R. L. SUKHRAM & SONS

REPORT ON THE
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
FOR SFEP 2/2017

NON-TECHNICAL SUMMARY

FORESTRY TRAINING CENRE INCORPORATED
JULY 4, 2021

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1.0 INTRODUCTION-THE DEVELOPER, RL SUKHRAM & SONS (RLSS)

Mr. Ragunauth Lall Sukhram launched RL Sukhram & Sons (RLSS) in 2006. The enterprise constructed an office, sawmill and a lumber yard at Lots 6 & 7, St. Lawrence, East Bank Essequibo and later, a lumber yard at Versailles, West Coast Demerara (see Figure 1). RLSS' current operations contribute significantly to home building projects at Tuschen and Parfaite Harmony respectively.

Figure 1: Photograph of RLSS Sawmill (left) and its lumber yard at Versailles (right)

RLSS sources timber from its several small forest concessions in the Kartabu Triangle and through purchases from other forest concessionaires. However, the total volume of logs available for processing is insufficient for RLSS strategic business goals.

In July 2017, RLSS acquired a State Forest Exploratory Permit (SFEP) 2/2017 for an area of 432,262.59 ha, situated between the upper Cuyuni River and the Upper Puruni River, in Region 7 (see Figure 2).

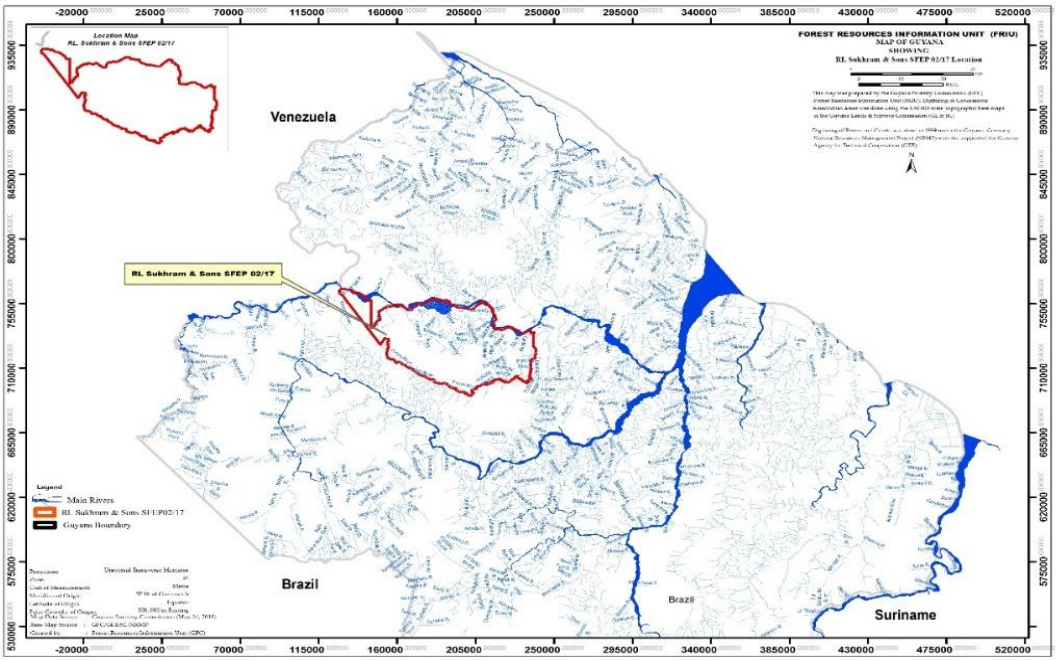


Figure 2: Map showing the geographic location of SFEP 2/2017

RLSS duly applied to the Environmental Protection Agency (EPA) for an *Environmental Authorization and* recruited Forestry Training Centre Inc. (FTCI) to support the development of the requisite *Environmental and Social Impact Assessment* (ESIA).

RLSS has in its employment or at its disposal several persons with expertise in accounting, forest technology, wood processing, mechanical engineering, marketing and human resources management. RLSS projections are that it would employ and train a total of least 150 persons for the forest concession based operations by December 2021.

In addition, RLSS has at hand a formidable array of equipment (see Figure 3) for deployment at its forest concession.

Figure 3: Photograph showing some items of RLSS Assets

RLSS will harvest logs at the concession area, transfer the logs via the Kartabu Puruni Road to Pine Tree Landing, right bank Cuyuni River**,** then transfer the logs to the enterprises' primary wood processing facility at St. Lawrence, East Bank Essequibo. RLSS will also maintain a small portable sawmill at its Ekabago Base Camp to salvage merchantable timber from defective logs or logs or portion of logs retrieved from mining sites: the merchantable lumber produced will either be utilized on the concession area or be transferred to St. Lawrence.

RLSS will collaborate with public agencies as well as the mining community to, *inter alia*, share responsibility for the preventive maintenance of the Kartabu-Puruni Road and for environmental management of the road corridor.

RLSS expects its operations to bolster the forestry sector's national timber output of by an 18% and generate an 8% increase in timber exports.

RLSS will enhance economic activity in the Kartabo Triangle through purchases of goods and employees' remuneration packages.

RLSS will add value to the livelihoods of residents there by extend its ongoing corporate social responsibility practices in Region 3, to include youth development programmes at Iteballi, Kartabu and Batavia (Region 7).

2.0 CONSULTANCY SERVICES-FTCI

FTCI has been conducting ESIAs in the Kartabu Triangle since 2006. In line with the multidisciplinary approach to ESIAs, FTCI recruited two external consultants, utilized four of its professional staffs as well as two of its forest technicians, and obtained additional support from two resource persons with expertise in ESIAs (see Table 1).

Table 1: List of experts that conducted the ESIA

No.	Consultant	Area(s) of expertise
	External Consultants	
1	Environmental Engineering Solutions (EES) (3 Persons)	• The collection and the analysis of environmental data such water quality and air quality respectively
2	Phillip Odwin Wildlife Expert	• Extensive experience in the capture and identification of fauna
	FTCI Staffs (6 persons)	
1	Robert Skeete	• Forestry, Introductory Anthropology
2	Robert Kissoon	• Forestry, Wood processing
3	Luann Nero (Ms.)	• Environmental Management, Social Science, Community Development
4	Mariea Suegrim (Ms.)	• Business Administration
5	Delyon Roberts	• Forest surveys, forest inventory
6	Bevin Dundas	• Forest Botany
•	**Resource Persons (2 Persons)**	
1	Jagdesh Singh	• Sustainable Forest Management; Forest Law, Policy and Governance; Environmental Law and Policy; Sustainable Development and Climate Change.
2	Godfrey Marshall	• Forester, Team Coordinator

In the preparation of the ESIA, FTCI carried out a number of tasks, including:

a) extensive consultations with stakeholders, including miners and boat captains traversing the upper Cuyuni River and the Upper Puruni River, respectively;

b) developed sampling plans for the collection of baseline data;

c) traversed a total of about 1,200 km: on foot, by road (ATV and 4 x 4 vehicle), and by river;

d) evaluated negative environmental impacts and developed applicable mitigation measures; and

e) prepared an environmental management plan.

Based on the remoteness of the concession area, the identification of access options for data collection took a considerable amount of time while the emergence of the COVID-Pandemic stymied consultations with stakeholders as well as the collection of baseline data.

3.0 BASELINE CONDITIONS FOR SFEP 2/2017

3.1 Location and access

The concession area is bounded by the upper right bank Cuyuni River to the north and by the upper left bank Puruni River to the south. Neither river is suitable for commercial scale transport of timber due to numerous rapids, rock outcrops and sand bars (see Figure 4) as well as marked changes in depth between the rainy season and the dry season.

Figure 4: Photo showing a natural barrier: Paiyuka Falls, Puruni River.

Initial access efforts were focused on the Arimu Road (see Figure 5); eventually however, RLSS *constructed* a 23km access road, extending from Tiger Creek Junction, northern side Kartabu-Puruni Road to the Ekabago River, the eastern boundary of the concession. (The access road traverses two forest concessions, a situation that required extended consultations).

3.2 Neighbouring forest concessions, properties

There are no indigenous communities *within* the concession area, however there are several miners' camps on left bank upper Puruni River and *Aranka Landing* on right bank Cuyuni River.

The boundary of SFEP 2/2017 has a total length of about 452km, including cut lines totaling 76.78km (see Figure 6). At the eastern boundary, there is a 39 km shared boundary –including 10km of cut lines -with SFEP 2/2013 held by TPTTL. RLSS shares a 26km boundary-including two cut lines with Kurutuku Amerindian Village at the north western edge of the concession. (The linear distance between the Kurutuku Village and RLSS' base camp is about 88km).

On right bank Cuyuni River, SFEP 2/2017 shares a 25.75km boundary-all cut lines-with Guyana Goldfields Inc., Aurora (GGI). GGI occupies about 1.2% of the concession area and for management purposes, the area has been designated as 'non-productive' forest. (The linear distance between the south easternmost point of GGI's property at Aurora and RLSS' Ekabago Base Camp is 49km). RLSS' planned infrastructure will not overlap with that of Guyana Goldfields Inc.

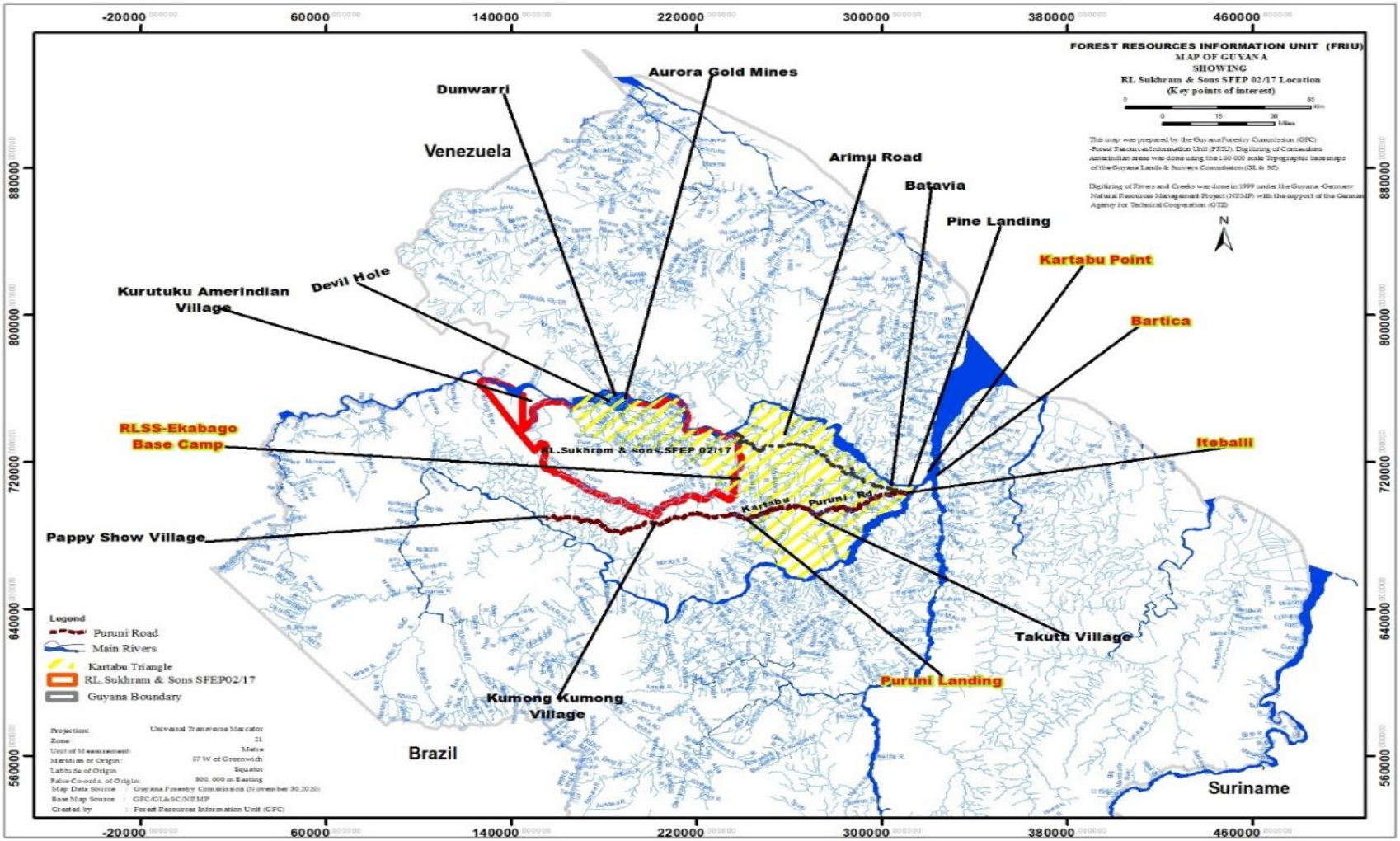


Figure 5: Map of SFEP 2/2017 and surrounding communities.

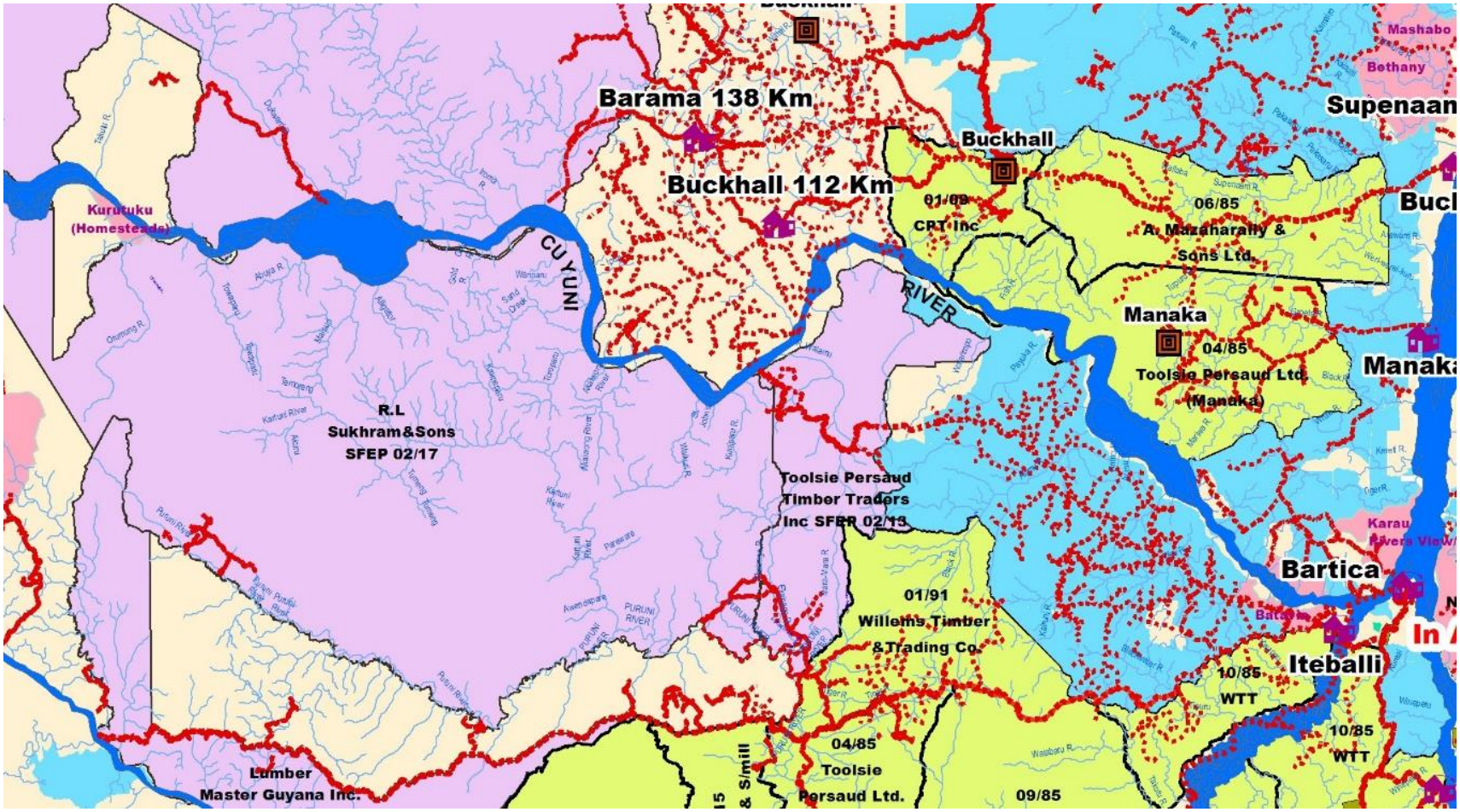


Figure 6: Diagram showing SFEP 02/2017 and surrounding forest concessions, communities.

3.3 The physical environment

3.3.1 Landform and hydrology

3.3.1.1 Landform

The concession area is generally hilly: the elevation ranges from 500 feet (152.4m) to 900 feet (274.32m). The hilly terrain is spread evenly across the concession area (see Figure 7). This has implications for the alignment of RSS primary road network.

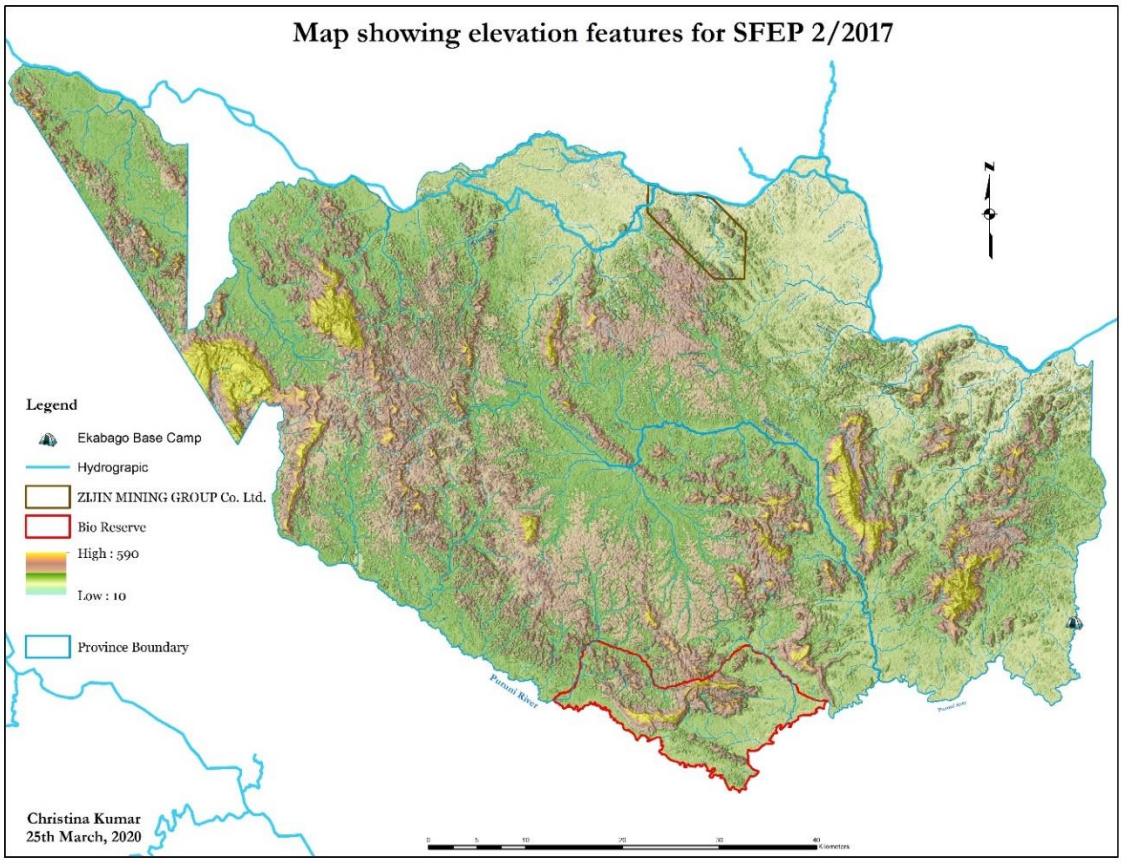


Figure 7: Map showing elevation features for SFEP 2/2017

3.3.1.2 Hydrology

The area is drained by a large number of right bank tributaries of the Cuyuni River and left bank tributaries of the Puruni River. The largest river within the concession area is the Kartuni River, left bank Puruni River: this river (and its tributaries) drains the whole central area of the concession area.

None of the rivers within the concession area are suitable for commercial scale log or lumber transport: only bateau-type riverine craft traverse the rivers carrying personnel and goods for miners; the movement of even these bateau type boats is severely restricted in the dry season. (The consultants were able to assess water quality through the collection and analysis of a *modest* sample set).

3.2.2 Geology & Soils

3.3.2.1 Geology

The concession area is situated within Guyana's Northern Province where the dominant lithology is the Greenstone Belt. The greenstone belt comprise predominantly metamorphic rocks and are reputed to be common in the Earth's oldest rocks, including the Guiana Shield.

3.3.2.2 Soils

The GFC has at hand detailed soil maps for the concession area. The dominant soil type, Kanhapludults, occupy some 84.45% of the concession area. Kanhapludults are very deep well drained soils, with slight to high erosion hazard. The other major soil type present is Ustchrepts, occupying 9.89% of the concession area: Ustchrepts are deep alluvial soils, mottled in the subsurface, poorly drained, and not suitable for road works.

The consultants were able to validate the soil types through the collection and analysis of soil samples.

3.2.3 Climate

Rainfall data available for Iteballi, left bank Mazaruni River indicate that the Rainfall pattern for the Kartabu Triangle follows the broad national pattern: Rainfall during the long wet season extends from May to July, peaking at about 195mm in June; also, the short wet season extends from December through January peaking at about 152mm in January (Figure 8).

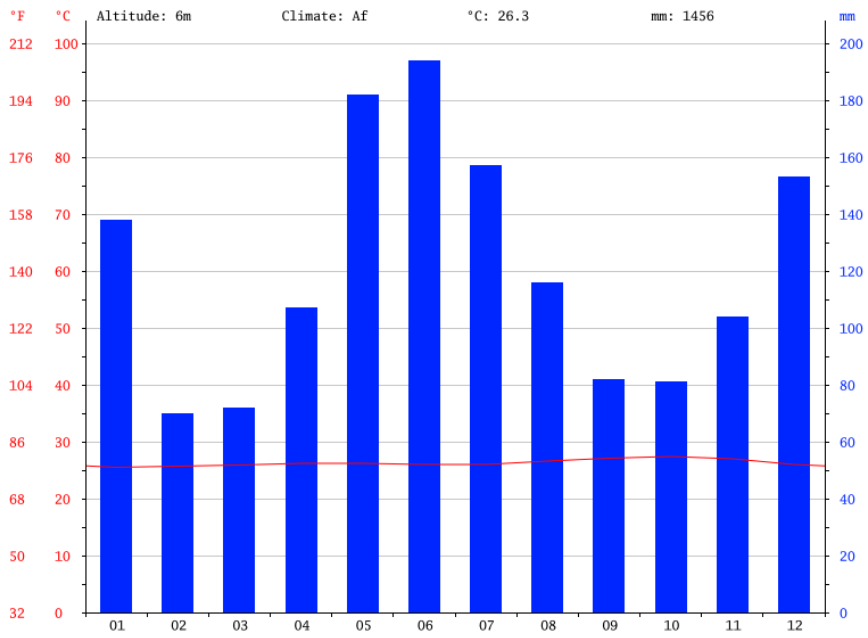


Figure 8: Climatograph for Iteballi, left bank Mazaruni River

Mean air temperature ranges between 25 to 27.5°C throughout the year in most regions except the upland regions in the interior/west of the country, where mean temperatures are cooler and range between 20 to 23°C. At Iteballi, left bank Mazaruni River, average temperature is 25.5°C (`78.0°F). The consultants were able to assess parameters for air quality.

3.3 The Biological Environment

3.3.1 Vegetative and forest types

The forests within the concession area are relatively intact. Miners have removed vegetation from small patches of forests, mainly along the left bank of the Puruni River and there are many *exploratory pits* scattered across the concession area.

The concession area embraces the transition between two national forest types: ***Northwest Wet Forests*** and ***Central Guyana Wet Forests*** (ter Steege H. , 2000). 75.8% of the forest area contain productive forests, while 54.9 % of forests occur on hilly terrain.

An analysis of data from 10 blocks in Compartment 1, enumerated at 100% revealed that just 9% of the species are responsible for 71.5% of the stems with Dbh≥35cm (see Figure 9).

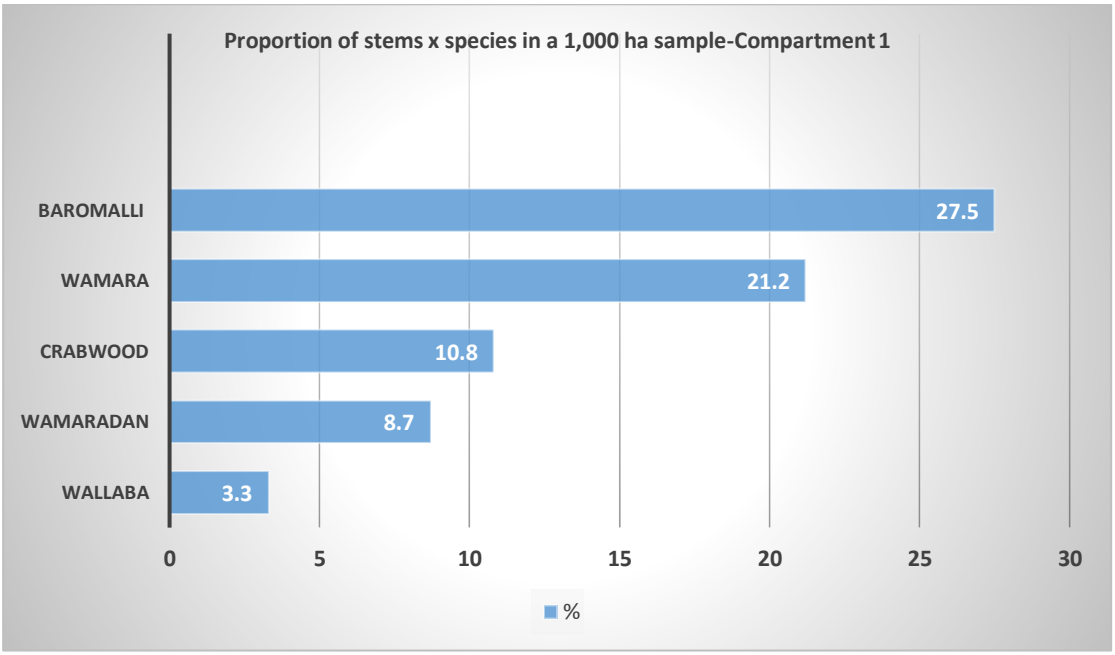


Figure 9: Relative abundance of five species based on 100% inventory of trees >=35cm over 1000ha.

RLSS is not unduly concerned about the species composition at this time and the enterprise determined that it will be able to harvest 13.33m^3/ha.

3.3.2 Fauna

The consultants relied mainly on trail cameras for discerning the fauna on the concession area (see Figure 10), but the actual sightings of the diversity of fauna was impressive. Seines and fishing rods were used to identify fish specimens while nets were used to target and bats and nets and electronic devices were used to identify birds. No evidence of any commercial scale hunting or vending of wild meat or fish was observed in the Puruni area.

Figure 10: Photograph showing wild hogs captured by a trail camera

3.4 The socio-economic environment

3.4.1 Communities

RLSS estimates that there about 400 persons-miners and businesspersons- spread across the concession area, mostly in mining camps on left bank Puruni River.

There are no communities within the concession area, save for Guyana Goldfields Inc. (GGI). GGI's mineral concession on right bank Cuyuni River occupies 1.2% of the concession area and is situated 49km from RLSS' Ekabago Base. The area occupied by GGI does not form part of the 'productive forests' for SFE 2/2017; further no overlap or shared use of any infrastructure between RLSS' logging operations and GGI's mining operation is contemplated. RLSS will observe a 500m buffer zone outside the boundaries of GGI.

Kurutuku Village shares common boundaries with the concession area, but the village is located some 88km from RLSS base camp, and RLSS' operations will not approximate the vicinity of Kurutuku before 2040. A 500m radius buffer zone will be observed on the external boundaries of the extended village. The consultants did not visit Kurutuku; however they were able capture the core issues there from a recent detailed report prepared in 2019 by the Amerindian Peoples' Association et al.

RLSS consulted with residents of Puruni Landing, Tiger Creek Junction, Takutu Village, Iteballi Village and Kartabu Village and Batavia Village. All those communities **are well outside the boundaries of the concession area**; however, when hauling logs along the Kartabu-Puruni Road, RLSS will share a segment of the Kartabu Puruni Road and will therefore likely come into contact with residents. RLSS trucks will traverse *Takutu Village*, where there are about 15 buildings along the Kartabu Puruni Road. A few residents along the road sell foodstuffs, fuel and tools for sale, while others offer mechanical/ vulcanizing services. Residents there believe that they will benefit from a higher volume of traffic in the area

Batavia is adjacent to RLSS' Pine Tree Landing where RLSS will maintain a log depot and ship logs to its sawmill at St. Lawrence, East Bank Essequibo. RLSS has a good business relationship with Batavia based in part from RLSS' ongoing purchases of logs from Batavia's Logging Association. Apart from Kurutuku on the north-western boundary of the concession area, the nearest Village is Puruni Landing, about 33 km by road from RLSS base camp. At Puruni Landing it is possible to secure a variety of goods, source medical attention and consult with the Police and with GGMC staffers.

The major concern for all communities in the Kartabo Triangle is the seasonal degrade of the Kartabu-Puruni Road in the rainy season, and the absence of any planned, predictable schedule for road maintenance. Malaria is the major illness prevalent in the area; however it is possible nowadays to conduct tests for malaria at Iteballi and at Puruni Landing. Security is a major concern for residents at Puruni Landing, but crime has reduced considerably since the recent posting of policemen to the location. (There is a GDF unit as well at Puruni Landing).

3.4.2 Land-use

3.4.2.1 Mining

Mining is the dominant land use within the concession area and has been occurring since the early 1900s. Mining concessions, including Guyana Goldfields, occupy some 389,193.93 ha (90%) of the concession area (see Figure 11); however ***active mining*** **occurs on just 970.38ha (0.2%) of the concession area[1].**

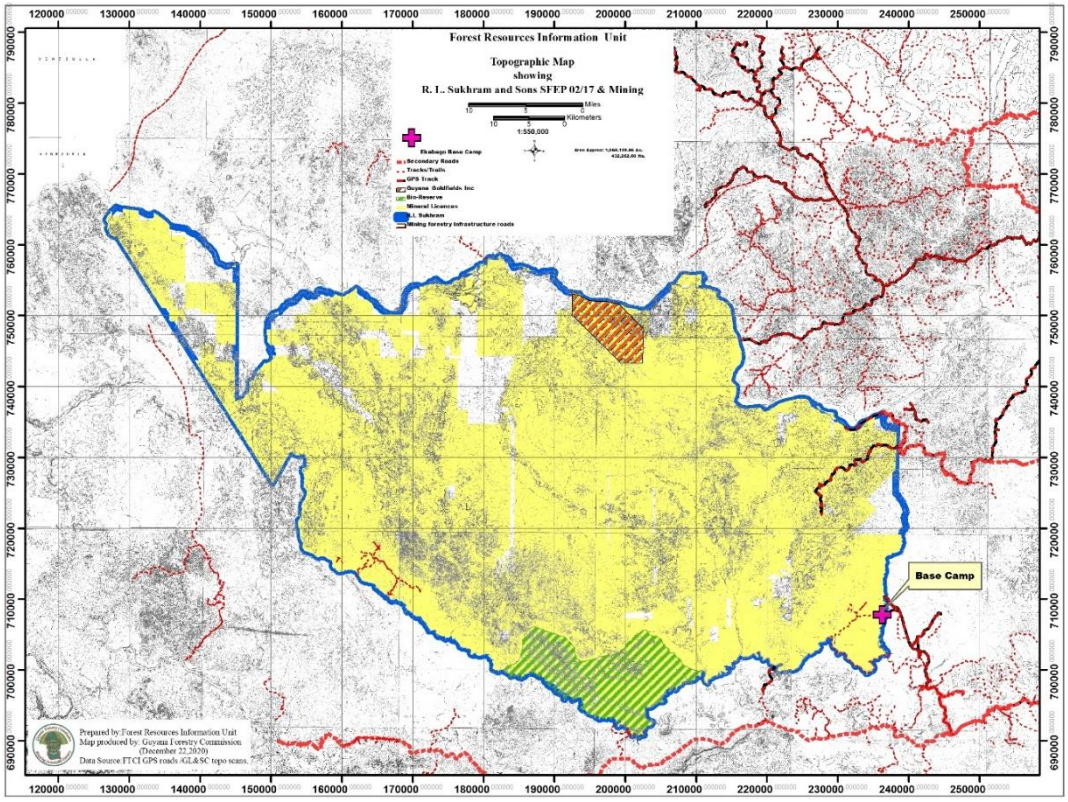


Figure 11: Map showing the extent of mineral licences on the concession area.

RLSS estimates that, save and except Guyana Gold Fields, there are about 30 itinerant mining teams (±320 persons) active within the concession area-these are supported by about eighty

[1] Source: GFC, January 2018.

businessmen engaged in the commercial transport of personnel and the trade in goods (especially fuel).

Generally the miners would like to see logging in the area because they themselves hate to see timber wasted during mining operations. However, miners expressed strong interest in RLSS proposed road network. (The supply of large volumes of fuel is a major issue for miners in remote areas and roads do facilitate the timely transfer of equipment and fuel to mining sites).

3.4.2.2 Logging

The entire Kartabu-Triangle is occupied by large concessions, small concessions and State Forest Exploratory Permits (see Figure 12). RLSS' access road traverses two forest concessions before 'joining' the Kartabu Puruni Road, and the requisite consultations with the respective holders of those concessions have occurred.

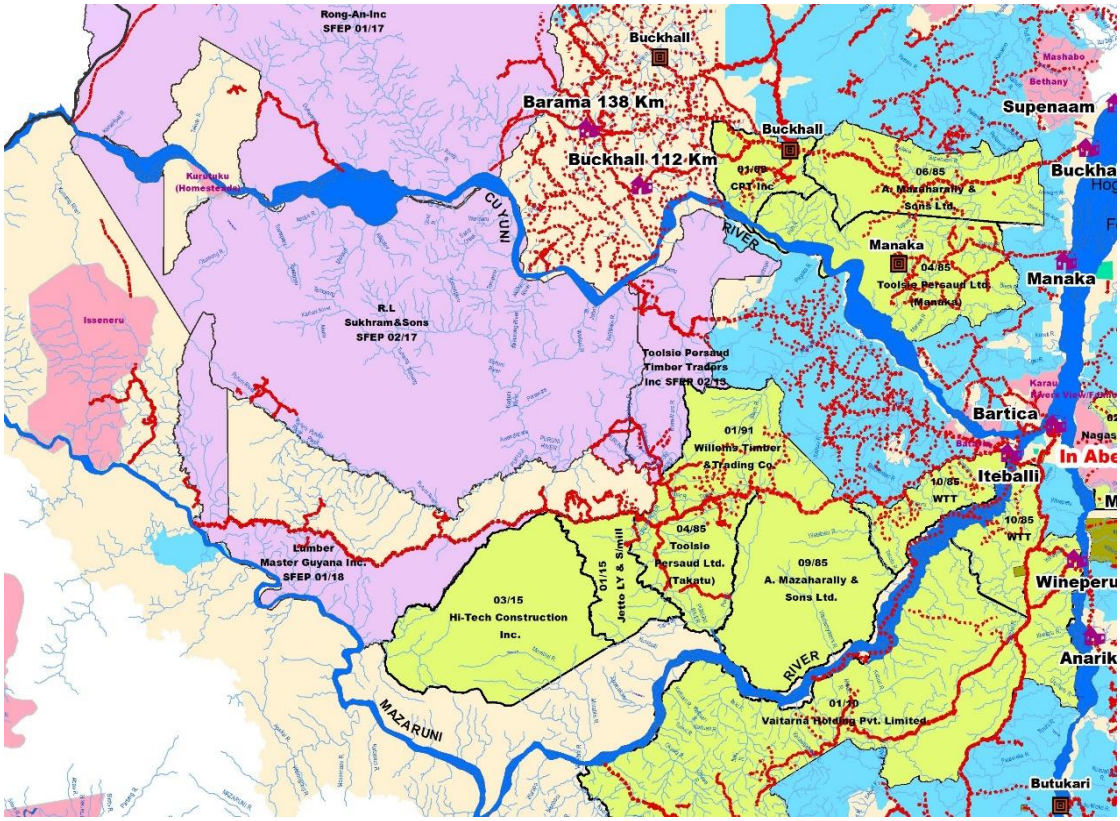


Figure 12: Map showing SFEP 2/2017 and neighbouring forest concessions.

3.4.2.3 Other Land Use

There is no evidence of any other kind of land use of significance in the concession area: specifically there are no commercial scale agricultural cultivations and no ecotourism resorts. The consultants have never seen any fishing crew or hunting crew respectively; in addition, the consultants have never seen wild meat on sale.

4.0 RLSS' LOGGING PROJECT

4.1 RLSS' forest management objectives

RLSS nurtures the vision of entering the top quintile of timber producers in Guyana, producing and exporting tropical timber products worldwide that meet and exceed customers' requirements.

RLSS forest management objectives include the following:

a) Optimizing value from the forest concession through the sustainable harvesting, utilization and marketing of not less than twenty 20 species of timber;

b) Developing and implementing exemplary forest monitoring and environmental management practices respectively based on a suite of technologies that include the use unmanned aerial vehicles (drones);

4.2 Forest Organization

4.2.1 Legal Classification-Productive and Non-productive forests

From RLSS' perspective, non-productive areas include the four forest types with a total area of 104, 850.88ha and the mineral license of 5802ha license held by GGI at Aurora; therefore the total non-productive area is 110, 652.88ha and the productive area is 321,609.71ha.

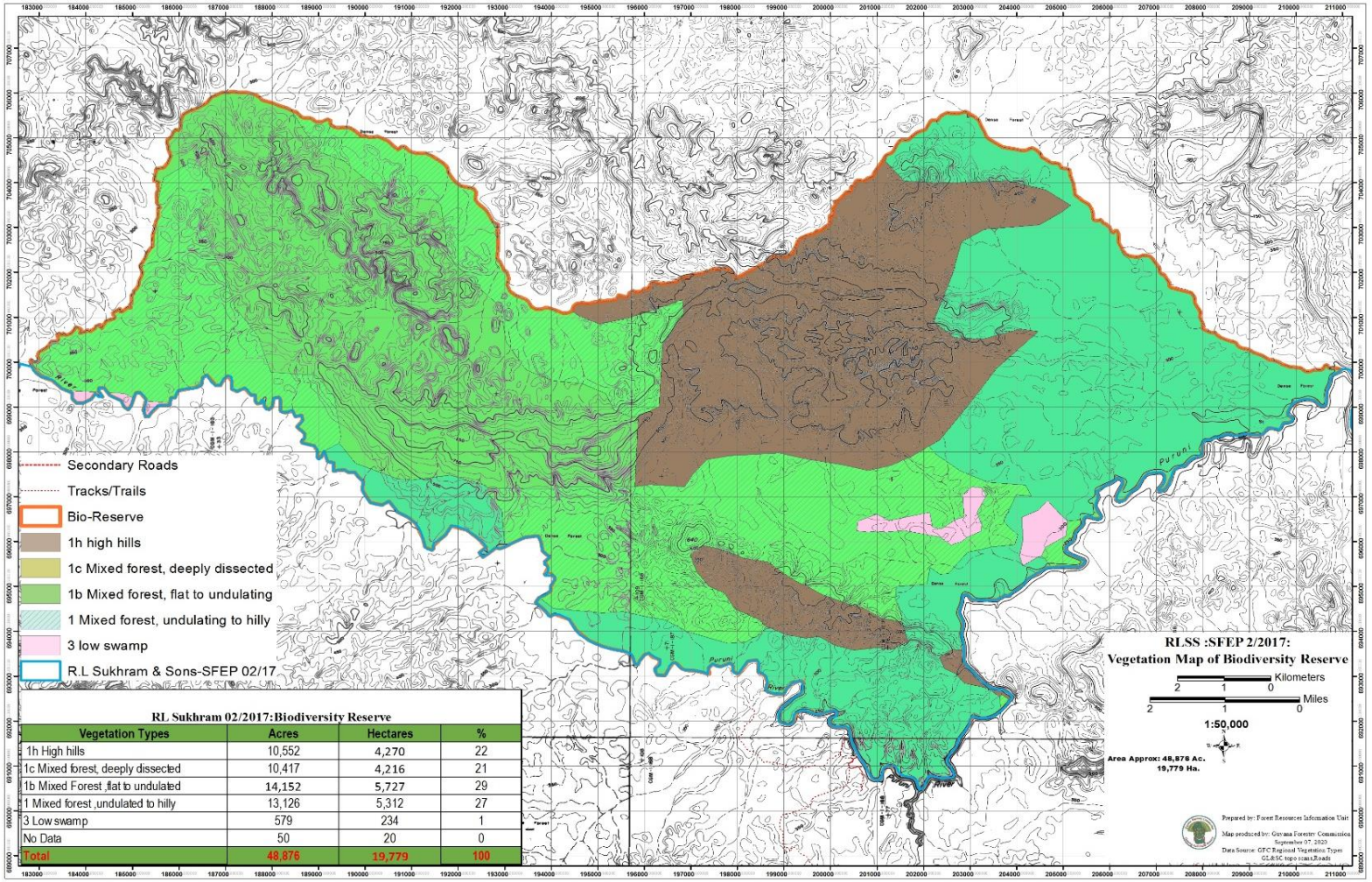
Based on the productive area, and, as per GFC guidelines RLSS has computed that it requires a Biodiversity Reserve of 14,472.44ha. In fact, RLSS has in fact designated an area of 19,799.48ha, situated on left bank Puruni River as a biodiversity reserve (see Figure 13). The biodiversity reserve includes both productive forest as well as some non-productive forests; in addition, the topographic conditions ensure a diversity of habitats.

4.2.2 Administrative Classification

Once the reconnaissance work was completed, RLSS moved to organize the concession area into compartments (see Figure 14). In addition, a site for RLSS' first base camp was identified, and the compartments were divided into rectangular blocks 1000m x 1000m. This ensures that the development of the concession is done in an orderly manner: blocks are inventoried and harvested in a specific sequence.

4.2.3 Primary road network.

RLSS has been able to plan the primary road network in compartment 1, using the areas of productive forest as well as the nature of the terrain.



RL Sukhram 02/2017:Biodiversity Reserve

Vegetation Types	Acres	Hectares	%
1h High hills	10,552	4,270	22
1c Mixed forest, deeply dissected	10,417	4,216	21
1b Mixed Forest ,flat to undulated	14,152	5,727	29
1 Mixed forest ,undulated to hilly	13,126	5,312	27
3 Low swamp	579	234	1
No Data	50	20	0
Total	48,876	19,779	100

Figure 13: Vegetation map of the biodiversity reserve.

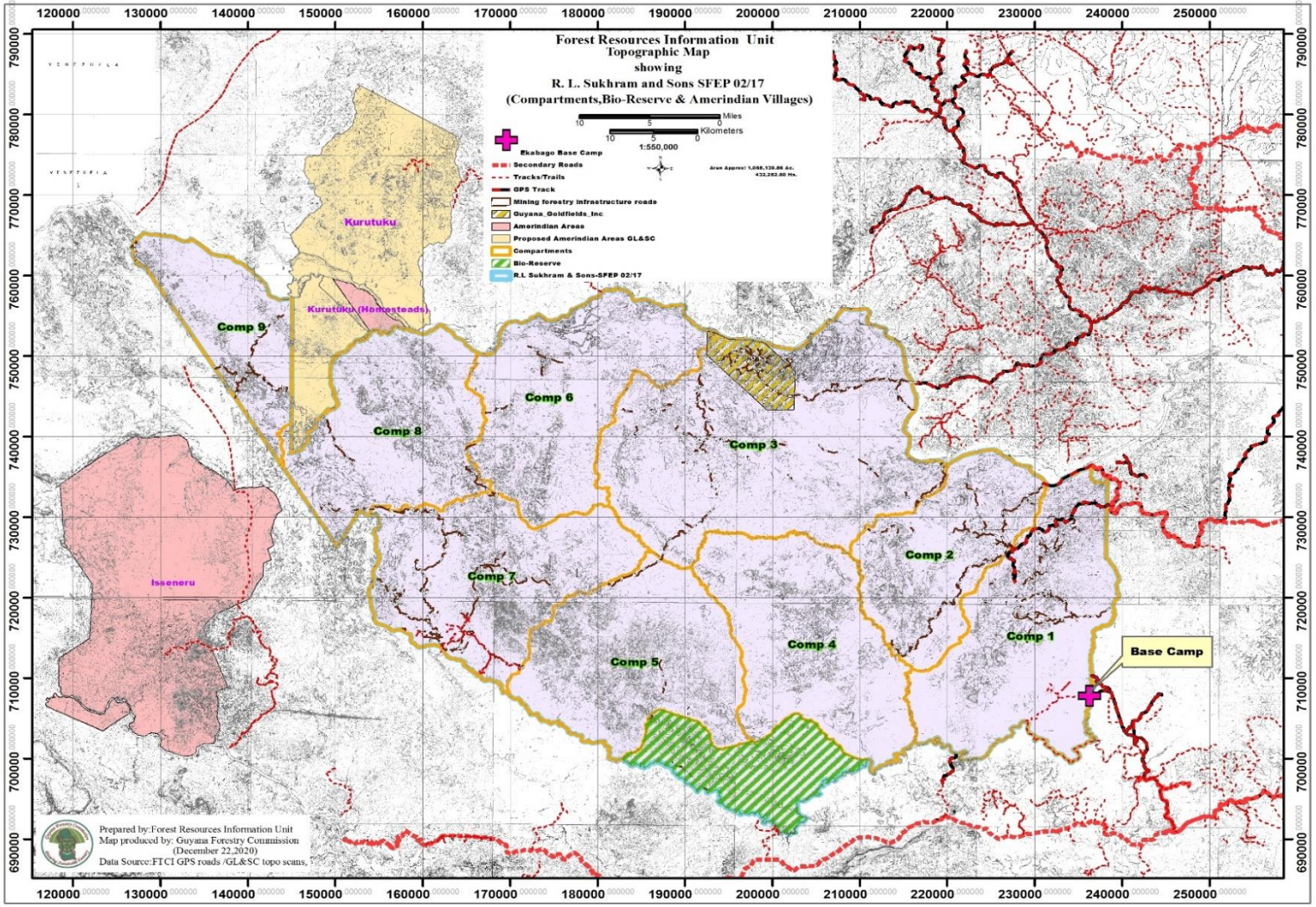


Figure 14: Map showing the organization of the concession area into compartments.

4.3 Production Parameters

4.3.1 Yield Regulation

Generally, yield regulation is determined by the following:

a) available volume/ha or per block for merchantable species based on preharvest inventories;

b) restrictions at the level of species-for example minimum diameter limits or protection status;

c) site restrictions- based on degree of slope, the occurrence of buffer zones, proximity trees protected trees, and in some cases whether there are nests of certain species of fauna on a tree targeted for felling; and

d) agreed cutting cycles and annual allowable cut.

4.3.2 Cutting cycle and annual allowable cut

Based on initial discussions and reconnaissance level data garnered to date, RLSS and GFC have agreed on the following parameters to guide the development of timber harvesting operations:

General parameters

A.	Concession size (ha)	432, 269.59
B.	Felling Cycle (yrs.).	40
C.	Sustained yield re 40yr. cycle (m^3/ha)	13.33

Operational parameters:

D.	Total sustained yield (m^3): (viii)*(iii)	3, 275, 311.88
E.	Annual Allowable area (AAA) (ha): (viii)/(ii)	6142.75~(61 blocks)
F.	Annual allowable cut (AAC) (m^3): (ix)/(ii)	81,882.80

4.3.3 Schedule of inventory and production

On the basis of the agreed annual allowable area and annual allowable cut, RLSS will submit the blocks in which it plans to conduct forest inventory and those which it plans to harvest respectively for the approval of the GFC. This is normally done via a Forest Management Plan for a five year period and an Annual Operations Plan for each calendar year.

4.3.4 Logging practices

Logging activity will proceed in a specific cyclic sequence: *RLSS will only conduct timber harvesting operations on 6,142.75ha or 1.4% of the concession area per annum.* The goal is that any unit area harvested will, theoretically at least, not be logged again by RLSS until after a 40-years.

RLSS' core operations *may be summarized as follows:*

a) Training of all field operatives to ensure proper standards and regular briefing sessions to reinforce the need for due attention to matters of occupational safety and health;

b) *Earthworks for road construction*: roads may be a major environmental hazard unless designed and constructed properly.

c) *100% forest inventory* to identify the number and volume of *merchantable* species, their respective spatial distribution, and pertinent site conditions.

d) Tree marking: to validate the condition of the merchantable stock, to establish felling direction and to plan skidding trail routes, and to address restrictions, linked to buffer zones or other criteria;

4.3.5 Operational Challenges

4.3.5.1 The mining community

The mining community's has displayed keen interest in RLSS road network; it is likely that there will be a significant increase in mining once timber harvesting starts; more mining activity could result in more opportunities for conflict. The challenge for RLSS is how to engage the mining community in a meaningful way.

RLSS' concerns are based on the following:

a) It is onerous to identify the bona-fide miners; frequently, the miners on the ground are not the actual owners of the mineral concessions; many 'miners' encountered in the field do not provide their (true names and addresses).

b) There is no overarching plan for the development of the mining district that RLSS can tap into.

4.3.5.2 The Kartabu-Puruni Road

The state of the Kartabu-Puruni Road is critical to RLSS log flows between its Ekabago Base Camp and Pine Tree Landing facility on right bank Cuyuni River. RLSS will be faced with maintenance costs for its concession based road networks as well as its 23km access road and will not be able to afford maintenance costs for extensive segments of the Kartabu-Puruni Road.

4.3.5.3 Labour issues

Currently, most logging companies are finding it challenging to get young people to do extended field time in the forest, even though the companies pay competitive wages, provides reasonable field accommodation and invests in an internet service.

4.3.5.4 Emergencies

The concession area is rather remote. RLSS is constantly engaged on measures to evacuate sick persons to Bartica (or Georgetown) as rapidly as possible from the concession area.

5.0 PROJECTED ENVIRONMENTAL IMPACTS

5.1 General Positive impacts

Generally, all stakeholders expressed the hope that the proposed development will materialize because:

a) More employment opportunities and job options or will become available within the Kartabu Triangle.

b) RLSS' road network will (eventually) afford the mining community more reliable and faster access to areas in the upper Puruni District and facilitate the expansion of gold mining operations.

c) Expanded economic performance in the area will lead to a corresponding growth in revenues for public agencies.

5.2 Negative environmental Impacts

5.2.1 Environmental impacts

Road construction and related earthworks will be a major sources of environmental impacts in the area particularly given the soil type and the hilly nature of the terrain. Elevated sediment levels in streams are anticipated if rainfall occurs within a few days after earth works due to erosion. Felling trees will alter the aesthetic qualities of the various landscapes. Any leaching or spillage of petroleum products will alter soil chemistry, and the quality of waterways.

5.2.2 Biological impacts

The selective felling of merchantable trees will cause both commercial degradation of residual forests. In the main, timber harvesting will contribute to short term forest degradation, altering species composition and the normal distribution of diameter classes. Harvesting trees that form the main canopy layer will alter the forest environment by modifying conditions in the understory in terms of light, temperature, and humidity; in turn the changes in the understorey environment may affect seed germination and seedling establishment for merchantable species.

Timber harvesting at any level will alter the habitats of many species of fauna. The use of heavy machines in the forest may scare or even kill some fauna or may force some species to migrate from the area. Timber harvesting may alter animal-animal, and animal-plant relationships, respectively.

5.2.3 Socio-economic impacts

Direct negative impacts relate to conflict between different stakeholders sharing the use RLSS's concession-based logging roads because non-RLSS users may resent restrictions or protocols that RLSS could introduce for the use of its roads. For example, RLSS may restrict the use of its roads during and perhaps up to four hours after heavy rainfall; other road users may resist this kind of restriction.

The construction of roads and skid trails *elsewhere in State forests* have set the pace for an influx of miners (and allied support businesses) who promptly use such roads and skid trails at a higher intensity than the loggers themselves). In fact, in many cases, loggers become *minor users* of their own logging roads. Where miners or any other stakeholder deprive loggers of the opportunity to harvest merchantable timber there is opportunity for conflict.

6.0 MITIGATION MEASURES TO BE IMPLEMENTED BY RLSS

On the basis of the projected environmental impacts in Section 5.0, RLSS has developed a mitigation plan (see Table 2) to address the impacts projected.

7.0 PROJECT RISKS

The outlay of mining properties within the concession area could be a major risk for RLSS's logging operations if **all** the properties hold extensive commercial deposits of gold ore. Indeed, no one can say for sure if similar gold resources that generated GGI's operations at Aurora is simply waiting to be discovered.

Small itinerant mining operations could have a nuisance value when RLSS were to convince customers overseas that it is not responsible for forest degradation produced by mining activities. In its management of small scale concessions, RLSS has maintained a respectful distance from mining operations and deliberately avoided any confrontation with them, to the extent that RLSS has never had any major confrontation with miners. It is a fact though, that the proximity of miners to areas being logged add to RLSS's administrative burden, especially from a security perspective, because RLSS will not know who the ***bona-fide*** miners are. Further RLSS anticipates major problems in engaging miners for meaningful discussions.

It is critical that RLSS develops and retains a cadre of highly trained field operatives to take forward the quality of forest management that RLSS envisages. (The Kartabu Triangle offers many competing job opportunities, for example experienced heavy-duty operators are always in demand.

Finally, for RLSS, it is vital that Kartabu Puruni Road remains open for use throughout the year so that RLSS can maintain is log flows between the concession area and Pine Tree Landing.

Table 2: Predicted impacts and proposed corresponding measures

Predicted impact.	Proposed mitigation measures	Lead agency	Time frame for implementation
1. Physical Environment			
1.1 Earthworks will lead to , scarification of soil surface, sub-soil exposure , erosion, soil compaction, and water logging	• Plan roads, bridges and culverts paying attention to topography and the use of stock maps. • Use appropriate machines for all earth works to reduce the time taken to complete each activity. • Consider the weather pattern before initiating major earthworks. • Follow the recommendations of the CoP (Sections 4.5-4.7, Section 5)	RLSS	During the entire time frame for the project.
1.2 Air quality: Dust and smoke (especially along roads) minor changes in micro-climate	• Vehicles will travel slowly <25 km/hr. whenever they pass Takutu village. • All machines must be fully functional to maintain emissions within manufacturers' parameters.	RLSS	During the entire time frame for the project.
1.3 Water resources: negligible increases in turbidity, temperature, ph.; oil spills	• Strict adherence to RIL principles and prescriptions of the CoP, especially regarding buffer zones along waterways. • Maximum care to be taken to ensure all vehicles and machinery are in a proper state. Dispense or change lube oil only in designated areas. • EPA's Brochure on Water conservation to be placed at all public points around the concession. • Regular briefing sessions for field staff would be formalized. • Care taken to avoid excessive spillage of borax solutions whenever used to treat (some species of) timber.	RLSS, GFC	During the entire time frame for the project.
2. Biological/ecological environment			
2.1 Timber harvesting: destruction of juvenile trees, genetic erosion of species, decline in soil fertility, spillage of oil, increased potential for blow downs	• Implement a system for conducting pre-harvest inventories and preparing stock maps. • Use directional felling techniques for felling trees. • Plan skid trails based on stock maps. • Use winching techniques. • Use heavy duty machines that are fully functional. • Training all field operatives in RIL practices	RLSS	During the entire time frame for the project.
2.2 Wildlife: modification, destruction of habitats, population changes	• Ensure a systematic manner of timber harvesting so that once a block is harvested, the operation moves on, so that no further disturbances occur. • Prohibit employees from hunting and fishing. • Unique ecosystems, habitats and species will be conserved, by restricting logging in areas where they occur.	RLSS	During the entire time frame for the project.

Predicted impact.	Proposed mitigation measures	Lead agency	Time frame for implementation
2.3 Ecological relationships; Modifications of ecological relationships.	• Implement proper RIL practices and prescriptions of the CoP (Sections 8, 9 & 10) • Prohibit the use of fires on the forest floor.	RLSS, GFC	During the entire time frame for the project.
3. Socio-economic environment			
3.1 Conflicts: restrictions of access, alienation of rights	• Engage residents in discussion and consultations to address mutual concerns: ensure the company is positioned to receive and address complaints.	RLSS	As required
3.2 Social problems: crime, use of alcohol, other disagreeable behaviour; increase in life threatening behaviour through exposure to various illnesses.	• Work with public agencies (Police, staff of the Ministry of Health, and staff of the Ministry of Regional Development) in Regions 2, 3 to address emerging issues. • Keep proper records of emerging problems and pass these on to the appropriate agencies.	RLSS	As required
3.3 Road safety: high probability of road accidents.	• Work with MOPW, the GPF, the mining community and other stakeholders to ensure adherence to proper road use practices and to identify road locations requiring special attention. • Make sure that each vehicle is in a full functional state prior to its use on the roadways, within and outside of the concession area. • Place appropriate cautionary signs at sharp turns, steep grades, and bridges and near populated areas. • Promote proper skills set among drivers through training.	RLSS	During the entire time frame for the project.
3.4 Waste management: illnesses resulting from a polluted environment	• Observe prescriptions of the Code of Practice for forest operators. 3rd Ed. Sections 8.0, 9.1, 9.2. • Hold frequent briefing sessions with staff to ensure a shared understanding of the consequences of poor control over waste management. • Distribute and put-up EPA's brochure on waste management at all camps.	RLSS	Monthly
3.5 Indigenous, archaeological assets: loss , destruction modification of habitats, landscapes	• Identify and isolate any assets encountered and post appropriate advisory signs and notices; ensure such sites are recorded on all stock maps. • Consult with the Amerindian Affairs Ministry and the Walter Roth Museum on collaborative efforts to protect any assets discovered. • Collaborate with communities to address the conservation of existing and emerging assets. • Offer training & incentives where appropriate	RLSS	As required

8.0 PROJECT VIABILITY

RLSS has prepared a SWOT Analysis prior to the start-up of operations for its own guidance (see Table 3).

Table 3: RLSS' SWOT Analysis prior to the start-up of operations.

STRENGHTS	WEAKNESSES
• **Location: RLSS's concession boundaries are well defined, virtually no problems with neighbours, and there are no (Amerindian) Communities within the concession area.** • **Large stocks of merchantable timber are available.** • **Wide ranging experience: RLSS has a strong and experienced, management team.** • **Markets: RLSS has access to markets based on current operations.**	• **Itinerant nature of mining: this refers to miners starting operations in blocks targeted for harvesting, extensive use of RLSS' logging roads and skid trails, etc.: these situation can complicate RLSS's strategic planning.** • **Unfamiliarity with the mining community *in situ:* it will take considerable time and effort for RLSS to get to know the owners of mining concessions so that the enterprise can begin positive collaboration with them.**
OPPORTUNITIES	**THREATS**
• **New technologies: RLSS can capitalize on new emerging technologies for wood processing.** • **New product lines: RLSS can capitalize on the large number of merchantable species to generate new wood products, including outdoor furniture.** • **New market opportunities: RLSS is in a position to adapt to new market conditions and customer behaviour.**	• **Competing land use-need to share road use: RLSS will share its concession road network with many people who use a wide assortment of vehicles: conformity with RLSS's road use protocols can lead to time consuming conflicts.** • **Strong national policy support for miners, whose activity drive economic activity in Region 7.** • Inability to compete with the mining sector re remuneration packages for heavy-duty operators.

All RLSS's financial analysis indicates that logging on the SFEP area will be profitable. A major cost centre will be the long-haul distance for conveying logs from the concession area to St Lawrence, a minimum distance of 200km, reaching more than 250km by 2025. (These haul distances have become the norm for the industry in the Upper Berbice, Upper demerara and Mazaruni-Cuyuni Districts. **RLSS's experience gives it a competitive edge**. To date, RLSS has been very skillful in navigating the variables and costs associated with the local logging and sawmilling activities, respectively. RLSS also understands the vagaries of timber sales on the local market.

9.0 MANAGEMENT OF STAKEHOLDER ISSUES

For RLSS, it is vital that any conflict with stakeholders sharing the use of the Kartabu-Puruni Road be addressed as quickly as possible. RLSS will set up **a checkpoint at Takutu Village**. The outpost will be staffed by two persons: a checker (clerk) monitoring the passage of RLSS's vehicles and a monitoring officer who will deliberately engage stakeholders to learn of any emerging issues that may lead to conflict or stymie log flows.

10.0 CONSULTANTS CONCLUSION/STATEMENT

Stakeholders' expect that RLSS' operations will be a major driver of economic development within the Kartabu Triangle, with many positive outcomes for the forestry sector and the mining sector respectively. RLSS expects to inject millions of dollars into the economy of the Kartabu Triangle

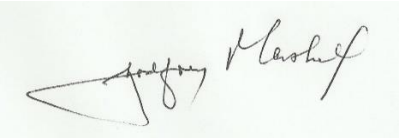
through remuneration packages and purchases of fresh vegetables, meat and fuel. With about 150 persons to be employed, the revenue base for the GRA and NIS will expand markedly

RLSS anticipates an 18% increase in national timber output once its operations get fully on stream by January, 2022. RLSS will expand its network of timber yards to include the Canje-New Amsterdam lumber market (Region 6) and the Bartica lumber market (Region 7). RLSS will pay attention to the local market for tropical hardwoods used by the furniture sub-sector.

Less than 1.5 % of the concession area will be logged over per annum. The consultants believe that RLSS's logging operations will not lead to forest fragmentation nor degrade forest resilience nor lead to major incremental change in environmental parameters such as water quality and air quality. Note that RLSS will continue to monitor environmental data at permanent monitoring points within the concession area.

Research elsewhere has demonstrated that well run forest concessions are major drivers of forest conservation. The consultants believe that RLSS will abide by all local laws and forest management and environmental management standards, in line with its environmental authorization. The consultants also believe that the company is sincere in its commitment to regular engagements with stakeholders.

The consultants recommend that an ***environmental authorization*** be granted to RLSS.



G. Marshall
Coordinator/Team Leader
FTCI Team.