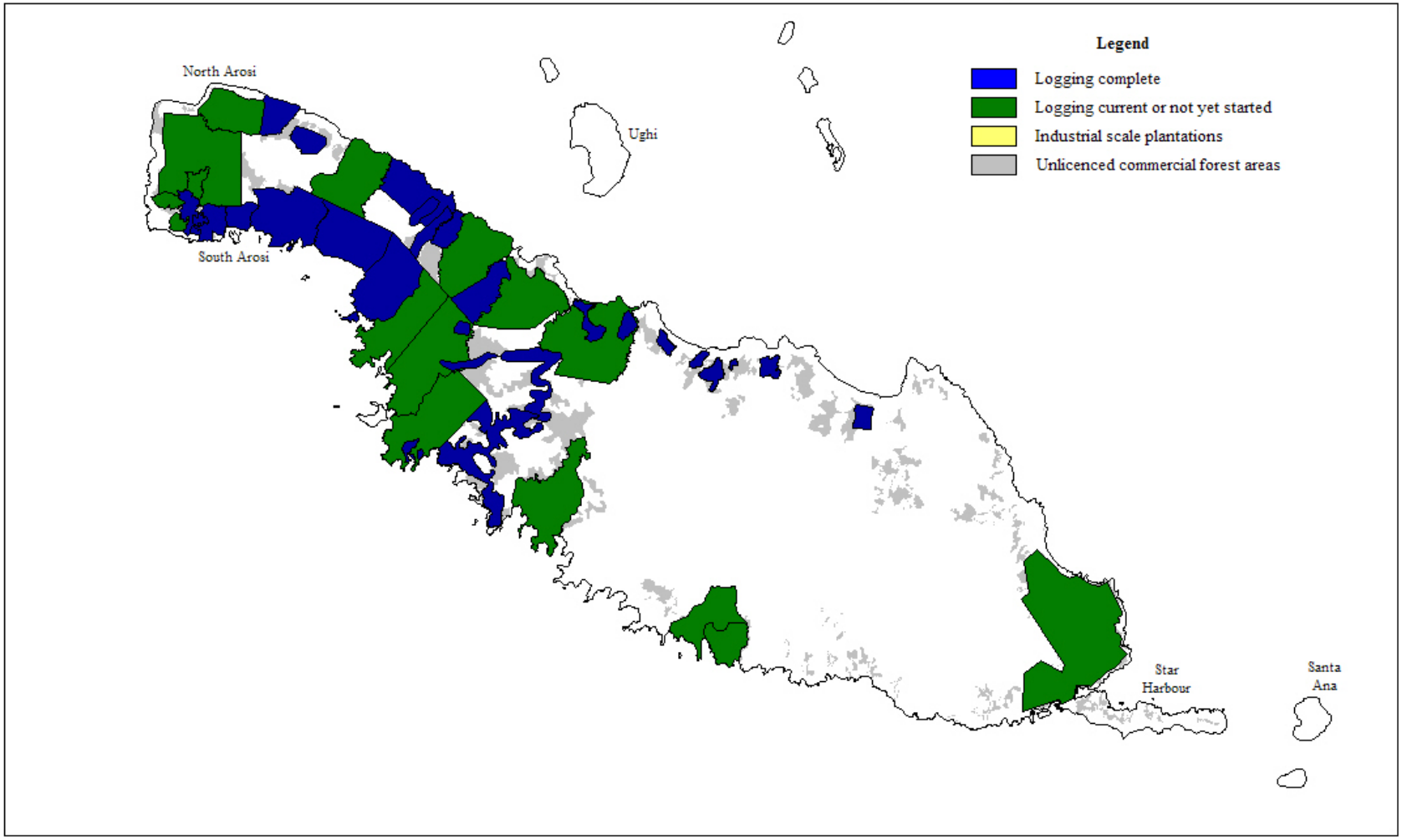
Isabel Province - Logging Licence Summary (Dec 2005)

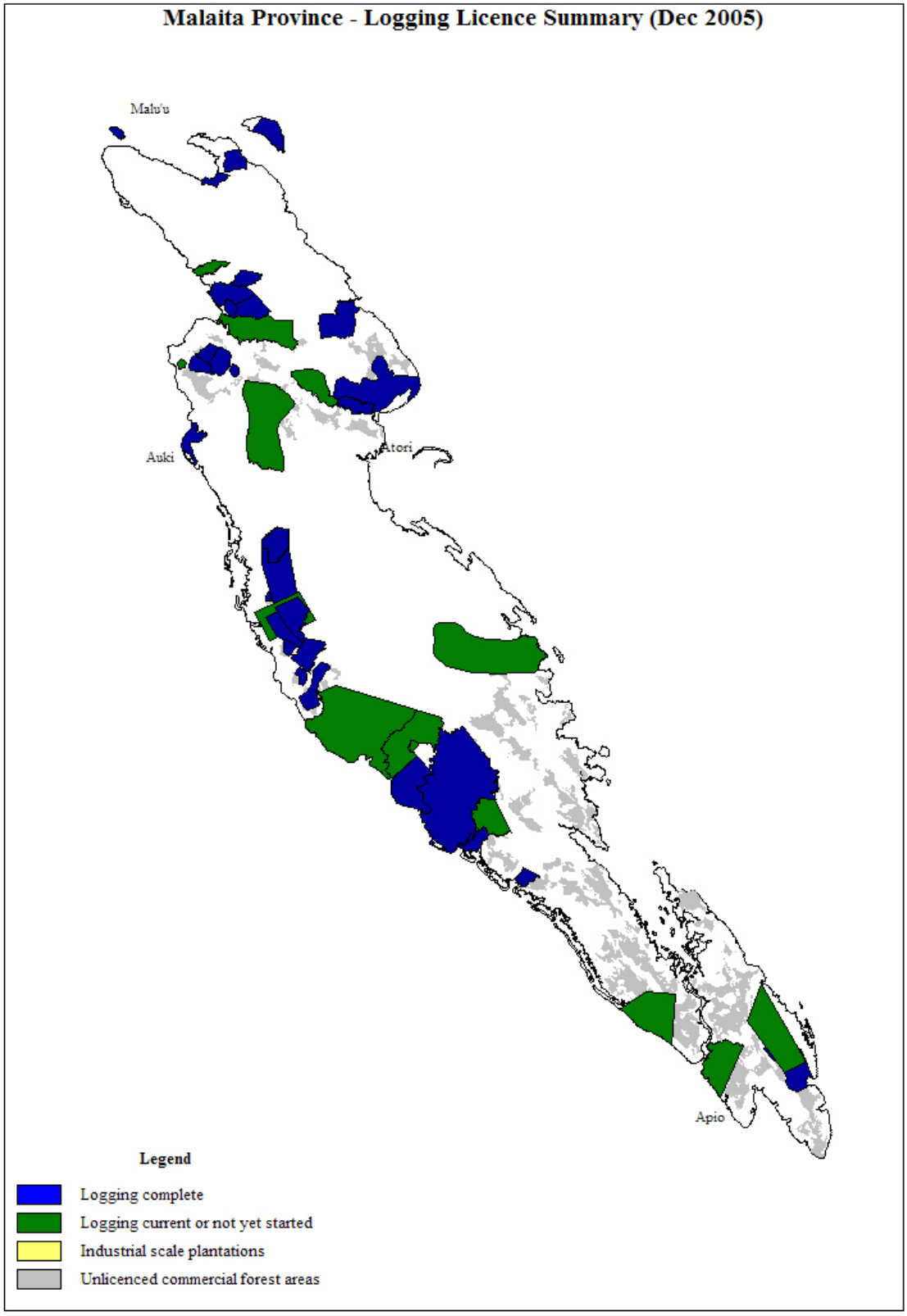


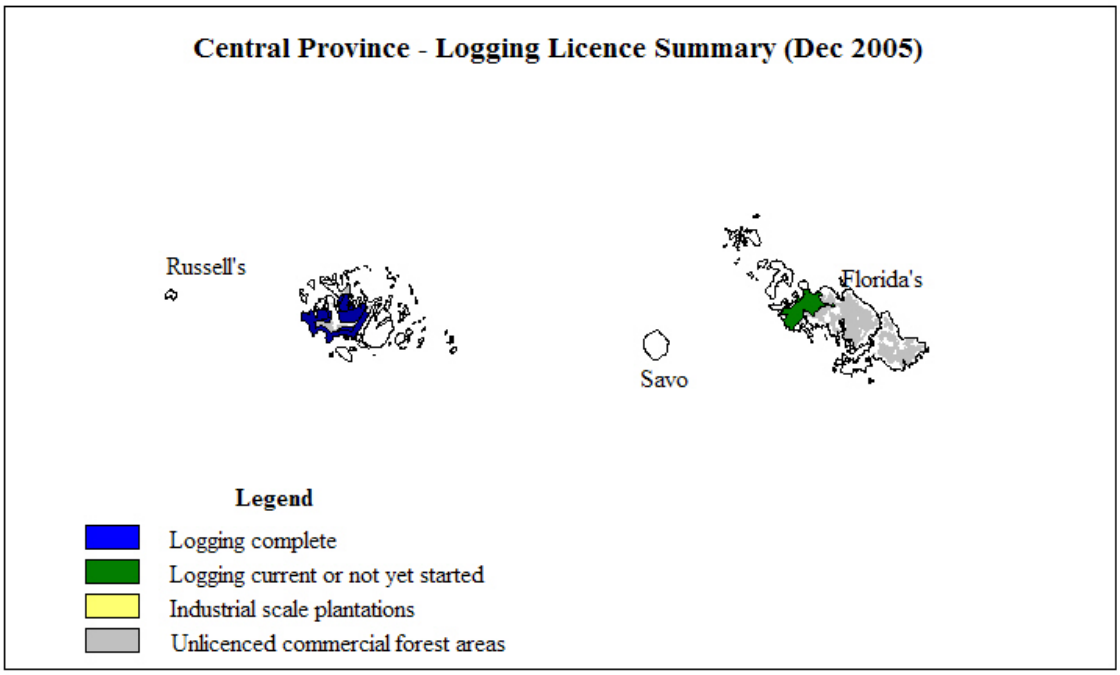
Choiseul Province - Logging Licence Summary (Dec 2005)



Makira Province - Logging Licence Summary (Dec 2005)




Malaita Province - Logging Licence Summary (Dec 2005)
Malu'u
Auki
Atori
Apio
Legend
Logging complete
Logging current or not yet started
Industrial scale plantations
Unlicenced commercial forest areas


Central Province - Logging Licence Summary (Dec 2005)
Russell's
Florida's
Savo
Legend
Logging complete
Logging current or not yet started
Industrial scale plantations
Unlicenced commercial forest areas

Limitations

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The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

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