RIMBA RAYA BIODIVERSITY RESERVE PROJECT – MONITORING AND IMPLEMENTATION REPORT

(1 JULY 2019 – 30 JUNE 2021)

Document Prepared By InfiniteEARTH Limited and EP Carbon

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Project Proponent(s)	*InfiniteEARTH* *Contact: Todd Lemons* *Email: contact@infinite-earth.com* *Web: www.infinite-earth.com*
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GHG Accounting/Crediting Period	*1 July 2009 to 30 June 2039*
Monitoring Period of this Report	*1 July 2019 to 30 June 2021*
History of CCB Status	*Validation:14-October-2011* *Most recent verification:01-September-2020*
Gold Level Criteria	*Exceptional Climate Adaptation Benefits: The climate-related project activities work to create food security, produce alternative sources of revenue, ensure healthier communities and protect biodiversity. Project activities to help achieve these benefits include fire suppression/education/training, soil enrichment, reforestation, agroforestry, crop rotation/diversification, forest protection and aquaponics, among others.* *Exceptional Community Adaptation Benefits: The community-related project activities provide benefits which include increased food security, the empowerment of women and other poor, vulnerable and marginalized groups, as well as increased economic opportunity and improved water quality and sanitation. Project activities to achieve these benefits include creation of job opportunities related to the Reserve, fire patrols, community based agroforestry programs, development of a social buffer and the construction of community centers, among others.* *Exceptional Biodiversity Adaptation Benefits: The biodiversity-related project activities provide benefits which include the protection of 54 species listed as Critically Endangered or Endangered by IUCN, 17 of which are confirmed present in the bordering Tanjung Puting National Park (TPNP). An additional 40 species listed as Vulnerable by IUCN are likely present in the Project area, 13 of which are confirmed in TNTP.*

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1 SUMMARY OF PROJECT BENEFITS

The Rimba Raya Biodiversity Reserve Project, an initiative of InfiniteEARTH, has reduced Indonesia's emissions by preserving tropical peat swamp forest, avoiding deforestation, drainage and conversion to palm oil plantation. Bordering the eastern boundary of the Tanjung Puting National Park in the Seruyan River watershed, Rimba Raya is rich in biodiversity including the endangered Bornean orangutan. Under the baseline scenario, the project area was slated by the Provincial government to be converted into four palm oil estates. These planned estates now comprise the 47,237 hectare Rimba Raya Carbon Accounting Area (CAA), which is monitored for the life of the project to protect and account for Rimba Raya carbon stores. The project monitors for encroachment and land-use change within the CAA as well within a 3-km buffer zone bordering the CAA in order to ensure that any drainage activities that may impact the CAA are accounted for.

During this monitoring period, Rimba Raya has shown substantial climate benefits from avoided emissions. The project has also demonstrated that the rights and needs of local communities have been appropriately addressed as well as important biodiversity conservation issues. This monitoring and implementation report is a reflection of the progress made by the project within the last two years in terms of its emissions reductions and REDD goals, as well as its climate, community and biodiversity objectives.

1.1 Unique Project Benefits

The project generates unique benefits in terms of climate, community and biodiversity. The Rimba Raya Biodiversity Reserve is located in the tropical peat swamp forest on the southern coast of Borneo in Central Kalimantan province, Indonesia. The location of the project allows for a unique contribution towards mitigating the effects of climate change because Indonesia ranks as the one of the world's largest emitters of greenhouse gases despite being a non-industrialized nation whose economy accounts for less than 1% of global GDP (World Bank and IMF Global Rankings - 2008).

The construction of palm oil plantations destroys more than 25,000 square kilometers of forestland that is home to dozens of endangered species as well as impoverished communities who face looming economic forces that threaten to appropriate land that has been their home for generations. Facing this crisis, Indonesia ratified the Paris Agreement in October 2016 and the current government has pledged to cut emissions by 29% to 41% by 2030. As such, the Rimba Raya Biodiversity Reserve Project is in a unique position to address this deforestation and help meet Indonesia's climate goals.

During this monitoring period, in addition to the standardized benefits, the project has achieved important climate, community and biodiversity benefits which are exemplified with the following progress:

1. The construction of 2 fire towers in in Ulak Batu and Muara Dua villages, with an additional one in construction (target completion in November 2021) in Pematang Lemau village. The project currently has 2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff. Patrols are routinely performed by firefighting staff, and 8 hydrant wells were installed throughout the project area, and an additional 6 are being planned. Trainings for fire suppression and equipment utilization were held regularly.

2. Continued monitoring of 25 orangutans in the Rimba Release Camp.

3. An additional 31 local community members have begun involvement in project-related employment during this monitoring period, including 10 women. Cumulatively, the project currently employs 27 women, making up 28% of the 99-member staff. Continued progress is being made in developing various economic working groups so that local community members can seek alternative livelihoods and/or employment directly related to the project.

4. 1,849 people received medical care through the floating clinic, including 985 women, across 8 different villages and 2 hamlets throughout the project zone.

5. 3 water purification systems (WPS) constructed in 2019, providing 211.724 liters of clean water per year for 900 households in 3 villages (Baung, Muara Dua, Jahitan). After initial investment from the project, the for-profit facilities hope to run independently and sustainably to provide extra income for the administrators. During the first quarter of 2021, the construction of five (5) additional WPS was initiated in different villages (Ulak Batu, Palingkau Cempaka Baru, Tanjung Rangas, and Pematang Limau) and are anticipated to be completed in October 2021. 280 of the 300 water filters that had been distributed during earlier monitoring periods were replaced. Due to the filter distribution and WPS construction, 2,173 households across 9 villages in the project zone have access to clean water.

6. 1 solar plant built in Tampudau, which produced 40 w/hour, equating to 288 khw/year, and continued operation of solar plant in Ulak Batu, which produced 1.33 kh/hour, equating to 4788 kwh/year. The project has provided solar power to 1,794 households (61% of residents) across 9 villages through distribution of solar lanterns and construction of solar plants. An additional solar power plant is in construction in Belanti village, which will provide clean electricity to 67 households.

7. 74,850 mangrove seeds planted in the mangrove swamps to increase mangrove carbon sink, 139,354 seedlings were grown in the nurseries for reforestation programs. 137.5 hectares of peat swamp were replanted. Seedlings were sourced and purchased from village nurseries that are supported by individuals and families from the community whose labor grows and maintains the seedlings.

8. Women's capacity building programs have continued. An additional 8 women own/operate chicken farms and shrimp paste business through Community Enterprise Grants Program. A total of 1,332 chickens and 118 units of shrimp paste were produced and sold locally, providing access to protein sorces that were previously unavailable to local communities.

9. 47,237 ha forest protected through community firefighting. Fire patrol covered 7,050.84 km. Continuation of land cover and fire danger monitoring occurs twice monthly at least, but occasionally more often as determined necessary by fire danger rating. Likewise, routine patrol is carried out twice monthly to monitor for logging outside of what is permitted by the project. Maps of areas that are vulnerable to logging have been created. Any instances of illegal logging have been documented and mapped throughout this monitoring period.

10. Sustainablity, agriculture, and forestry education is being carried out through the Farmer Working Groups in 4 villages Baung, Jahitan, Palinkau, Cempaka Baru villages creating demonstration plots for vegetable gardening. 24 scholarships were distributed to students in 2018 for completion of high school. An additional 10 recipients were selected for the second batch of high-school scholarships, and 5 recipients for open university scholarships were selected. 3 were libraries constructed to increase access to books, computer and internet, and educational opportunities.

11. Roughly 15,187 hectares of forested areas have continued to be protected, all of which would have been converted to oil palm plantation if it were not for the project.

In the table below, project-specific outcomes and impacts from this monitoring period are discussed.

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
Create food security	Planting of multi-use trees has continued as part of agroforestry program. Vegetable farming to increase food secutiry and household income through Farmer Field School Providing alternative sources of	2.2.1 2.2.6 4.1 4.4.2	Community-based, cash crop agro-forestry project based on multi-story/multi-crop plantations of native species cash crops, inter-planted with rare species (such as ramin and meranti) in a matrix of secondary

	income revenue through forest guard patrols and fire fighting Additional sources of protein through the continuation chicken farming and shrimp programs.		forest regrowth, establishment of alternative sources of revenue
Produce alternative sources of revenue	Hiring of more local guards and fire patrols, furthered employment of women and micro-credit finance directed at women-specific entrepreneurial pursuits, locally-owned nurseries for reforestation The Farmer's Field School has helped implement new programs throughout the project area, such as a chicken farm, shrimp paste packaging, and fish cages.	2.2.1 2.4.3 4.1 4.2.3	Establishment of village-run seedling nurseries, agroforestry and aquaculture programs
Ensure that communities are healthier	Installation of WPS in 3 villages (and additional 5 WPS under construction) and continued maintenece of individual household water filters Involving communities in river clean-ups 1,849 patients have been seen at the floating clinics 468 reading glasses have been distributed to community members in need.	2.1.10 2.2.1 4.1.1 4.3.2 4.4.2	Social buffer program establishment, social mapping activities, construction of community centers, fuel efficient stove distribution, implementation of clean water systems
Rehabilitate riparian zones	Continuation of guard post construction and hiring of guards, seedling planting from village-operated nurseries	4.1.1 5.1 5.2.2	Support of OFI and TNTP buffer area, replantation and reforestation efforts in

	(139,354 seedlings), continued monitoring of project zone and area – including buffer zones, continued funding for OFI activities, continued support and coordination with TNTP staff		degraded and vulnerable areas, monitoring of riparian zones
Increase presence of vulnerable and endangered species	Continued monitoring of species present in project zone and nearby TNTP – especially vulnerable and endangered species, creation of community centers to supply information and training, continued training and patrol of fire, continued guard patrols for illegal activities and oil palm expansion	4.1.1 4.4.2 5.1.2 5.3	Biodiversity monitoring, support of OFI and TNTP activities, education awareness, fire planning, oil palm expansion prevention
Improved access to education	First batch of 24 high school students received continued funding; 10 scholarship recipients selected for second batch for the completion of senior high school year, 5 recipents selected for open university, 3 libraries established	2.2.1	Improved access to education, improved literacy

1.2 Standardized Benefit Metrics

In addition to the unique benefits listed and described in the table above, the Rimba Raya Biodiversity Project has also accomplished other benefits relevant to VCS and CCB standards. These achievements are listed and briefly decribed below.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
emissi on Reduct ions &	Net estimated emission removals in the	N/A	N/A	N/A

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	project area, measured against the without-project scenario			
	Net estimated emission reductions in the project area, measured against the without-project scenario	7,575,970 tCO_2e	3.2	44,081,161 tCO_2e
Forest cover	For REDD projects: Number of hectares of reduced forest loss in the project area measured against the without-project scenario	15,187 ha	3.2	15,187 ha
	For ARR projects: Number of hectares of forest cover increased in the project area measured against the without-project scenario	N/A	N/A	N/A
Improved land management	Number of hectares of existing production forest land in	N/A	N/A	N/A

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	which IFM practices have occurred as a result of the project's activities, measured against the without-project scenario			
	Number of hectares of non-forest land in which improved land management has occurred as a result of the project's activities, measured against the without-project scenario	32,049	1 3.2 5.1	32,049
Training	Total number of community members who have improved skills and/or knowledge resulting from training provided as part of project activities	3,806 community members were trained as a result of project activities. Trainings occured throughout communities in the project zone. Community members were trained about solar power electrification (664), specifically on how to use the facilites, as well as the construction of water purifying systems (3,037), including trainings on	2.4 4.1 4.3	8,031 people were trained as a result of of project activities over the project lifetime. Trainings included proper use and facilitation of community systems (including power and water purification), alterative agricultural activities, biodiversity monitoring, safety procedures (including fire and

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		socialization, village commitment, and how to use the facilities. Additionally, community members were trained on vegetable farming (20), and project-related environmental sustainability trainings (90). Community members were also trained and socialized on the scholarship selection process (15).		proper hydrant development), as well as socialization and facility implementation of such systems.
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	995 women were trained as a result of project activities. Trainings occured throughout communities in the project zone. Women community members were trained about solar power electrification (304), specifically on how to use the facilites, as well as the construction of water purifying systems (1,440), including trainings on socialization, village commitment, and how to use the facilities. Additionally, women community members were also trained and socialized on the scholarship selection process (10).	2.4 4.1 4.3 4.4.2	1,978 women were trained as a result of of project activities over the project lifetime. Trainings included proper use and facilitation of community systems (including power and water purification), alterative agricultural activities, biodiversity monitoring, safety procedures (including fire and proper hydrant development), as well as socialization and community implementation of such systems.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Employment	Total number of people employed in of project activities, expressed as number of full time employees	99 people were employeed directly by the project over this monitoring period in capacities related to management, implementation of project activities, and monitoring.	2.4 4.1 4.3	99 people were employeed directly by the project over the project lifetime in capacities related to management, implementation of project activities, and monitoring.
	Number of women employed in project activities, expressed as number of full time employees	10 women were employeed directly by the project over this monitoring period in capacities related to management, implementation of project activities, and monitoring.	2.4 4.1 4.3 4.4.2	31 women were employeed directly by the project over the project lifetime in capacities related to management, implementation of project activities, and monitoring.
Livelihoods	Total number of people with improved livelihoods or income generated as a result of project activities	1,103 people had improved livelihoods or income generated as a result of project activites. Such activities consisted of solar power electrification (664); distribution, socialization, and training of reading glasses (468); construction of water purification sytems (3,037), including socialization, gathering village commitments, and training on how to use facilities; engaging and training floating clinic paramedics (3); Dispersement and training communities on obtaining health services (1,849); and socialization and training community members about the	4.1 4.2.1 4.3.1	2,586 people had improved livelihoods or income generated as a result of project activities over the course of the project lifetime. These improvements came as a result of project actitivies such as employment of operating and managing community facilities (such as solar power electrification and water purification systems), reading glasses distribution and training, alternative agricultural training and implementation,

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		scholarship selection process (15).		and health services trainng and employment.
	Number of women with improved livelihoods or income generated as a result of project activities	1,225 women had improved livelihoods or income generated as a result of project activites. Such activities consisted of solar power electrification (304); distribution, socialization, and training of reading glasses (220); construction of water purification sytems (1,440), including socialization, gathering village commitments, and training on how to use facilities; engaging and training floating clinic paramedics (2); Dispersement and community training on obtaining health services (985); and socialization and training community members about the scholarship selection process (10).	4.1 4.2.1 4.3.1 4.4.2	1,628 women had improved livelihoods or income generated as a result of project activities over the course of the project lifetime. These improvements came as a result of project actitivies such as employment of operating and managing community facilities (such as solar power electrification and water purification systems), reading glasses distribution and training, alternative agricultural training and implementation, and health services trainng and employment.
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	6,018 people had improved health services as a result of project activities, in comparison to the without-project scenario. Such actitivies include the generation and availability of clean, renewable engery through solar power electrification (664) as well as the availability of clean drinking water through creation of the water	2.2.1 4.1.2 4.4.2	9,069 people had improved health services as a result of project activities, as compared to the without-project scenario. Project activities related to the improvement of community health included the provision of clean, renewable energy; the availability of

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		purifying system (3,037). Community members recieved new reading glasses and were trained on how to properly use them (468). And finally, the installment of the floating clinic and training on how to effectively receive health services allowed for a greater number of people to be treated for health related problems (1,849).		fresh, clean drinking water; the availability of fresh, healthy food; and the installment of floating medical clinics with training on how to properly access health services through the clinic.
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	2,949 women had improved health services as a result of project activities, in comparison to the without-project scenario. Such actitivies include the generation and availability of clean, renewable engery through solar power electrification (304) as well as the availability of clean drinking water through creation of the water purifying system (1,440). Women community members recieved of new reading glasses and were trained on how to properly use them (220). And finally, the installment of the floating clinic and training on how to effectively receive health services allowed for a greater number of women to be treated for health related problems (985).	2.2.1 4.1.2 4.4.2	4,377 women had improved health services as a result of project activities, as compared to the without-project scenario. Project activities related to the improvement of women's health in the communities included the provision of clean, renewable energy; the availability of fresh, clean drinking water; the availability of fresh, healthy food; and the installment of floating medical clinics with training on how to properly access health services through the clinic.
u c a t .	Total number	2,684 people had access	2.2.1	10,908 people had

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	to education or their quality of education was improved as a result of project acitivites, as compared to the without-project scenario. Socialization and educational acitivies were carried out in regards to solar power electrification development (664), vegetable gardening (20), use and importance of reading glasses (468), water purification (3,037), health procedures (3), obtaining health services (1,849), project-related fire suppression, GIS, and other monitoring trainings (285), and learning about scholarship selection processes (10).	3.3 4.1 4.3 4.4	access to education or their quality of education was improved as a result of project acitivites, as compared to the without-project scenari over the course of the project lifetime. Educational activities put forth by the project included, but were not limited to, learning and training of community services (water and power), agriculture and forestry, health procedures and services, biodiversity monitoring, and fire/emergency responses systems.
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	1,225 women had access to education or their quality of education was improved as a result of project acitivites, as compared to the without-project scenario. Socialization and educational acitivies were carried out in regards to solar power electrification (304), use and importance of reading glasses (220), water purification (1,440), health procedures (2), obtaining health services (985), project-related fire suppression, GIS, and other monitoring trainings (82), and learning about scholarship processes	2.2.1 3.3 4.1 4.3 4.4	5,014 women had access to education or their quality of education was improved as a result of project acitivites, as compared to the without-project scenari over the course of the project lifetime. Educational activities put forth by the project included, but were not limited to, learning and training of community services (water and power), agriculture and forestry, health procedures and

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		(10).		services, biodiversity monitoring, and fire/emergency responses systems.
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	3,037 people experienced increased water quality and/or improved access to drinking water during this monitoring period as a result of project activites. The main project activity which allowed for this was the construction of the water purification facility in 3 villages. Along with its creation, activities were carried out to train community members on how to use the system, socialize community members on its existence and importance, and gather community commitment to using the facility.	2.2.1 4.1.1 4.3.2	5,520 people experienced increased water quality and/or improved access to drinking water over the project lifetime through the creation of the water purification system and through community trainings about its importance and how to properly use it to obtain clean drinking water.
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	1,440 women experienced increased water quality and/or improved access to drinking water during this monitoring period as a result of project activites. The main project activity which allowed for this was the construction of the water purification facility in 3 villages. Along with its creation, activities were carried out to train community members on how to use the system, socialize community members on its existence and importance, and	2.2.1 4.1.1 4.3.2 4.4.2	3,455 women experienced increased water quality and/or improved access to drinking water over the project lifetime through the creation of the water purification system and through community trainings to teach its importance and how to propery use it to obtain clean drinking water.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		gather community commitment to using the facility.		
Well-being	Total number of community members whose well-being was improved as a result of project activities	6,048 people had their well-being improved as a result of project activities during this monitoring period. All project actitivies put in place by the project were intended to have an overall positive impact on the lives of community members. Specific activites which implemented such impacts included access to solar power electricity (664) and clean drinking water (3,037), reading glasses (468), and health services (1,849), alternative agricultural methods including vegetable farming as a means for income and personal nutrition (20), and access to training for scholarship applications (15).	2.1.10 4.1.2 4.4.2	20,870 people had their well-being improved as a result of project activities during the project lifetime. Project activities implemented in order to secure these impacts include access to clean and renewable resources, alternative livelihoods, improved health services, and opportunities for educational advancement.
	Number of women whose well-being was improved as a result of project activities	1,255 women had their well-being improved as a result of project activities during this monitoring period. All project actitivies put in place by the project were intended to have an overall positive impact on the lives of community members. Specific activites which implemented such impacts included access to solar power electricity (304) and clean drinking water	2.1.10 4.1.2 4.4.2	7,205 women had their well-being improved as a result of project activities during the project lifetime. Project activities implemented in order to secure these impacts include access to clean and renewable resources, alternative livelihoods, improved

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		(1,440), reading glasses (220), and health services (985), and access to training for scholarship applications (10).		health services, and opportunities for educational advancement.
Biodiversity conservation	Change in the number of hectares significantly better managed by the project for biodiversity conservation, measured against the without-project scenario	47,237 ha	5.1.2 5.2	47,237 ha
	Number of globally Critically Endangered or Endangered species benefiting from reduced threats as a result of project activities, measured against the without-project scenario	1 additional fauna species and 3 additional flora species of Critically Endangered status or Endangered status have benefitted from reduced threats as a result of project activities during this monitoring period.	5.1.1 5.1.2 5.3	In total, 55 species of Critically Endangered status or Endangered status haved benefitted from reduced threats as a result of project activities throughout the lifetime of the project.

2 GENERAL

2.1 Project Description

2.1.1 Implementation Description

In May 2013, the Project achieved validation and its first verification for the period 1 July, 2009 – 30 June, 2010. The project's second verification was completed on the on the 9 December, 2013 and the third verification was completed on 30 June, 2014. The fourth audit for VCS was 1 July 2014 - 22 June 2017, and the third audit for CCB was January 2014 to June 2017. The previous monitoring period for VCS and CCB was 23 June, 2017 to 30 June, 2019, during which time the project achieved a total of 7,722,728 tCO2e of adjusted net emissions reductions. The current monitoring period is 1 July, 2019, to 30 June, 2021, and the project achieved a total of 7,575,948 tCO2e net emissions reductions, adjusted for uncertainty due to project activities.

The project's initial climate objectives were to stop encroachment from palm oil plantations in the project area, and to create a physical barrier between palm oil plantations and the Tanjung Putting National Park. The project's initial biodiversity objectives were to expand the contiguous habitat of the national park eastward to the Seruyan River, and to support OF I's work in the region. Finally, initial community objectives were to actively engage communities in the project zone to improve access to health care, employment, education, capacity-building opportunities, and other government services, as well as improve food security within communities. During the previous monitoring period, Rimba Raya identified several new community related objectives for the project. These included engaging with 25% of the poorest people in each community, as well as specifically avoiding or mitigating negative impacts in all communities that the project works with, especially with regards to women, as well as poor, vulnerable, or marginalized individuals.

To improve the quality of project activities and relevance of monitoring results over time, project management and staff undertook a detailed assessment of project activities by developing a detailed Theory of Change model (see Section 4.1.1). The Theory of Change model was constructed using guidance from the handbook for Social and Biodiversity Impact Assessment, and the model was additionally analysed to identify potential negative impacts on women, poor, vulnerable and marginal groups (see Section 4.4). With respect to monitoring of community impacts, new monitoring indicators were identified from the exercise and incorporated into the monitoring plan (see Section 4.3).

Project activity targets were to intensify reserve monitoring and protection measures, continue community support mechanisms and further biodiversity related protection through monitoring and activity affiliations with OFI and TNTP. The implementation of technologies and measures included the continued growth of the guard post network. Likewise, fire patrol efforts were continued during this monitoring period. Since 2014, full crews have been established in all 3 field units, and all have

been provided with basic firefighting, safety training and have also been equipped with appropriate pump kits (pumps, hose, nozzles, hand tools). Appropriate refresher trainings have also been held.

In terms of operation, a multitude of project activities have successfully continued during this monitoring period. Aside from guard patrols and fire protection, progress was made in the follow planned project activities: buffer enrichment and rehabilitation, community-based agroforestry program implementation, funding and assistance of OFI and TPNP activities, construction of community centers, establishment of clean water systems, installation of low maintenance solar powered lighting systems, creation of a floating health clinic as well as capacity building and micro credit program enactment.

2.1.2 Project Category and Activity Type

The Rimba Raya project follows the framework of Reducing Emissions from Deforestation and Degradation (REDD) through Avoided Planned Deforestation (APD). This project is not a grouped project.

2.1.3 Project Proponent(s)

Organization name	InfiniteEARTH
Contact person	Todd Lemons
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Table 1: Information for the project proponent

2.1.4 Other Entities Involved in the Project

Organization name	Orangutan Foundation International (OFI)
Role in the project	Forest Protection, Ground Surveying
Contact person	Dr. Biruté Galdikas
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Telephone	+62 0532-24778
Email	

Organization name	World Education Indonesia (World Education, WE, or WEI)
Role in the project	Community Development, Education, Technical Advising and Consultation
Contact person	Edy Hartono
Title	Country Manager - Indonesia
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Telephone	+62-812-588-8021
Email	edwihartono@id.worlded.org

Organization name	EP Carbon
Role in the project	Remote Sensing, Land Use Change Analysis, VCS/CCB verification support services
Contact person	Kate Carroll
Title	Project Manager
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Table 2: Information for the project partners

2.1.5 Project Start Date (G3.4)

The Rimba Raya project start date is November 31, 2008. This corresponds with date in which the Bupati of Seruyan Regency signed the letter of approval and recommendation of the project, thus

establishing the Reserve. The project lifetime is 60 years, thus the project end date is December 31, 2069.

2.1.6 Project Crediting Period (G3.4)

This monitoring report presents the results of the sixth monitoring period (M6) commencing 1 July 2019 and ending 30 June 2021. This monitoring report covers a period of just over 2 years.

The initial project crediting start date was 1 July 2009 which corresponds with the date in which field crews were sent into the project area to begin the baseline assessment. The project has a 30-year crediting period.

The first project operational year was 2009-2010. This year was verified against the Verified Carbon Standard (VCS) only. The second monitoring period (1 July, 2010 – 30 June, 2013) and third monitoring period (1 July, 2013 - 30 June, 2014) were verified against both the VCS and the CCB Standards, with the CCB Monitoring period ending on 9 January, 2014. The fourth monitoring period (9 January 2014 – 22 June 2014 for CCB, 1 July 2014 – 22 June 2017 for VCS) was verified successfully against both the VCS and CCB standards. The fifth monitoring period was verified under the VCS and CCB Standards, from 22 June 2017 – 30 June 2019. This sixth monitoring period is seeking verification under the VCS, CCB and SDVista Standards, from 1 July 2019 – 30 June 2021 for VCS.

2.1.7 Project Location (G3.3)

The project is located in the Seruyan Regency, in the province of Central Kalimantan, Indonesia. The Project lies between 112°01'12 "- 112°28'12" east longitude and 02°31'48"- 03°21'00" south latitude and is bounded by Tanjung Puting National Park in the west, the Java Sea in the south, the Seruyan River in the east, and a palm oil concession in the north. There have been no changes to the project location since validation. The project area can be seen within greater regional area in the image below (Figure 1).

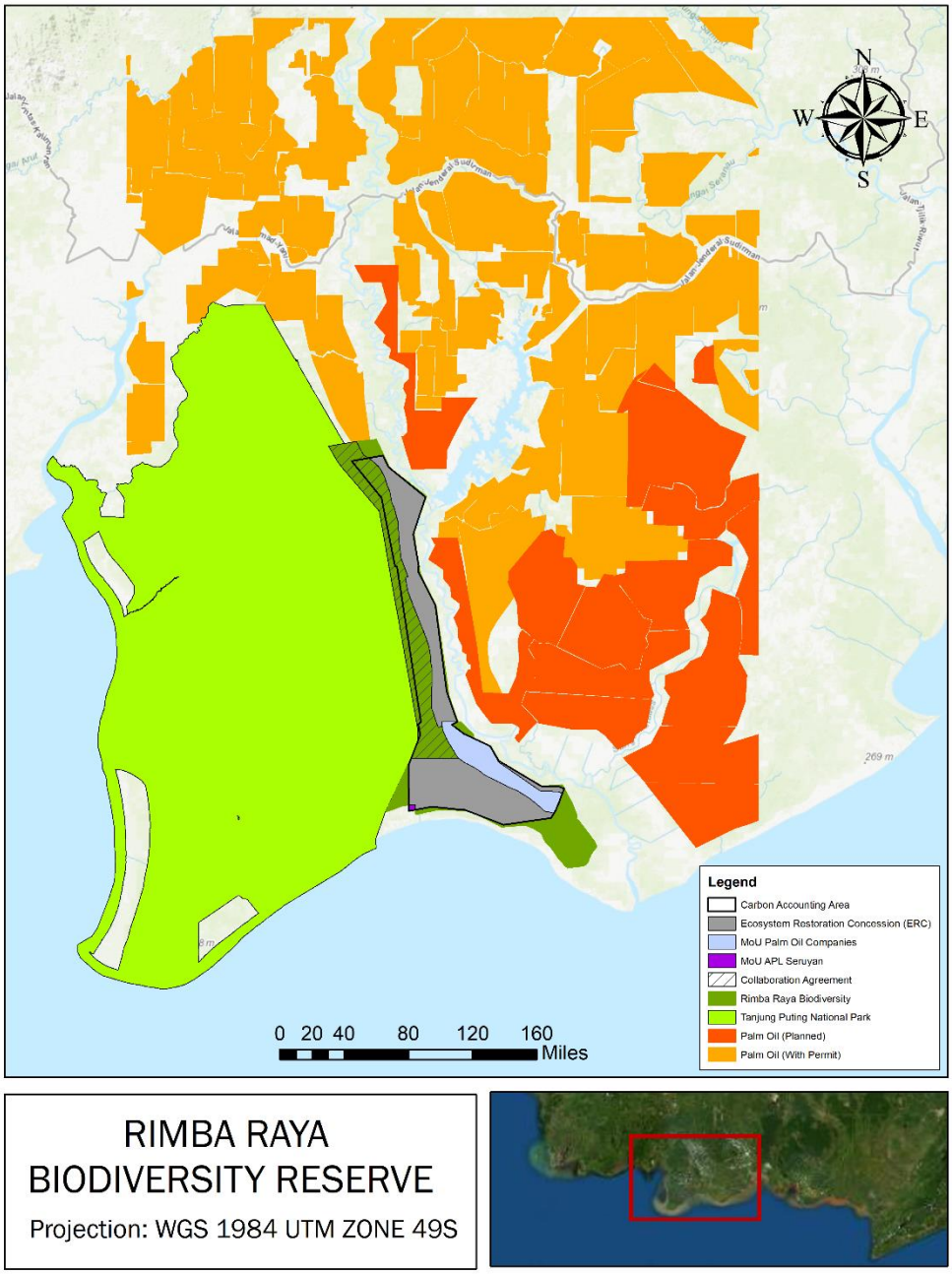

Figure 1: The Regional Location of the Rimba Raya Project

2.1.8 Title and Reference of Methodology

The Rimba Raya Project follows the framework of Reducing Emissions from Deforestation and Degradation (REDD) through Avoided Planned Deforestation (APD). The project employs the VM0004 Methodology for Conservation Projects that Avoid Planned Land Use Conversion in Peat Swamp Forests, v1.0. The project employed the latest version of the AFOLU Non-Permanence Risk Tool, v4.0. This project is not a grouped project.

2.1.9 Other Programs (CL1.5)

As of this monitoring period, the Rimba Raya Biodiversity Reserve Project is not registered with any other GHG program. Likewise, The Rimba Raya Biodiversity Reserve Project neither has nor intends to generate any other form of GHG-related environmental or GHG emission reductions or removals during this monitoring period. The project has never been previously rejected by any other GHG program.

2.1.10 Sustainable Development

The Sustainable Development Goals are an adaptation of the Millennium Development Goals and were adopted by all member countries of the United Nations on 25 September, 2015. These goals cover a wide range of indicators and activities meant to sustainably end poverty and spread prosperity across the world. Indonesia adopted these goals and as a nation prioritized eliminating poverty, inequality, and the promotion of peace, justice, strong institutions, and climate action.

While the Sustainable Development Goals were created after the Rimba Raya project had already been started, many of the project activities were designed with the overarching goal of sustainable development and already support most of these goals. In fact, as shown in the table below (Table 3), all the development goals are supported by at least one project activity. Most of these project activities have made progress during this monitoring period.

Sustainable Development Goal	Activities Supporting Goal	Relevant MIR Sections
Eradicating Poverty: End poverty by 2030 through the targeting of the most vulnerable people.	Employment opportunities, community based agro-forestry, providing additional credit, supplying solar lighting, and conserving water by reducing the expansion of palm oil.	1.1, 4.1.1, 4.1.2, 4.4
Zero Hunger: End all forms of hunger and malnutrition by 2030.	In addition to the activities listed above for eradicating poverty, additional project activities directly address food insecurity. These include fire suppression and education, soil enrichment, and crop diversification.	1.1, 3.3, 4.1.1, 4.1.2, 4.4
Good Health and Well-Being: Achieve universal health coverage, access to safe and affordable medicines and vaccines, and eradicate global epidemics.	Protection of plant species with potential medical benefits (see Goal 6 in section 4.1.2), protecting water quality, expanding access to clean water with water filters. Also efforts have been made to begin building a floating health clinic.	1.1, 2.2.1, 3.3.1, 4.1.2, 4.2.1, 4.4.2
Quality Education: Ensure inclusive and quality education for all and promote lifelong learning.	Educational programs for all ages on a range of topics including fire management, health issues, and water safety. Distribution of solar lighting and installation of solar power systems have allowed for expanded educational opportunities for children both at school and home. Preventing the expansion of oil palm plantations ensures children will not be forced to skip school to work on them. Scholarships were also granted to to students for senior year of high school and university level.	1.1, 4.1.1, 4.1.2
Gender Equality: Achieve	Women frequently work the more dangerous jobs on	1.1,

gender equality and empower all women and girls.	palm oil plantations for little to no pay. With the project, women are being employed through project-related activities, receiving money from the micro-credit program, and have taken part in programs and meetings that increase their social capital.	4.1.1, 4.1.2
Clean Water and Sanitation: Ensure access to water and sanitation for all.	The project has resulted in the distribution of a large number of water filters and installment of water purifying systems, protected water sources by preventing the expansion of oil palm and planting buffers, and created a working group dedicated to sustainable fisheries. Long-term, educational programs are focused on protecting water sources so that they can adapt to climate change.	1.1, 2.2.1, 3.3, 4.1.3, 4.4.2
Decent Work and Economic Growth: Promote inclusive and sustainable economic growth, employment and decent work for all.	Project directly employs local community members. There are also opportunities to receive micro-credits and access new markets to sell goods. Additionally, while converting the project area to palm oil plantation would have provided some employment opportunities to local members, these jobs frequently go to people outside local communities and do not pay well compared to the difficulty of the work.	1.1, 2.2.1 4.1.2
Industry, Innovation, and Infrastructure: Build resilient infrastructure, promote sustainable industrialization and foster innovation.	The project hasn't just prevented the expansion of palm oil, an industry that causes large amounts of damage to the environment, but has encouraged innovation to new markets such as cash crops and encouraging chicken meat working groups.	1.1, 2.2.1, 4.1.3
Reduced Inequalities: Within and among countries.	Project is providing equal opportunity employment for women and other minority groups, and employs local people instead of immigrants from outside the area. Project activities have been implemented with a goal of sustainability which will ensure benefactors of the project will not fall behind citizens of other countries.	1.1, 2.2.7, 4.1.1
Sustainable Cities and Communities: Make them inclusive, safe, resilient, and sustainable.	While there are no larger urban areas within the project area and surrounding region, this is a co-benefit of many of the other project activities and the goals they support. The project is providing equitable opportunities, increasing the resilience to climate change through buffer zones, and diversifying economic opportunities.	1.1, 2.4.2, 2.4.3, 4.3.1, 4.3.2, 4.4.2
Responsible Consumption and Production: Ensure sustainable consumption and production patterns.	Forests are only allowed to be harvested in limited amounts for local consumption.	1.1, 2.2.1, 2.4.3, 5.1.2, 5.2.1
Climate Action: Take urgent action to combat climate change and its impacts.	On October 31, 2016, Indonesia ratified the Paris Agreement, committing the country to emissions reductions. Deforestation is easily the largest source of emissions within the country, and reducing these emissions within the project area is the primary goal of this project. Activities such as increased monitoring, fire prevention and economic diversification exist to support this goal.	1.1, 2.2, 3.1, 3.2.4, 4.1
Life Below Water: Conserve and sustainably use the	A sustainable fishery has been created as a result of working group created in conjunction with World	1.1, 3.2.1,

oceans, seas, and marine resources.	Education. Additionally, buffer zones have been created especially within riparian zones, which reduce the amount of peat drainage into the Seruyan River and protect its water quality, which prevents this pollution from reaching the ocean.	4.1.3, 4.2.1, 5.1.2
Life on Land: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.	Protecting the forest within the project area is the primary goal of the Rimba Raya project. As an additional co-benefit, this forest is the habitat for a high amount of biodiversity, and protecting this habitat is the best way to protect these species. Finally, as part of the project activities, degraded areas are being replanted as buffer zones.	1.1, 2.2 5.1, 5.2,
Peace, Justice, and Strong Institutions: Promote just, peaceful, and inclusive societies.	InfiniteEarth has supported the formation of stronger institutions through the creation of working groups that are inclusive of women and indigenous groups. These working groups have been created in conjunction with project partners World Education and OFI, ensuring these decentralized groups have sufficient institutional support.	1.1, 2.2.1 2.4, 4.1
Partnership for the Goals: Revitalize the global partnership for sustainable development.	Throughout development of this project, InfiniteEarth has worked with various levels of society. In the public sector, it reached agreement with the national government to claim the carbon rights for the area. It also received concessions from the private sector when PT Best agreed to hand over control of some of the property in the project area to the Rimba Raya project. Finally, the project proponent's partners in the project are civil societies and NGOs with a long history of conservation and sustainable development.	1.1, 2.1.4, 2.2.7, Non-Permanence Risk-Report

Table 3: All UN Sustainable Development Goals and Their Supporting Activities

As the project has moved forward, it has re-evaluated its goals and subsequent project activities with the Sustainable Development Goals adopted by Indonesia. When necessary, project activities have been altered or created in order to support the accomplishment of these development goals.

2.2 Project Implementation Status

2.2.1 Implementation Schedule (G3.4).

The project has updated the Project Implementation Schedule (Table 4) to include both progress that has been made on previous activities, as well as new activities that were identified through the community Theory of Change exercise that was conducted by Rimba Raya Staff.

Project Phase	Event / Milestone	Activity Description / Relevancy	Start Date	Finish Date	Status	Responsible Party	Progress Remarks
Feasibility study	Meeting with Orangutan Foundation Intl.	Determine synergy between orangutan conservation objectives and avoided deforestation	20-Mar-2008	21-Mar-2008	Complete	Todd Lemons	V
Feasibility study	Visit potential project site area	Survey current condition of forest, assess immediate local threat from palm oil	21-Mar-2008	23-Mar-2008	Complete	Todd Lemons	V
Feasibility study	Meet independently with three members of Commission 4 (development) of the Provincial legislature	Discuss new land-use plan that intends to convert Production Forests to Palm Oil	21-Mar-2008	25-Mar-2008	Complete	Todd Lemons / Biruté Galdikas	V
Feasibility study	Meet with Provincial Governor	Determine possibility of his support given historical support of palm oil	25-Mar-2008	25-Mar-2008	Complete	Todd Lemons / Biruté Galdikas	V
Feasibility study	Meet with Conservation	Meet with "Head of Sub-Directorate" of the	8-Apr-2008	8-Apr-2008	Complete	Todd Lemons /	V

	Dept. of the Ministry of Forestry (PHKA)	dept. in order to build support at lower levels within the agency.				Biruté Galdikas	
Feasibility study	Meet with Conservation Dept. of the Ministry of Forestry (PHKA)	Meet with the "Director of Area Conservation" and "Director General" to explicitly outline the project plan and ask for support	9-Apr-2008	9-Apr-2008	Complete	Todd Lemons / Biruté Galdikas	V
Feasibility study	Deliver LOI to Ministry of Forestry	Lay out plan. Demonstrate common goals with OFI and define project area.	10-Apr-2008	10-Apr-2008	Complete	Todd Lemons / Biruté Galdikas	V
Feasibility study	Meet with Minister of Forestry	Determine level of support for the project. Ask for advice on how to proceed	12-Apr-2008	12-Apr-2008	Complete	Todd Lemons / Biruté Galdikas	V
Feasibility study	Commission "Desk Top Study"	Contract Forest Carbon to conduct a Desk Top Study of the Project area	1-Jun-2008	15-Aug-2008	Complete	Forest Carbon	V
Feasibility study	Application for "Area verification"	Local branch of the National Forestry Dept determines current legal status of project area and issues letter of approval if no legal conflicts with title or proposed activities	15-Sep-2008	1-Oct-2008	Complete	Todd Lemons / Promethe us	V
Feasibility	Meet with	Determine level of	15-Sep-2008	18-Sep-2008	Complete	Infinite-	

study	Chiefs of the local villages	support for the project. Discuss community concerns and needs				Earth	V
Establishment of Rimba Raya Reserve	Establishment of offices	Administrative offices established in Jakarta and Pangkalan Bun and field office established in Seruyan	1-Oct-2008	31-Dec-2014	Started	Infinite-Earth	• HQ office in Jakarta • Operational office in Sampit (completed in 2014) • 3 Management unit offices in Telaga Pulang, Muara Dua and Kuala Pembuang
Establishment of Rimba Raya Reserve	Project Design	Design & Development of the Rimba Raya REDD Project	1-Oct-2008	15-Mar-2009	Complete	Infinite-Earth	V
Feasibility study	Meet with Bupati of the Seruyan Regency	Determine level of support for the project. Discuss regency needs.	15-Oct-2008	18-Oct-2008	Complete	Todd Lemons	V
Establishment of Rimba Raya Reserve	Bupati's Letter of Recommendation	Bupati of Seruyan Regency signs letter of approval and recommendation of the project	1-Nov-2008	31-Nov-2008	Complete	Todd Lemons / Promethe us	V
Establishment of Rimba Raya Reserve	Biodiversity Study	Commission Biodiversity Study of project area	1-Nov-2008	15-Jan-2009	Complete	Daemeter	V
Establishment of Rimba Raya Reserve	Community Assessment	Commission Assessment for all communities in the	1-Dec-2008	1-Feb-2009	Complete	Daemeter	V

		project area to determine land tenure analysis, socio-economic status and needs, etc					
Establishment of Rimba Raya Reserve	Governor's Letter of Recommendation	Governor of the Central Kalimantan province signs letter of approval and recommendation of the project	1-Dec-2008	15-Mar-2009	Complete	Todd Lemons /Dr. Galdikas	V
Extension of OFI Activities	Construction of orangutan release centers & feeding platform	Four release stations will be built inside the project area	1-Dec-2013	31-Mar-2017	Ongoing	Rimba Raya / OFI	1 release station has been built in 2017, located in Tatah Slamet, Baung village, Danau Sembuluh Sub-District, Seruyan District, Central Kalimantan – Rimba Raya area. Monitoring of the orangutan population after the release process has been ongoing since 2017, 2 baby female orangutans (Mercedes, born in Dec. 2017, and Putri, born in Nov. 2018) were born in the release area.
Development of Social Buffer	Village Heads Meeting	OFI sponsored meeting of Project Zone Village Heads to discuss conservation issues.	23-Dec-2008	23-Dec-2008	Complete	OFI	V

Development of Social Buffer	Daemeter Social Survey	Daemeter field team visits villages in the Project Zone to gather info and elicit opinions on proposed project activities	23-Dec-2008	28-Dec-2008	Complete	Daemeter	V
Establishment of Rimba Raya Reserve	Agreement with carbon buyers	Contract for the purchase of REDD credits	15-Feb-2009	15-Jun-2010	Complete	Infinite-Earth	V
Establishment of Rimba Raya Reserve	Technical Proposal	Submit Technical proposal (Project Operational Plan) to Dept of Forestry for review	1-Mar-2009	15-Mar-2009	Complete	IE Mgt Team / Sonokoling	V
Establishment of Rimba Raya Reserve	Technical Proposal	Present Technical proposal (Project Operational Plan) to Dept of Forestry and field questions & concerns.	15-Apr-2009	1-May-2009	Complete	IE Mgt Team / Sonokoling	V
Establishment of Rimba Raya Reserve	Fire Plan	Design and Implementation of comprehensive fire prevention and response plan	1-May-2009	1-Jun-2010	Complete	Marc Nicolas	V
Establishment of Rimba Raya Reserve	PDD Pre-validation	PDD submitted for pre-validation review	1-May-2009	31-May-2009	Complete	Rainforest Alliance	V
Establishment of Rimba Raya Reserve	PDD Translation and Dissemination	PDD translated into Indonesian and distributed to all stakeholders for the CCB public comment	1-May-2009	31-May-2009	Complete	Rini Firdaus / OFI / Rimba Raya	V

		period					
Establishment of Rimba Raya Reserve	Minister's Letter of Recommendation	Concession approved contingent on compliance with administrative steps	1-Jun-2009	30-Jun-2009	Complete	IE Mgt Team / Promethe us	V
Establishment of Rimba Raya Reserve	Monitoring Plan	Design & Development of Monitoring Plan	1-Jun-2009	15-Jan-2009	Complete	Forest Carbon / Daemeter	V
Establishment of Rimba Raya Reserve	Daemeter Phase 2 Biodiversity and Community Assessments	CCB validation and verification	1-Jun-2009	15-Jan-2010	Complete	Daemeter	V
Establishment of Rimba Raya Reserve	CCB Validation	PDD posted to CCB website and project validation commences, triggering public comment period	1-Jun-2009	15-Jun-2010	Complete	SCS	V
Establishment of Rimba Raya Reserve	1st and Second Validation of Methodology	Receive 1st validation of methodology, receive 2nd validation	1-Jun-2009	07-Sep-2011	Complete	Bureau Veritas,	V
Development of Social Buffer	Public comment meetings	Meetings in Project Zone communities to describe project and elicit comments	1-Jun-2009	15-May - 2010	Complete	Rimba Raya/ OFI	V
Extension of OFI Activities	Release of rehabilitated orangutans	Coordinated release of 300 rehabilitated orangutans into the project area	1-Jun-2012	31-Dec-2021	Pending In Planning	Rimba Raya / OFI	25 orangutans were released in this monitoring period. Monitoring of the

							orangutan population after the release process has been ongoing since 2017, 2 baby female orangutans (Mercedes, born in Dec. 2017, and Putri, born in Nov. 2018) were born in the release area.
Establishment of Rimba Raya Reserve	Environmental Impact Assessment	Conduct Environmental & Social Impact Study per Dept of Forestry Regulations for final approval	1-Jan- 2010	15-Apr-2010	Complete	Focus Consulting	V
Development of Social Buffer	Community consultations	Series of meetings with Project Zone communities to elaborate and prioritize social programs	1-Aug-2009	31-May - 2010	Complete	Rimba Raya	V
Development of Social Buffer	Community consultations	Initial (1 of 2) Public Comment Period	1-May-2010	31-May - 2010	Complete	RRC & World Education	V
Development of Social Buffer	Community consultations	Formal CCBA Public Comment Period	1-Sep-2010	30-Sep - 2010	Complete	RRC & World Education	V
Establishment of Rimba Raya Reserve	Minister's Decree granting IUPHHK Concession Rights	Final approval of the Rimba Raya rehabilitation and restoration concession license	1-Sep-2009	Feb-2013	Complete	IE Mgt Team / Rimba Raya	V

Development of Social Buffer	Establishment of community committees	Establish system of community involvement in day-to-day operations, process and procedural rules for decision making, arbitration, etc. using existing socio/political/judicial structures (village counsels, tribunals)	1-Jan-2010	31-Dec-2014	Started	Rimba Raya / OFI	Rimba Raya has made village agreement where both parties (Rimba Raya and certain village) agree on some points supporting conservation and restoration programs performed by Rimba Raya. Some do and don'ts are included in the village. So far 9 villages have signed the agreement. 8 Village Agreements were signed 9 stimulus fund packages were disbursed Participatory Mapping activity were conducted in 7 villages and signed
Establishment of Rimba Raya Reserve	VCS Verification	VCS verification commences	01-Jun-2010	April 2013	Compete	SCS	V
Execution of Rimba Raya Operational Plan	Guard Posts	20 guard posts built at strategic locations across the Reserve	1-Jan-2014	1-Jan-2019	Pending in planning	Infinite-Earth / OFI / Rimba Raya	3 guard posts have been built in these locations: 1. Natai– Kopi (North Unit) 2. Tatah Ji - Muara Dua (Central Unit) 3. Sigintung Area – Muara Dua (Central Unit) – in Collaboration area with TNTP – only for transit/staying over but not fully guarded

							24/7. 4. Kudung – in collaboration with BPBD - Regional Disaster Management Agency (south unit) – plan to be active in 2022 as the MOU with BPBD is currently under development.
Execution of Rimba Raya Operational Plan	Hiring and training of new personnel	Field manager, Chief Reserve warden, and 35 new guards hired and trained	1-Jan-2013	1-Jan-2019	Started	Infinite-Earth / OFI / Rimba Raya	ComDev: 1. Education Manager (1 Manager, 1 coordinator + 7 staff) 2. Health (1 Manager, 2 coordinator + 7 staff) 3. Alternative Livelihood (1 Manager, 2 coordinator + 7 staff) FLR: (Forest and Landscape Restoration) 1. Fire and Forest Protection (1 Manager, 3 coordinator + 15 staff) 2. Biodiversity (1 Manager, 3

							coordinators + 1staff) 3. Nursery & Planting (1 Manager, 3 coordinators + 11 staff) In 2022, will hire 3 coordinators and at least 6 staff
Execution of Rimba Raya Operational Plan	Hiring and training of fire brigade	Fire chief engaged and fire brigade hired and trained	1-June-2010	31-Dec-2015	Started	Infinite-Earth /Rimba Raya	V
Co-Management of Tanjung Puting	Execution of Co-Management Agreement with TPNP Authority	Become an additional party to the existing and historical co-management agreement between OFI and TPNP	1-Jun-2010	Aug-2013	Complete	Rimba Raya / OFI	V
Extension of OFI Activities	Construction of orangutan remote feeding platforms	Four supplemental feeding platforms will be built inside the project area	1-Jun-2014	31-Dec-2016	Pending in planning	Infinite-Earth / OFI / Rimba Raya	1 feeding platform finished construction in Feb 2017 in Tatah Slamet – Baung village. Multistakeholder agreement signed to build 3 orangutan release camps, including feeding platform and guard post.
Development of Social Buffer	Annual grants to local communities	Grants are given to communities after consultation with	1-Aug-2013	31-Dec-2039	Started	Infinite-Earth	Scholarship for Senior High School 1. Period 2018 – 2021: 24 students received

	for education.	World Education.					RR Scholarship (finished) 2. Period 2021 – 10 students received RR Scholarship Scholarship for University: Period 2021 – 3 students received RR Scholarship
Collaboration Agreement of Tanjung Puting	Commencement of annual grants to TPNP	Grants to fund TPNP conservation activities	1-Jan-2014	31-Dec-2039	Started	Infinite-Earth	Continued correspondence and co-management with TPNP staff including capacity building exercises, training, shared fire brigade and monitoring activities. • The collaboration agreement has been terminated on 2nd September 2021 as there was no clausal for carbon utilization. • RR is currently developing the new agreement with a carbon utilization concept. This collaboration is expected to continue.
Co-Management	Training of TPNP guards	Bring in outside military and police	1-Aug-2013	31-Dec-2039	Started	Rimba Raya /	Firefighting training is provided across all

of Tanjung Puting	and staff	training personnel to adequately train and equip staff				OFI	monitoring periods, including 2019 - 2021 period. Military police are involved during forest patrols or when fire is occurred. Rimba Raya Project always coordinate with multi-stakeholder parties for fire suppression. Additional refreshment training included the techniques discussed in the Climate section, as well as biodiversity-related trainings such as camera trap.
Extension of OFI Activities	Commencement of annual grants to OFI	Grants to fund OFI orangutan conservation and rehabilitation activities	1-Jun-2011	31-Dec-2039	Started	Infinite-Earth	We provide each month IDR 120jt for OFI.
Development of Social Buffer	Community centers & libraries	2-3 community centers & libraries will be built, 1 in Baung and 1 in Muara Dua	1-Jun-2014	31-Dec-2015	Pending in planning	Rimba Raya / OFI	2 village libraries were developed during previous monitoring periods in 2016. The Ulak Batu and Muara Dua libraries were opened in 2017. In 2021, Rimba Raya Project has supported Tanjung Rangas village

							library with building and infrastructure renovation, computer, projector and multimedia equipment. Furthermore, provision of electricity generator. By 2022, the project is expected to complete the construction of village library in Palingkau.
Development of Social Buffer	Water filtration systems	Development of community based clean filtration system	1-Sept-2013	15-Mar-2014	Started	Rimba Raya	300 units of water filters were distributed during the previous monitoring period, and 280 of those were repaired this monitoring period By the period 2019-2020, 3 WPS were constructed in three villages. The 3 WPS facilities are producing 211.724 liter per year for 900 HH in 3 villages. Besides opening access to clean water, RR had initiated the profit-oriented village business from the facilities, providing an extra income. The facilities are envisioned to run independently by the administration committee.

							In year 2021, 5 additional WPS facility are being constructed in 5 villages: Ulak Batu, Cempaka Baru, Tanjung Rangas, Pematang Limau. and Palingkau
Development of Social Buffer	Aquaponics program	Fund technical consultants on creating high yield, small footprint aquaponics greenhouses	1-Jun-2014	31-Dec-2015	Pending planning	Rimba Raya	Aquaponics projects were not continued during this monitoring period. It is expected to initiate with the support of technical consultant for maintenance system, including feeding and flowing water devices installation.
Outreach and Education	Orangutan study	Design and setup of orangutan tracking study	15-Jun-2009	30-Jun-2014	Started	Rimba Raya / OFI	Orangutan's fauna and nest monitoring has been included in the Rapid assessment activity. RR and 3 other stakeholders (OFI, TNTP and BKSDA) had conducted a joint survey on 29 April – 5 May 2021, and resulted 3 potential release locations in Tatah Empa in Baung village, Muara Tatah Isur in Jahitan village and Tepian Sungai Sigintung in Muara Dua village.

Establishment of Rimba Raya Reserve	CCB Verification	Receive CCB Gold Validation	15-Mar-2009	30-Nov-2014	Started	IE/RR	IE
Development of Social Buffer	Early Childhood Education & Development (ECED)	Begin stocking materials and hiring trainer / instructors for the ECED programs at the 2-3 community centers	1-Oct-2014	31-Mar-2016	Pending in planning	Rimba Raya / OFI / World Education	Develop village library – providing children books. RR has developed Education division in Q3 2021 and environmental curriculum for education especially for elementary levels.
Outreach and Education	Interactive Educational Platform	Creation of an interactive educational platform around the content of the research study	1-Oct-2014	31-Dec-2015	Started	Rimba Raya / Infinite-Earth	The Farmer Field School in SMPN 2 Telaga Pulang has been discontinued; however, RR has: • Developed Farmer Working Groups implemented in: 1) Jahitan 2) Baung 3) Palingkau 4) Cempaka Baru • Developed Education Division and environmental curriculum for education especially for elementary levels.
Execution of Rimba Raya	Implementation of	Execution of Monitoring Plan	1-Jun-2013	31-Dec-2039	Started	OFI / Rimba	Rimba Raya has developed field monitoring system by:

Operational Plan	Monitoring Plan					Raya	a) Rapid assessment b) Fire Monitoring, including hot spots c) Forest Patrol, including illegal logging/hunting activities d) Subsidence Pole e) Participatory mapping f) Forest inventory with 1% intensity g) Replanting on damaged area (rehabilitation program) Rimba Raya conducts community development program – providing several alternative livelihoods in order to minimize / reduce / stop villagers entering the forest - Rimba Raya area (wood harvesting for commercial economy activity). No Subsidence poles monitoring during the audit July 2019 – June 2021. It will be conducted again in Q4-2021 after canal blocking is completed.

Development of Social Buffer	Immunization Program	Launch disease prevention & immunization program	1-Sep-2013	31-Dec-2039	Started	Rimba Raya/ Health In Harmony	Health service is provided in form of Floating clinic who serve 8 villages and 2 hamlets. Targeting 35 patients each village or 350 patients approximately per service. In 2021, it is expected to complete at least 5 health services.
Execution of Rimba Raya Operational Plan	Construction of fire towers	5 fire towers built at strategic locations across the Reserve	15-Mar-2014	15-Mar-2019	Started	Rimba Raya	2 fire towers were built in Natai Kopi, Ulak Batu village and Sungai Mahat, Muara Dua village. 1 additional fire tower is projected to be completed in Q4 2021 in Pematang Limau due to severe flooding events.
Development of Social Buffer	Commencement of micro-credit program	Provide micro-finance program to local communities for agriculture, aqua-culture and other enterprise development	1-Jun-2014	31-Dec-2039	Pending in planning	Infinite-Earth	Rimba Raya has developed 1 local cooperative. Micro finance programs led to the development of an additional chicken farm in Jahitan “Manuk Taheta”, in addition to an existing program supporting a chicken farm in Baung “Indah Berseri.”
Development	Health	Provide health care in	1-Sep-2013	31-Dec-2039	Started	Rimba	Rimba Raya shall provide better health service for

of Social Buffer	Program	return for help conserving forest area				Raya/ Health In Harmony	the villagers by Floating Clinic program. Health service is provided in form of Floating clinic who serve 8 villages and 2 hamlets. Targeting 35 patients each village or 350 patients approximately per service. In 2021, it is expected to complete at least 5 health services.
Execution of Rimba Raya Operational Plan	Phase I-III Rehabilitation of degraded habitat	Rehabilitation of degraded habitat via a multi-story mixed indigenous species natural forest & community based cash crop agro-forestry approach	1-Aug-2013	31-Dec-2039	Started	Rimba Raya	Replanting some multi-fruits tree in the replanting areas. The program planting of cash crops such as pineapple and djengkol has continued to be supported throughout the monitoring period. Multi purposes local tree species in designated planting area such as pineapple, djengkol, cempedak, and coffee.
Outreach and Education	Completed building of chicken farm in Baung	A chicken farm is operational for meat production within the village of Baung	2016	2017	Completed	Indah Berseri, Jahitan Manuk Taheta, Putri Baung Bakena	Two chicken farms are now operational, with the Jahitan Manuk Taheta chicken farm coming online during this monitoring period. These chicken farms generate income for members and are a

							protein source for local communities. A chicken egg production program was discontinued during this monitoring period, as it was not economically viable.
Outreach and Education	Forest tree nursery development	Replanting activities are required in the area, which requires educational materials for villagers to use to develop a nursery in some villages.	2014	2017	Ongoing	Muara Dua and Ulak Batu	Rimba Raya is preparing curriculum and materials, along with funds for the procurement of demonstration plots. Equipment and participatory monitoring are also being evaluated. Nursery & Planting Division will develop a guidance book for nursery and planting that can be used both for RR staff and local communities who are involving in Rimba Raya nursery and planting activities.
Outreach and Education	Pilot project for fish cultivation within floating cages	10 fish ponds of 3 x 2 m have been installed for production of the patin fish. Rimba Raya has helped with the implementation of studies looking at the most effective development	2014	2017	Ongoing	Palingkau	Rimba Raya helped the fishermen procure the cages, along with help from the Marine and Fisheries Department. They've also been part of the implementation process of the case study underway attempting to maximize yields through

		methods. These fish will add alternative protein and income sources for participants.					experimentation and leading discussions. In 2021, RR develop 1 Fishery Working Group in Pematang Limau "Tunas Makmur". It was scheduled to create another Working Group in Ulak Batu but the flooding events prevented its completion.
Outreach and Education	Continued development of a women's working group for packaging shrimp paste	This is an effort to keep the price of shrimp paste stable in the area through a women's group in charge of packaging the paste for later use.	2015	2017	Ongoing	Sungai Perlu	Rimba Raya is continuing to provide financial support as well as organizational management support. In 2021, RR temporally discontinued the support for ZUPER and it is creating the enabling conditions to form a new Working Group in another village in 2022.
Outreach and Education	Creation of a working group focused on dried fish production	The Muara Dua community is well known in the region for their ability to produce a high quality product sustainably. Rimba Raya created the Tampudau working group to focus on expanding	July 2016	2017	Started	Muara Dua	The Tampudau Hamlet work group for salty fish "Karya Bersama" has been discontinued. The market price point offered by Javara was unable to cover the product cost. In 2021, RR develop 1 Fishery Working Group in Pematang Limau "Tunas Makmur". It was

		this production					scheduled to create another Working Group in Ulak Batu but the flooding events prevented its completion.

Table 4: Project Implementation Schedule for the Rimba Raya Project

The primary project activity has been to avoid the conversion of tropical peat swamp forest to oil palm plantations. Operationally this primary activity is achieved through the implementation of the following core project activities. Any progress made during this monitoring period is included in their descriptions.

1. **Establishment of the Rimba Raya Reserve**. The primary project activity has been the establishment of the Rimba Raya Reserve, a privately-funded protected area along the eastern boundary of Tanjung Puting National Park (TPNP). The management plan includes the creation of a series of guard towers, a fire response plan and fire brigade, and a comprehensive monitoring system. These measures have helped to ensure the permanence of project area carbon stocks, biodiversity and the territorial integrity of TPNP. In addition, project proponents have funded significant enrichment and rehabilitation work inside the project area and its buffer zone, increasing carbon stocks, biodiversity and sustainable community involvement.

2. **Guard post network**. OFI has been instrumental in funding and building a small network of guard posts along the perimeter of TPNP over the past two decades, with the bulk of these posts located along the park boundaries to the north and west of the project area. The Rimba Raya project has extended and continued to extend this network of guard posts to create comprehensive observation and communication coverage. The network of guards and guard posts has provided protection from illegal logging, poaching, and encroachment by oil palm plantations.

Rimba Raya has hired local guards in the form of permanent field crews that are responsible for patrolling relating to forest protection and this has been done regularly since September 2014. During the previous monitoring period, three new guard posts were built. During this current monitoring period, two new fire towers were built in Ulak Batu and Muara Dua villages were built, and an additional guard post is planned for completion in 2021 in Pematang Limau village.

3. **Fire Plan**. Fires have periodically swept through the project area and the park during dry periods. The Rimba Raya project has created a fire response system, including training and equipping a fire brigade and developing a fire response plan for the reserve in conjunction with guard towers and stations. To reduce the impact of fire, fire towers, fire brigade and equipment suitable for peat swamp firefighting are being established in the project area.

During the previous monitoring period, full crews have been established in all 3 field units, and all have been provided with basic firefighting, safety training and have also been equipped with appropriate pump kits (pumps, hose, nozzles, hand tools). During the roughly 6-month fire season, these permanent crews are supplemented with 3 full (11 person) seasonal crews that assist in conducting the routine field work, monitoring and measuring, building of guard posts and fire towers and other such tasks so the permanent crews can focus almost exclusively on fire prevention and

suppression. During this monitoring period, two additional fire towers were constructed in Ulak Batu and Muara Dua, and 8 fire hydrant wells were installed throughout the project area. Crews were also given refresher training on fire suppression techniques in July 2019, and all staff were trained on the 5-year fire strategy in February 2021.

4. **Monitoring Plan**. A monitoring plan has been developed to collect relevant climate, community, and biodiversity data. Combining early warning, ground truthing and remote sensing, the monitoring plan tracks key indicators to report on the integrity of the reserve's carbon stocks and biodiversity and to allow project proponents to adapt the reserve management plan to changing conditions. Crews have been established in all 3 field units to conduct patrols necessary to provide this early warning system and allow the field staff to take earlier action to conditions that warrant such. During this monitoring period, various monitoring operations have continued and employee refreshment training courses have occurred.

5. **Enrichment and Rehabilitation**. The project proponents have committed to undertaking significant enrichment and rehabilitation work inside the Project area. Each year, the project proponents will carry out enrichment activity, planting seedlings of native dipterocarp and other appropriate tree species in areas with an insufficient inventory of young trees. In addition, significant rehabilitation of non-forested areas (including shrubland, grassland, and deforested areas), is planned. In particular the planting of native species such as jabon, binuang, and makaranga that thrive in exposed and degraded conditions. By the conclusion of the project, significant stretches of forest will have been restored to their natural state, increasing carbon stocks in the Project area and providing additional habitat, thereby strengthening the physical buffer protecting TPNP.

In the previous monitoring period in March 2019, two mangrove nurseries were constructed in Pantai Seribu Cemara – Sungai Bakau village, along with an additional nursery block in Sei Patin – Sungai Undang village. Planting took place from June-July 2019, December 2020, and January 2021. During the first and second quarter of 2021, the planning phase to plant more than 100,000 mangroves has been developed with the execution target in last quarter of 2021

During this monitoring period, around 139,354 seedlings were grown in these community nurseries. All seedlings were sourced from nurseries run by the project communities. Monitoring of forest growth from previous plantings occurs and efforts are made to identify inter-planting needs when appropriate.

6. **Indigenous Species, Cash Crop, Community-based Agro-forestry Program**. As part of its reforestation effort, Rimba Raya has launched a community-based, cash crop agro-forestry project based on multi-story/multi-crop plantations of native species cash crops, including fruit, nut, spice,

and rubber trees and jelutung, inter-planted with rare species (such as ramin and meranti) in a matrix of secondary forest regrowth.

Two nurseries have been previously established in villages within the concession area, one in Ulak Batu which now has a permanent nursery site with an irrigation system, and one in Muara Dua, where a permanent site has yet to be identified and instead the seedlings continue to be grown and maintained by individual families within the property. Between the two nurseries, 139,354 seedlings have been grown during this monitoring period. Rimba Raya is working with the local community members to identify a broad mix of income and subsistence wood producing species that are grown in the nurseries until replanting and then purchased from the villages. These trees are planted by the families in the villages with the assistance of Rimba Raya staff in individual plots so that each family can maintain them over time and reap the harvests of any products once they grow to the required age. These include species such as jelatung and rubber for sap, ramin, meranti and ulin for village construction, and various fruit trees that can be harvested for subsistence or sale to OFI for feeding orangutan or to the oil palm companies for fresh fruit for their staff.

In the previous monitoring period, the project ramped up a more intensive agroforestry program focusing on short, medium and long-term cash products, especially 'niche' products such as essential oils and other non -timber forest products like gaharu (agarwood), which bring higher prices and are becoming more difficult to find. Additionally, work continued in assisting villagers with participatory mapping, which has helped identify areas to be targeted by these activities.

Throughout the monitoring period, Rimba Raya grew 139,354 seedlings in local community-run nurseries to be planted in the local community.

7. **Funding of OFI activities**. A portion of the revenues from the sale of the project's carbon credits will be used to fund OFI's on-going activities; including new programs for reforestation of critical orangutan habitats and acquisition of viable habitat that does not currently meet REDD project requirements for additionality. In addition, project proponents are building new orangutan release centers and feeding platforms at strategic locations inside the Project area. Working with project proponents, OFI uses the release centers to eventually reintroduce as many as 300 orangutans from their orangutan Care Center and Quarantine (OCCQ) Rehabilitation Center near Pangkalan Bun, back into the wild, utilizing the reserve as a staging ground for their migration into the park. During this monitoring period, 6 orangutans were released into the wild.

8. **Collaboration with Tanjung Puting National Park**. The TPNP Authority has the responsibility to protect over 400,000 ha of national park. Its staffing levels do not correspond to the level of pressure by the agent of deforestation. The mere presence of the Rimba Raya project along the park's exposed eastern flank will significantly support the authority to maintain the boundary. The

Rimba Raya Conservation Project is committed to developing a for-profit conservation model for underfunded national parks. Under this model the project proponent works to strengthen the co-management agreement already in existence between TNPN and OFI. The project proponent has also supported park personnel training, capacity-building opportunities, improved equipment for monitoring and communication, and the reserve's fire brigade.

9. **Development of Social Buffer**. An essential element of the Rimba Raya project is the engagement of all stakeholders in the Project zone in order to create a social buffer to the park and Project area, thereby alleviating many of the external pressures that drive deforestation. The project proponents have created a process framework designed to disseminate information about project development and implementation, support community participation in all aspects of the project, and offer opportunities for capacity-building. To create an effective social buffer, project proponents believe that a comprehensive approach to socio-economic development must be undertaken with the objective of addressing the root causes of community-based deforestation – namely poverty, hunger, disease, lack of adequate shelter, and exclusion. To that end, a slate of programs has been developed based on data from an initial social survey in the Project zone and with reference to the UN Sustainable Development Goals for Indonesia.

10. **Community Centers**. Following the successful example of OFI with communities in the park's western region, project proponents built community centers in strategically selected villages inside the Project zone to act as a soft interface between the Project and the communities. The community centers offer facilities for park and project staff as well as for community organizations, and they supply news and radio communication facilities, libraries, and social and agricultural training programs. Village libraries in Ulak Batu and Muara Dua were completed and began leasing books to students in 2017. In 2017, there were 52 visitors to the Muara Dua Library who visited 257 times to read, as well as 24 visits to borrow 69 books. The Muara Dua library has an inventory of 388 books.

The Ulak Batu library was also open in 2017. The Ulak Batu library has 532 books from the Village Library with an additional 388 books donated from RRC. In 2017 it averaged 5 days of service per month, with roughly 200 visits to read by 90 visitors and 17 visits to borrow 58 books.

During this monitoring period, an additional three libraries were built (including a library in Tanjung Rangas), providing increased access to books as well as computer and internet and other educational opportunities. A community center is in development to provide open-access infrastructure criditcal to community organizing, engagement, and governance.

11. **Agriculture & Aquaculture Productivity.** The Rimba Raya project has extended World Education's ongoing programs for food security, access to government services, and capacity building within the project zone. By helping local households meet their food needs utilizing land

already under cultivation and by educating them about their political rights, the Rimba Raya project has eliminated many of the incentives driving illegal logging and the unnecessary conversion of forest to agricultural land. Agriculture activities have ranged from Farmer Field Schools to teach better agricultural practices, planting plots in various vegetables to demonstration plots. Crops covered to date include peppers, eggplants, rice, and various other vegetables capable of being supported by the various soil types present in each village. The salty fish working group established during the previous monitoring period was discontinued, as the low sale price of the fish product was not economically feasible.

12. **Community Multi-crop Agro-Forestry**. In keeping with its commitments to reforesting degraded lands within the Rimba Raya Reserve, the project proponent has implemented a community-based agro-forestry program for native cash-crop species.

Two nurseries have been developed in previous monitoring periods; a permanent site in Ulak Batu and individual garden sites in Muara Dua where Rimba Raya purchases seedlings. The seedlings are planted by the villagers in individual family plots, harvested by the community members with the commodities harvested to be used for subsistence, and sold to Rimba Raya or others. Multiple species have been used to provide wood for construction materials, fruit for consumption and sale, and sap producing trees such as rubber and jelutung for income production. These nurseries have continued operation during the current monitoring period, and had their carrying capacity expanded.

13. **Clean Water Systems**. Recent years have seen increased flooding in the Seruyan River watershed, and Project zone communities have had trouble gaining access to clean water resources. Based on community surveys intended to help project proponents prioritize social programs, it has been determined that clean water is one of the largest priorities for those living in the communities. To date, 2,172 water filters have been distributed to 9 of the villages across this and previous monitoring periods. During this monitoring period, 280 brokenwater filters were replaced. Also, three (3) Water Purification System (WPS) facilities were constructed in Baung, Jahitan, and Muara Dua and each can provide 2000 liters of clean water in 4-5 hours. Six (6) additional WPS installations are in development to cover all population centers within the project.

14. **Low Maintenance-Small Scale Solar Lighting**. The lack of electricity in the communities bordering the Project area affects their lifestyle and the economy. During the previous monitoring period, 1,671 solar lanterns were distributed among 9 villages, and 11 units of 60-watt solar panels were installed along with 11 solar generator units operating at 1 kW. During this monitoring period, 300 broken batteries for the solar lanterns were replaced across all 9 villages. Additionally, a solar power plant that can generate 12 kilowatt-hours per day was installed in Ulak Batu village in 2018, funded by HEF NZ Embassy. This power plant provides illumination for 57 houses and some public facilities, including road illumination. During this monitoring period, two solar plants providing power

for the entire populations of Ulak Batu (61 households, providing 4788 kwh/yr total) and Tampudau (35 households, providing 288 kwh/yr total) were installed. Another solar plant is in construction in Belanti.

15. **Micro-Credit**. Microcredit is the extension of very small loans to people who otherwise have not access to finance. These individuals lack collateral, steady employment, and a verifiable credit history and therefore cannot meet even the most minimal qualifications to gain access to traditional credit. During the previous monitoring period, progress has been made in securing financial support and creating working groups for shrimp paste production, salty fish products, and chicken meat/egg production. Financial support for these working groups has continued in the current monitoring program, although the salty fish production program and the chicken egg production program were halted due to not being economically viable.

Micro credits provided by Rimba Raya have the following structure:

Rimba Raya shall provide the start-up capital. The start-up capital is designed to purchase and procure the required materials. The start-up capital is expected to be returned to:

a) Enlarge the working group in terms of production and/or membership

b) The members might split of and develop another group

Terms and Condition in providing the start-up capital or funding for the initiative projects; 1) the start-up capital (most of the time) is provided to the group not in cash form, yet in a complete required materials and 2) the start-up capital shall not be returned to Rimba Raya in terms of money. The work group has agreed to split the net profit under the following distribution: 70% for the members and 30% for returning the capitals.

18. **Sustainable Health Care**. The project proponent plans to develop a health care system designed specifically to meet the needs of Project zone communities in collaboration with Health in Harmony (HIH), a Western Kalimantan-based health care program that integrates high quality, affordable health care with strategies to protect threatened forests. During the monitoring period, progress has continued in developing a health care plan concept and installing WPS in all stakeholder villages to improve access to clean water

19. **Floating Clinic.** Project proponents continued the arrangement for the construction, outfitting, and deployment of a floating medical clinic. In lieu of community clinics, a floating clinic was chosen for its mobility and the resulting ability to deliver medical services up and down the Seruyan River, effectively servicing all of the communities in the Project zone.

Initial discussions with the Indonesian medical profession took place before the verification about how to staff a floating clinic, as well as planning, budgeting, construction work, and development for the mobile clinic. The boat was completed in time for a trial of the floating clinic in May 2019.

A planning meeting in May 2019 with UPTD PUSKESMAS made good progress at determining required personnel, medical equipment, planned services and service locations, and how to meet logistical needs. A two-day trial of the floating clinic was conducted successfully, with 316 people being treated by medical professionals in 7 villages and 2 hamlets. Additional changes were made to the floating clinic plans after the trial period (see Floating Clinic Report No. 1 - TRIAL Phase OK.docx).

Rimba Raya Project covers the 100 percent of its operation, including the daily allowances of the nurses to accompany the medical activity in the 7 villages and 2 hamlets. While the Governmental Healthcare System supports the Project in appointing the nurses to accompany the operation and pays their base salaries, the government does not cover the additional costs for nurses to visit the project zone or the operational costs of the floating clinic. Nursing staff is not sent to the project zone by the government, rather, Rimba Raya sees to it that a team of nurses can staff the floating clinic and pays all of their operational expenses to do so. Additionally, the Project fully supplies medicines to the villagers based on their respective prescription. This provision encompasses the most costly component for a successful operation. Likewise, the impact is visible by identifying diseases that were unknown by patients such as malaria, gastritis, among others. Without Rimba Raya taking the initiative to staff and operate the floating clinic as well as pay for the clinic's operational costs, these medical services would not be available to the community.

During this monitoring period, 1,849 people were treated by the floating clinic, across 8 different vilages and 2 hamlets. This included 985 women.

20. **Capacity Building Programs**. Capacity building efforts with women's working groups have continued the work that began in previous monitoring periods. These working groups are involved in activities such as shrimp paste and chicken meat production. A chicken egg production working group that was founded in previous monitoring periods was discontinued, as it was not economically viable. Likewise, a garbage recycling handicraft working group that was established in previous monitoring periods was discontinued due to both limited markets and limited demand for handicraft work. During this monitoring period, 8 women were given financial and technical support from the Community Enterprise Grants Program to own and operate chicken farms and shrimp paste businesses.

21. **Subsidence Measurements.** Subsidence measurements detect changes in peat surface height at certain times in order to determine peat volume versus water content. Subsidence

measurements have not been collected this monitoring period due to flooding in the project area. These measurements will resume late 2021.

2.2.2 Methodology Deviations

There were no methodology deviations during this monitoring period.

2.2.2.1 Methodology Deviations for Previous Monitoring Periods

There were two methodology deviations established during the fourth monitoring period and these deviations have been continued for this monitoring period. The first was performing only one complete landcover classification for 2017 instead of completing a landcover classification annually. This is an acceptable deviation under the VCS Standards as it is only a deviation regarding monitoring or measurement. This was conservatively completed, through the use of additional satellite imagery from the other years of the monitoring period to insure that no areas were missed.

The second deviation was the use of community engagement and field monitoring instead of aerial imagery to detect logging gaps. Again, this is an acceptable deviation under the VCS Standards for the same reasons and was done due to the high degree of difficulty in obtaining annual high resolution imagery and then actually observing the location of logging gaps. Field crews were instructed to make note of any signs of logging they observed within the project area and community members were engaged with Rimba Raya staff, informing them of areas where logging was observed. When notice of this logging was received, Rimba Raya field workers traveled to the logging gaps and documented and verified the existence of these gaps while taking measurements of felled trees.

2.2.3 Minor Changes to Project Description (*Rules* 3.5.6)

There have been no minor changes to the project description during this monitoring period.

2.2.3.1 Minor Changes to the Project Description in Previous Monitoring Periods

During the fourth monitoring period, there were some minor changes changes to the project regarding the villages included in it. Six villages in the northern region, Bahaur, Pairing Raya, Parang Batang, Tanjung Hanau, Banua Usang and Parent are no longer part of Rimba Raya since the Decree issued by MOEF in 2013 cut out the upper part of the working area. The project was also expanded into new villages from the Seruyan District. The Rimba Raya project added Sungai Perlu in 2014, Pematang Limau in 2015 and Kuala Pembuang 1, Kuala Pembuang 2, Sungai Undang and Persil Raya in 2016. So in total, up to 2017 there were 9 villages in partnership with Rimba Raya.

2.2.4 Project Description Deviations (*Rules* 3.5.7 – 3.5.10)

2.2.4.1 Deviations for this Monitoring Period

Two project description deviations have occurred during this monitoring period, both occur in Section 2.1.4. These two changes deal with updating the list of entities involved to remove parties no longer involved with the project. (1) PT Pandu Maha Wana Asia Pacific Consulting Solutions and (2) Environmental Accounting Services were removed from the project description to reflect their inactive involvement with the project.

Relevant deviations from prior monitoring periods continue.

2.2.4.2 Project Description Deviations from Previous Monitoring Periods

First Monitoring Period Deviations (July 2009 to June 2010)

The Project Management Zone of 91,215 hectares was described and spatially delineated in the validated Project Documentation. Since validation the Project Management Zone, managed by the Project Proponent has been slightly reduced to 81,414 hectares.

The CAA has not changed. As such the deviation to the Project Management Zone has no impact on the net GHG reductions from the Project activities.

Second Monitoring Period Deviations (July 2010 to June 2013

First Deviation	
Source:	Project Description Section 3.3 (Data & Parameters Monitored) and Section 4.2 (Quantifying GHG emissions and/or removals for the baseline scenario)
Criteria and Procedures:	Update of parameters used in quantifying GHG emissions and reductions, specifically the peat bulk density value based on newly available data.
Relation to Monitoring or Measurement:	This procedure is related to measurement.
Timeline for Deviation	January 7, 2010 – crediting period end date
Requested Deviation:	Update GWP values peat bulk density for this monitoring period in both the baseline and project accounting models to the bulk density value measured in the field.
Justification:	Section 17 of VM004 allows for updates to data used in modeling calculations as better data becomes available, and if such changes are expected to increase the accuracy of modeling measurements. This deviation does not affect the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.
Quantification Impact:	Changes to these factors will impact overall GHG emissions from peat burning in both the baseline and project scenarios.

Third Monitoring Period Deviations (July 2013 to June 2014)

No Project Description deviations during this monitoring period.

Fourth Monitoring Period Deviations (July 2014 to June 2017)

First Deviation	
Source:	Project Description Section 3.3 (Data & Parameters Monitored) and Section 4.5 (GHG Emission Reductions)
Criteria and Procedures:	Update of parameters used in quantifying GHG emissions and reductions, specifically global warming potentials (GWP) for N_20 and CH_4.
Relation to Monitoring or Measurement:	This procedure is related to measurement.
Timeline for Deviation	June 22, 2014 – crediting period end date, or availability of updated IPCC GWP values
Requested Deviation:	Update GWP values for N_20 and CH_4 for this monitoring period in both the baseline and project accounting models to values found in the 2007 IPCC 4th Assessment Report (IPCC AR4) in order to follow the VCS Standard v3.7.
Justification:	Section 17 of VM004 allows for updates to data used in modeling calculations as better data becomes available, and if such changes are expected to increase the accuracy of modeling measurements. This deviation does not affect the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.
Quantification Impact:	Changes to these factors will impact overall GHG emissions from biomass burning and peat burning in both the baseline and project scenarios. Baseline emissions will only be updated from years 6 and on, as years 1-5 have already been credited during previous monitoring periods.

Second Deviation	
Source:	Project Description Section 3.3, VM0004 Methodology Section 19.2.2
Criteria and Procedures:	Update the ex-post peat burn depth value in the accounting from literature values that determine peat burn depth based on frequency of fire.
Relation to Monitoring or Measurement:	This procedure is related to measurement. Updating the peat burn depth based on more recent literature values, confirmed with field measurements, increases the accuracy and precision of emissions due to peat burning.
Timeline for Deviation	June 22, 2014 – crediting period end date, or availability of improved field measurements
Requested Deviation:	Instead of using a peat burn depth of 0.34 m for ex-post accounting, the project will use the value of 0.18 m, 0.11 m, and 0.043 m for the first, second, and third fires respectively. The conservativeness of these values was confirmed with field measurements collected in burned areas within the project area, which ranged from 0.005 – 0.03 m in depths. The project will apply these burn depth values to the 2014-2017 burn area based on the historical frequency of fire within the burn area. The historical frequency of fire will be determined by examining the fires within the CAA from 2000-2014.
Justification:	The methodology allows for the use of literature values that are confirmed by field measurements in the project accounting in

	section 19.2.2. Due to the nature of fires in peat, often times the burn depths decrease as an area experiences multiple burns. Two studies, Hooijer et al. 2014 and Konecny et al. 2015 found decreasing burn depths correlated with the frequency of fire within the study area. The CAA has a history of fire that predates the project start date, which ultimately affects the burn depths that occur during fires within different parts of the CAA. The Hooijer and Konecny studies looked at fires within a study area over a period of 20 years. The project conservatively reviewed the frequency of fire within the CAA for a period of 14 years using MODIS burn area data in order to ensure that the burn depths were applicable across the same timeline. The project is applying literature values that have been confirmed to be conservative using field studies as required by the methodology. The project is also conservatively estimating historical burn data across the CAA using a shorter window of time than the literature cited, and only applying MODIS burn areas rather than a combination of MODIS burn area and burn hotspots that would show larger areas of historical fires within the CAA. This deviation does not affect the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.
Quantification Impact:	Ex-post emissions from peat burning are lower as a result of using this updated literature value.

Third Deviation	
Source:	Project Description Section 3.2 and Monitoring Plan Section 8.1, VM0004 Methodology Section 19.2.3
Criteria and Procedures:	The monitoring of land cover change is completed for the length of the monitoring period rather than annually.
Relation to Monitoring or Measurement:	This procedure is a key component of monitoring, especially with regards to carbon accounting and emissions estimates.
Timeline for Deviation	June 22, 2014 – crediting period end date
Requested Deviation:	As opposed to the annual monitoring of land cover change as required by the VM0004 Methodology, the project will monitor land cover change once, at the end of each monitoring period.
Justification:	The change from annual monitoring of land cover change to monitoring once at the end of the monitoring period has no effect on the accuracy or conservativeness of the LULC change assessment. In fact, the classification of LULC change once during a monitoring period reduces the likelihood of errors in classifications and reduces needless expense and complexity for the project proponent and allows for the best cloud-free product to be utilized for the monitoring period in order to improve classification results. Most VCS methodologies have no annual

	monitoring requirements as these prove to be prohibitive cost-wise for projects. Additionally, a time series of data (including Landsat and MODIS) over the monitoring period can be used to confirm areas of land cover change due to fire or other causes, which can serve to confirm LULC classification in the final image. This deviation does not affect the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.
Quantification Impact:	LULC change monitoring once at the end of the monitoring period has no quantifiable impact on emissions estimates. However, it does serve to minimize classification error and maximize the availability of cloud free-data, providing a more accurate estimate of LULC change over the monitoring period.

Fourth Deviation	
Source:	Project Description Section 3.2.5 (Monitoring, including estimation, modeling, measurement or calculation approaches), VM0004 Methodology Section 19.2.1.2
Criteria and Procedures:	The project will establish a procedure to back calculate the number of logging gaps within a given area of observed logging activity in the event that neither aerial imagery nor field crews could obtain the necessary data.
Relation to Monitoring or Measurement:	This procedure is related to monitoring for forest degradation and the measurement of the number of logging gaps
Timeline for Deviation	June 22, 2014 – crediting period end date
Requested Deviation:	The number of logging gaps will be calculated by dividing the known area of observed logging activity by the average area of one logging gap. This procedure is to be applied when the number of logging gaps is unable to be estimated through field crews or review of aerial imagery.
Justification:	The number of logging gaps estimated by this method is highly conservative as it assumes the entire area in which logging activity was observed was impacted by logging.
Quantification Impact:	This method would increase the estimated emissions over the monitoring period due to logging activity.

Fourth Monitoring Period Deviations (June 2017 to July 2019)

No Project Description deviations during the fourth monitoring period.

Fifth Monitoring Period Deviations (June 2019 to July 2021)

No Project Description deviations during this monitoring period.

2.2.5 Risks to the Project (G3.5)

The main identified risks to the project benefits are loss of carbon stocks due to ongoing pressure from oil palm expansion in the northern boundary and from fires lit by bordering communities to clear

land and expand agriculture. These risks (whether natural or human-induced) would be expected to impact climate, community, and biodiversity benefits during the project lifetime. Fire has an impact on climate benefits through the release of carbon emissions from aboveground forest and belowground peat deposits, and can be expected to negatively impact biodiversity benefits through destruction of habitat. Fire can also negatively impact local communities as the smoke can cause respiratory illnesses and reduce the amount of overall GHG emissions reductions from the project, thereby reducing the project's funding.

Through the utilization of carbon funding, the Rimba Raya Biodiversity Reserve Project has expanded and enhanced the patrol and protective work being undertaken in the area since 1971 by OFI. This funding has increased the patrols to act as a deterrent and the physical presence through marking of boundaries as well as the installation of posts and fire towers in order to efficiently monitor and respond to threats.

Forest patrols protect the forested area from illegal activities by way of community socialization. Communities around the project area are included in patrols, thus the communities are made aware that such illegal activities are forbidden. Patrol activities are conducted by monitoring vulnerable areas either on foot, by motorcycle or by cess (small boat for 2 – 4 persons).

In addition, funds are available for enterprise development to reduce the pressure on agriculture expansion and oil palm expansion with the ambition to maintain and enhance the climate, community and biodiversity benefit beyond the life of the project.

The project has continued to make the necessary investments in job creation and income generation activities for the local communities from the sale of credits in the voluntary market so that agricultural expansion is less sought after.

2.2.6 Enhancement of High Conservation Values (G3.6)

A preliminary analysis of HCVs in the project zone determined that 12 of the 13 HCV sub-values defined in the Toolkit for Indonesia were potentially present. Observed HCVs are included in the table below (Table 5).

Identification Number	High Conservation Value Present in Project Zone	Relevance
1.1	Areas that Contain or Provide Biodiversity Support Function to Protection or Conservation Areas	Biodiversity
1.2	Areas that Contain Critically Endangered Species	Biodiversity
1.3	Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species	Biodiversity
1.4	Areas that Contain Habitat of Temporary Use by Species or Congregations of Species	Biodiversity

2.1	Large Natural Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics	Biodiversity
2.2	Areas that Contain Two or More Contiguous Ecosystems	Biodiversity
2.3	Areas that Contain Representative Populations of Most Naturally Occurring Species	Biodiversity
3	Rare or Endangered Ecosystems	Biodiversity
4.1	Areas or Ecosystems Important for the Provision of Water and Prevention of Floods for Downstream Communities	Community
4.3	Areas that Function as Natural Barriers to the Spread of Forest or Ground Fire	Community
5	Natural Areas Critical for Meeting the Basic Needs of Local People	Community
6	Areas Critical for Maintaining the Cultural Identity of Local Communities	Community

Table 5: High Conservation Values Present in the Rimba Raya Project Zone

Maintenance or enhancement of all these HCVs depended directly on the protection of remaining forest, retention of connectivity between remnant forests in the project zone with those of TPNP, potential rehabilitation of degraded riparian forest zones in the project area, and prevention of oil palm expansion to protect water quality and associated aquatic habitats of the Seruyan.

Specific measures taken to achieve these goals included the implementation of planned project activities. These project activities included the establishment of the Rimba Raya Reserve, creation of a guard post network, establishment of a fire plan and monitoring plan, forest enrichment and rehabilitation, creation of an indigenous species/cash crop/community based agroforestry program, development of a social buffer, construction of community centers, enhancement of agriculture and aquaculture productivity, introduction of fuel-efficient stoves, the planning of of a sustainable health care system and floating clinic, establishment of capacity building program as well as several other project activities.

Implementation of these project activities has directly and indirectly protected and/or enhanced the HCVs that are present in the project area. Moreover, many project activities positively affect multiple HCVs. For example, the creation of a guard post network protects nearly all of the present biodiversity and community HCVs in the project area. In terms of biodiversity, it has allowed for the surveying and patrol of large areas of forest; this allowed for protection of HCVs 1.1-1.3 as well as 2.1 and 2.2. Guard tower networks have kept watch for illegal activity or natural disturbances (fire) which may directly affect vulnerable/endangered species as well as representative populations of native species (1.2, 2.3, 3).

In terms of community, the forest guard post network has acted as a monitoring system for fire and floods, directly affecting community HCVs 4.1 and 4.3. Likewise, guard networks and forest patrols have protected areas of the forest from illegal activity and degradation thus protecting areas which are critical for the needs and identities of local people (HCVs 5 and 6). Like this project activity, there are other project activities which have protected and/or enhanced multiple HCVs that have been identified as present in the project area.

2.2.7 Benefit Permanence (G3.7)

In order to maintain and enhance the climate, community and biodiversity benefits beyond the project lifetime, the project proponent has developed a model that will protect the Rimba Raya Project area in perpetuity. In the creation of this Reserve, the carbon stocks and biodiversity of the project area are intended to remain intact beyond the lifetime of the project because the Reserve itself will be protected from conversion to palm oil plantation indefinitely. In this protection, critical habitat is safeguarded for numerous species and carbon stocks present in forest and peatland swamps remain intact.

The creation of the Reserve, as well as the revenue made from the sale of carbon credits, has and will continue to fund community-based action so that benefits are experienced during the lifetime of the project and that they positively impact future generations of the community. The creation of the Reserve allows for continued community benefits such as sustainable livelihood opportunities, equal opportunity employment for women and other marginalized groups, as well as sustainable food sourcing production. This is because the Reserve itself provides sustainable employment opportunities and agroforestry-based food production, among other community benefits that will remain permanently intact.

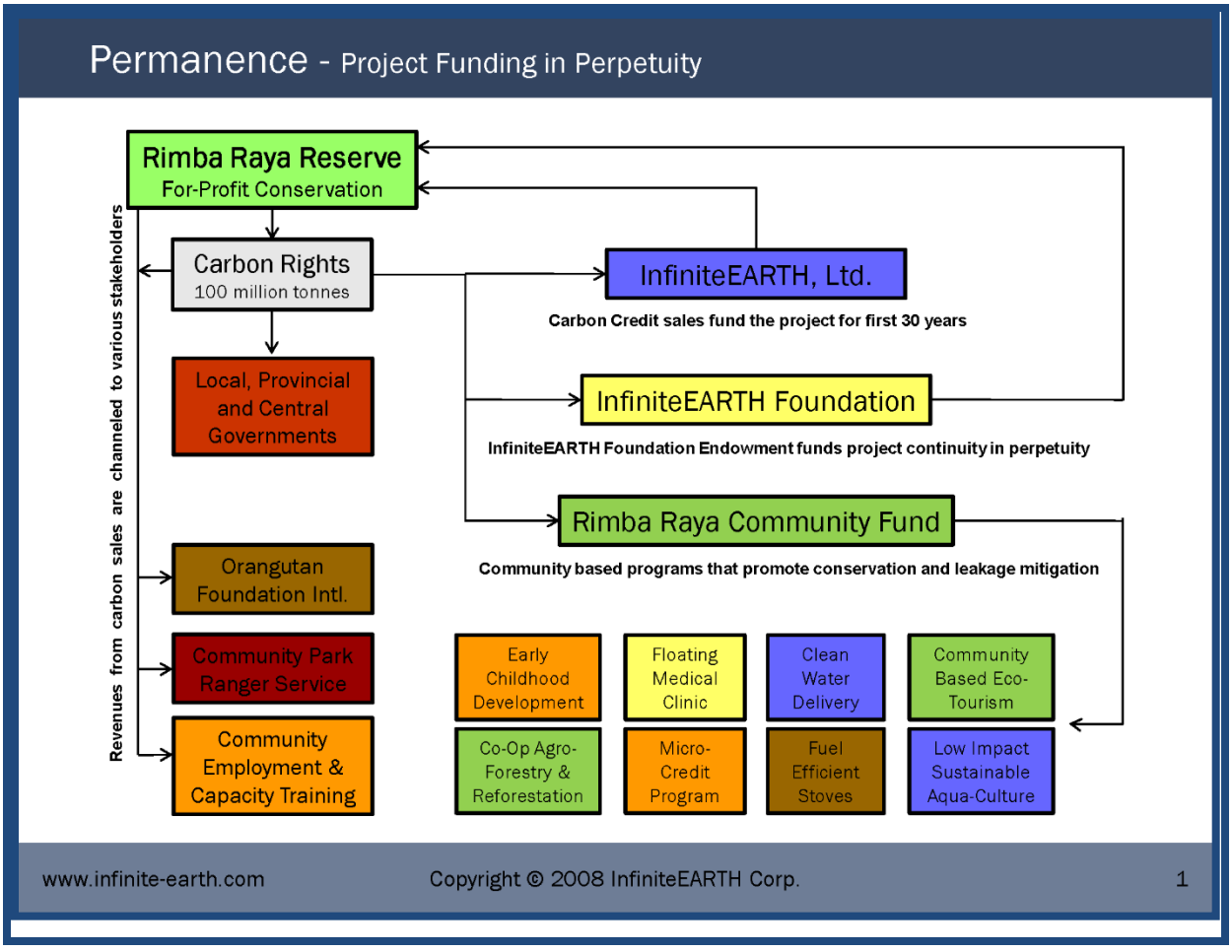

Figure 2: Outline of project permanence in terms of funding

2.3 Stakeholder Engagement

2.3.1 Community Consultation (G3.8)

Despite the absence of communities or families living within the boundaries of the CAA, the Rimba Raya Reserve project has, through a series of formalized meetings and studies, gained local approval of the project by including communities bordering the buffer zone of the CAA as stakeholders in the project development process.

The project proponent has worked to create effective means of communication and consultation with the community so that their input can help to steer the project. In partnership with World Education, a well-known development organization that has been working with communities in the area since 2003, the project proponent has engaged local communities to assess community development needs, local uses of surrounding forests and community land uses. Socio-economic studies were carried out throughout the course of project development and implementation. The most recent study, conducted in 2017, provided an updated look into the lives of stakeholders living in the project zone in terms of physical, financial, social and natural capital indicators (See Rimba Raya Endline _QUICK SURVEY _Edy September 2017.xls). The results from the study's consultation and survey components provided a deeper understanding of community needs and were incorporated into the development of the project so that program goals match local needs.

Findings from the most recent socio-economic study indicated that the majority of the population in the project zone is experiencing high levels of deprivation as dictated by fluctuating income streams and the cost of food being the largest expenditure. These economic conditions and food security depend almost entirely on local natural resources – fisheries, water, firewood and rice production – which can be inconsistently available or accessible at any given time. Because palm oil plantations act as a large provider of reliable employment for local stakeholders, they are viewed as predominately positive among community members. These trends are also observable among education and health sectors. Also notable in the recently completed study was the variability amongst the eight villages surveyed concerning the outlined indicators, despite their geographic closeness. This has reinforced the appropriateness of the project's approach in how it designs its development and implementation; intensive community-based interventions that are tailored to the local needs of the local communities are necessary for successful and effective projects.

Stakeholders were welcomed and encouraged to provide feedback to OFI and WE and well as to IE directly. One method of ensuring this communication occurred was through the creation of village agreements. Village agreements between the Rimba Raya Reserve and a community (as a partner of Rimba Raya) contained mutually agreement upon points in order to ensure benefit sharing was implemented for village communities. Figure 3 below shows the process for appropriately carrying out village agreements. Additionally, the Early Warning Early Response system has been implemented (additional information can be found in Section 2.3.4) and encourages community

members to report any concerns, possible issues, suggestions, or advice to a unit manager or member of the community development staff. Each village has at least one such person who has been trained to respond to these by bringing the concern to Rimba Raya in order that a proper response can be made.

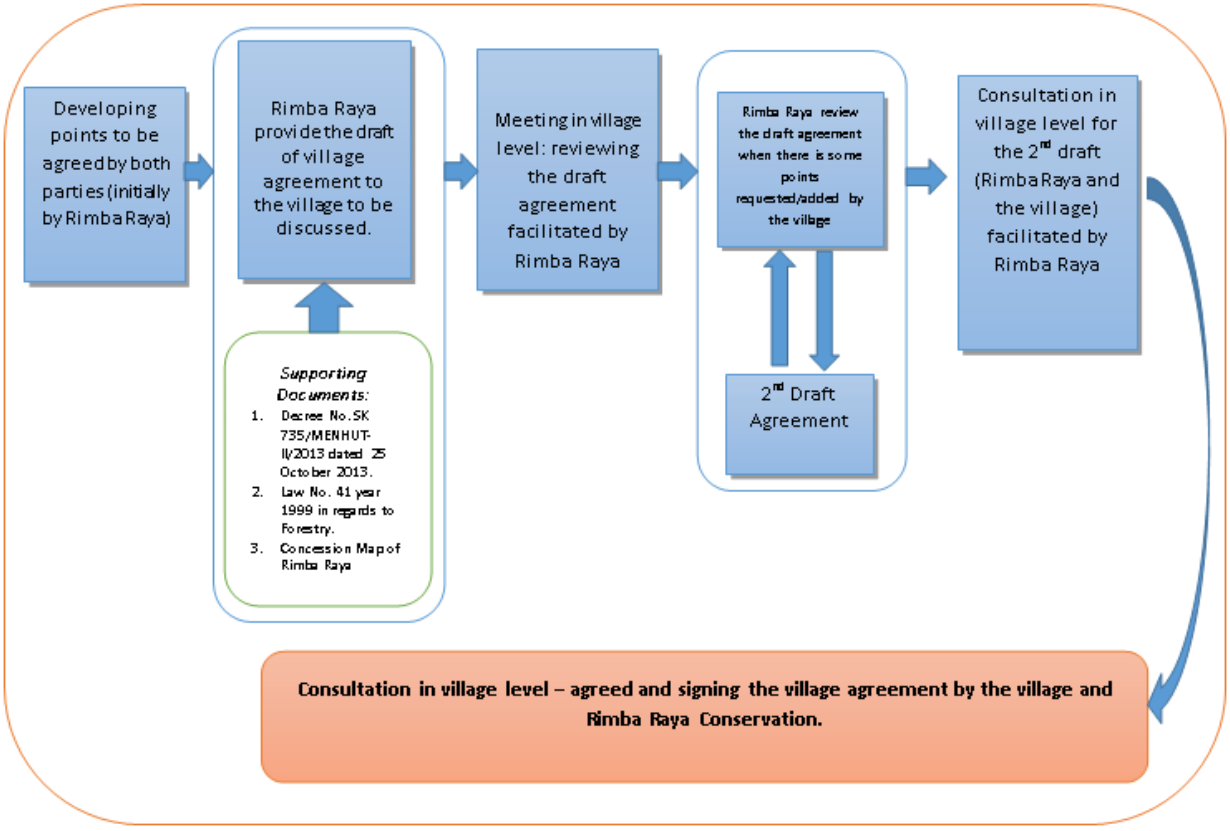

Figure 3: Agreement Process between Rimba Raya and Project Participants at the Project Level

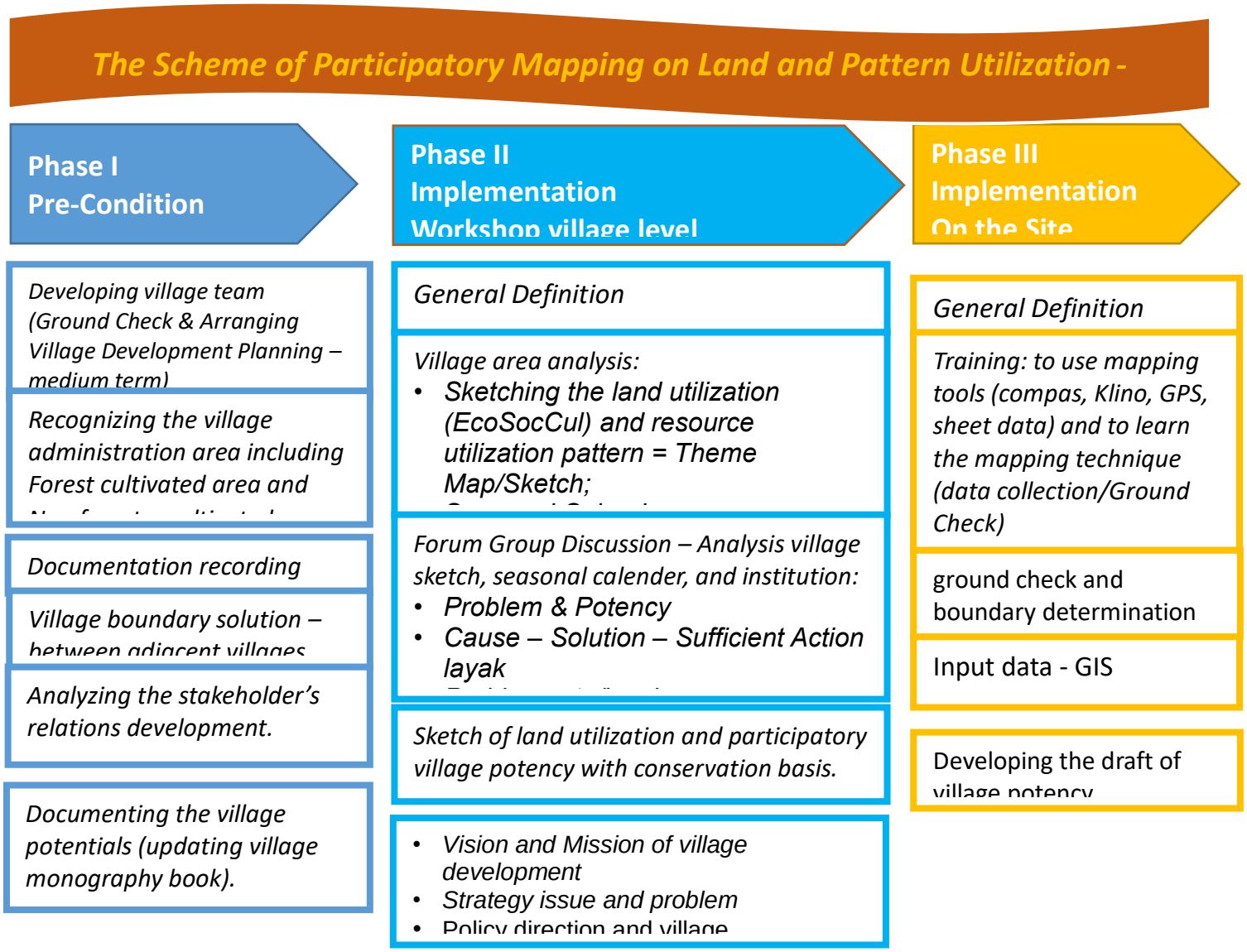

Figure 4: The Participatory Mapping Process for Community Involvement

Other, more general, methods of communication to inform stakeholders included postings on the "village board," announcements at nearby village offices and unit offices as well as other publicized written media. Stakeholders were able to provide feedback through telephone calls, email/instant messaging, letters and in-person visits with project proponents and other project partners.

A summary of this report has been prepared and copied for distribution in all of the villages within the Rimba Raya operational area as well as district and sub-district seats. Notices have been placed in all villages about the availability of these summaries in each of the villages and announcements included within local newspapers where Rimba Raya has a presence. Rimba Raya office locations have copies of this summary to distribute to community members that make a request, and efforts were made by all staff when working with the community members on other components of the programs to share that these were available.

The socioeconomic study as well as other social surveys, participatory mapping exercises, collective village agreements, and other forms of dialogue with community stakeholders allowed for the inclusion of their feedback into project decision making. Through adaptive management, stakeholder feedback has been used during project development and implementation during this monitoring period in order to influence the project, such as the transition to gas stoves based on community feedback.

2.3.2 Public Comment Period Publicity (G3.9)

In order to ensure that the communities were aware of the public comment period, the community information board was updated to notify communities of the public comment period and audit site visit, as well as to provide copies of monitoring results and report summaries in the local language.

At the beginning of the project, a community awareness program was carried out which disseminated information about climate change, carbon trade and the operational plan, including information about providing public comments and expressing grievances. Informational packages were also distributed containing this material. Likewise, posters, brochures and SOPs were dispersed among the local communities. Any key documents, such as monitoring reports, were made available to all communities.

Together with World Education, the project proponent conducted leadership training for the village heads (or village representative) on facilitating the management of community comment-grievance, as well as on the subject of climate change versus local livelihood. Comprehensive focus groups followed in each village to further explain the public comment period to all households.

The project proponent installed 30 "post-office" boxes in 9 villages so that comments could be submitted. During this monitoring period, the boxes remained and still served as a channel for community members to submit comments and grievances.

2.3.3 Distribution of Project Information (G3.9)

A summary of reports and monitoring results has been prepared and copied for distribution on the community information board in all of the villages within the Rimba Raya operational area as well as district and sub-district seats. Notices have been placed on the community information boards within all villages about the availability of any summary or important project documentation and announcements were included within local newspapers where Rimba Raya has a presence. Rimba Raya office locations have copies of this summary and all other key documentation to distribute to community members that make requests, and efforts were made by all staff when working with the community members on other components of the programs in order to share the information that these were available. All information was made available in the local language.

2.3.4 Conflicts and Grievances (G3.10)

A formal grievance/conflict resolution process had been previously instituted and publicized (see SOP - Handling Conflicts and Grievances .docx). During this monitoring period, the process has continued to be publicized and practiced as originally intended. It has all elements needed in the process to make sure it meets with standard conflict resolution protocols. However, some changes have been implemented that have handed additional responsibilities to local community members. For Example:

- Managed by a Third party – WEI has handed over the responsibility for receiving and mediating between the communities and Rimba Raya to local villagers that have been trained as community development staff. At the beginning of the project, WEI trained these villagers with funding from Rimba Raya on how to be productive facilitators within the village and how they should be addressed. The 1st training was completed 9 to 11 June, 2015 in Telaga Pulang and the second was completed 28 January to 1 February, 2016 in Kual Pembuang. Additional information on this training can be found in Capacity Building for comdev Staff 2016.docx.

- Formal Process – World Education has informed all villages on the process of contacting them to submit a grievance or resolve a conflict. Posters have been posted publically. This process was completed in 2010, but the procedure has continued to be publicized by community development staff at a more local level.

- Publicized - All communities and stakeholders were informed of the 3rd party mediation of WE by 2010. Posters have been installed in all communities. Stakeholders were informed in face to face meetings by Rimba Raya personnel. Since 2013, work has been completed to inform villagers on the transfer of responsibility to local community development staff.

During community consultations, the project proponent explained the conflict resolution process and provided clear verbal and written guidance on how grievances can be raised to the proponent. More

information can be found in SOP - Handling Conflicts and Grievances .docx. These issues are handled in the following manner:

1. Each community has been provided with a method and contact details for a third-party intermediary who represents the project proponent. Often times this was World Education.

2. When a grievance had been lodged, the third-party intermediary notified the project proponent and contacted stakeholders who lodged the grievance within one week after submission to discuss their concerns.

3. The stakeholder lodging the grievance met independently with a designated Indonesian representative of the third-party intermediary organization to identify concerns and discuss potential solutions. The intermediary documented the nature of the grievance, the actions being requested and the list of potential solutions that were discussed at the meeting with the stakeholder.

4. Where a significant grievance was lodged, the third-party intermediary then reported to the project proponent about the grievance being lodged.

5. The third-party intermediary and the project proponent met to decide on the appropriate course of action to address the issue.

6. The third-party intermediary then reported back to the stakeholder to present the solution.

7. This exchange of information continued until the dispute has been resolved.

8. The time frame should be no longer than 30 days.

9. Project proponents then prepared a report on the resolution process, which was made accessible to stakeholders.

In addition to this process, the Early Warning Early Responses (EWER) procedural community conflict resolution process was implemented by Rimba Raya during this monitoring period and works in the following way:

1. If field staff finds a potential problem, they are to notify the Unit Manager.

2. If field staff receives a complaint from a community member, they are to notify the Unit Manager.

3. The Unit Manager analyzes whether they can resolve it in the field themselves.

4. If the Unit Manager can handle the issue, they have the authority to resolve it, but still must report it to the General Manager.

5. If they can't handle the issue, the General Manager will respond to the issue.

6. If the General Manager needs additional support to resolve the issue, higher management is notified.

7. A legislative hearing will be completed if needed.

With the decentralization of responsibility from WEI staff to trained community members, villagers should be more likely to come forward with any complaints or grievances. Additionally, trained community development at a more local level will have a better understanding of these issues and be able to properly address them.

2.4 Management Capacity and Best Practices

2.4.1 Required Technical Skills and Expertise (G4.2)

The technical skills and expertise of the project proponent and project partners were maintained during this monitoring period so that project activities were implemented successfully.

Key technical skills were provided by ecoPartners LLC with regards to the monitoring and quantification of project GHG emissions reductions. EP Carbon is a forestry-based company that works with project developers, forest owners and verification bodies to build successful carbon offset projects. EP Carbon possesses expertise in the technical aspects of project design, planning and development including biometrics, accounting methodologies and remote sensing. EP Carbon has extensive experience validating and verifying projects under multiple carbon standards, including both VCS and CCB. During this monitoring period, EP Carbon has provided technical input with remote sensing, land use change analysis and project documentation as well as guidance support through verification.

Key technical skills that were carried out which pertain to project management include supervision of the physical assets of the Reserve, administration maintenance of logistics, budgets and human resources and finally, management of REDD policy and the certification of carbon credits. The project proponent, InfiniteEARTH and the project partner, OFI possess a wealth of experience in these categories. For example, Todd Lemons, the CEO of InfiniteEARTH Todd Lemons has 25 years of experience managing offshore natural resources projects with field operations experience in Chile, Bolivia, Brazil, Malaysia, and China. OFI, a principal partner organization, has 37 years of experience co-managing Tanjung Puting National Park, including the construction and permanent staffing of 19 guard posts throughout the park and inside the Project area. This expertise was necessary for the success of the most recent monitoring period as activity continued in Reserve management, administrative tasks and organization of a REDD carbon project.

Key technical community engagement skills implemented in the most recent monitoring period include communication, community organizing, conflict resolution, community mapping, community

development and monitoring. Project partners, OFI and World Education possess and maintain the above skills so that project implementation was successfully carried out during this monitoring period.

Since its founding in 1951, World Education has worked in over 60 countries in all regions of the world to provide training and technical assistance in many sectors. World Education supports the development of many types of indigenous non-governmental organizations (NGOs) and community-based organizations (CBOs) to achieve long-term results.

Although Orangutan Foundation International (OFI) is an organization dedicated to the conservation of wild orangutans and their rainforest habitat, OFI also supports education initiatives, creating awareness concerning orangutans and has had years of experience working with the staff at the nearby TNTP.

These organizations engage the communities surrounding the park in informational meetings, educational workshops, capacity building and skills development, as well as conservation work. In the process, they have disseminated information about the importance of protecting the park and generated goodwill in communities inside the Project zone, laying a sturdy foundation for continued stakeholder engagement during project implementation. Both of these organizations have been and continue to be intimately involved in project implementation.

Key technical skills to assess and monitor biodiversity within the project zone include forest cover and condition mapping, ecosystem mapping, botanical surveying, orangutan surveying, mammal surveying, bird surveys and camera trapping.

OFI has a deep store of technical expertise and experience in monitoring, assessing, and rehabilitating orangutans and other species of animals and plants important to the survival of orangutans. Project proponents have drawn upon this set of skills and expertise in implementing biodiversity-related project activities.

Until 2015, PT Pandu Maha Wana Asia Pacific Consulting Solutions was in charge of field staff management and operations, measuring and monitoring, community development and ecological restoration. When the contract with PT Pandu Maha Wana ended in 2015, the Rimba Raya staff assumed all direct responsibility for these operations.

The project proponent and its partners are qualified in their expertise and contribute the technical skills required to complete the above actions. In doing so, project implementation has been successfully maintained during this monitoring period.

2.4.2 Worker Training (G4.3)

Capacity building and worker training are critical elements in the operation of the Rimba Raya project's social service program. In order for these initiatives to succeed, members of the community need the skills necessary to effectively implement project activities. It has therefore been imperative for the social service provisions to not just create additional employment, but also provide training in

the skills required to maximize these opportunities. Training and capacity building efforts have been designed in collaboration with the communities to ensure that they address current community concerns and prioritize community needs.

Progress in worker training and capacity building that have been made during this monitoring period include:

Firefighting and prevention

- The two fire towers that are being constructed are manned 24 hours a day, 7 days a week. An additional fire tower is under construction as well, with the goal of completing construction by the end of 2020.

- 8 hydrant wells were installed throughout the project area, and an additional 6 are being planned. Patrols are routinely performed by firefighting staff, and firefighting staff have had refreshment trainings on fire suppression techniques and equipment in July 2019. Additionally, in February 2021, a fire strategy training was held.

Wildlife monitoring

- During the current monitoring period, wildlife monitoring was continued using field surveys and camera trapping as part of the biodiversity survey.

Agro-forestry, ecosystem restoration, and HCV training

- Two nurseries have been developed in previous monitoring periods; a permanent site in Ulak Batu and individual garden sites in Muara Dua where Rimba Raya purchases seedlings. The seedlings are planted by the villages in individual family plots, harvested by the community members with the commodities harvested to be used for subsistence, sold to Rimba Raya or other others. These nurseries have continued their operations and enhanced their capabilities. Multiple species have been used to provide wood for construction materials, fruit for consumption and sale, and sap producing trees such as rubber and jelutung for income production.

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Throughout the course of the project, Rimba Raya has targeted a wide range of people in the communities with capacity building efforts in regard to the various needs of the project. Members of the communities from all groups, including and especially women, are encouraged to apply for available positions.

Since most or all of the communities have members under the employment of Rimba Raya, skills and capacities have become part of the fabric of the communities regardless of turnover. As all new employees need to be trained, the skills gained in each community have not been lost. Likewise, as

demonstrated above, refresher courses have been provided routinely to reorient workers and/or update them on new methods.

Figure 5: Members of the Community Participating in Applied Training

2.4.3 Community Employment Opportunities (G4.4)

Job announcements for the local villages were distributed one month before the hiring of our permanent field crews began and a series of interviews were conducted in the villages where these crews were to be located. The project proponent advertised applicable employment opportunities by contacting village heads and by posting to announcement boards in village offices and mosques. Partner organizations OFI and WE also disseminated employment information.

The Rimba Raya Recruitment Policy ensured that members of project zone communities were given priority for all project-related positions. Priority was given to community members for positions which met with their skills. As training for most staff was budgeted, prior technical experience was not imperative for some positions. In many cases, specialized local knowledge and relationships were more important than technical knowledge. For each position, once a proper applicant base was acquired – including adequate representation from women and other minority groups – an interview process featuring verbal and written consultations with multiple IE staff commenced with the goal of selecting the best candidate for the position.

The Rimba Raya Recruitment Policy does not discriminate based on gender and ensures that an adequate number of women and members of other underrepresented groups have the opportunity to apply. During this monitoring period, the project continued to increase gender participation during the employment process since many of the women in the villages have greater long-term interest in how their communities develop and how opportunities for their family arise. Out of 99 direct employees of Rimba Raya in the project area, 27 are women.

In addition, significant progress was made during this monitoring period in terms of the project's micro-credit program. The micro-credit program provides additional budget, training and support for

economic and entrepreneurial pursuits. This is especially important for women and other marginalized groups who did not apply or did not get hired for project-related jobs. Using the micro-credit program during this monitoring period, women's working groups were established and finances were secured for shrimp paste and chicken meat production.

2.4.4 Relevant Laws and Regulations Related to Worker's Rights (G4.5)

The main body of Indonesian law governing the relations between workers and employers is UU No. 13/2003.

In addition, the following conventions of the International Labour Organisation have been ratified by Indonesia:

- C81 – Labour Inspection Convention, 1947
- C87 – Freedom of Association and Protection of the Right to Organise Convention, 1948
- C98 – Right to Organise and Collective Bargaining Convention, 1949
- C100 – Equal Remuneration Convention, 1951
- C102 – Social Security (Minimum Standards) Convention, 1952
- C105 – Abolition of Forced Labour Convention, 1957
- C111 – Discrimination (Employment and Occupation) Convention, 1958
- C138 – Minimum Age Convention, 1973
- C169 – Indigenous and Tribal Peoples Convention, 1989
- C182 – Worst Forms of Child Labour Convention, 1999

Project proponents have maintained their strong commitment to inform all stakeholders of their rights with respect to the project. The Rimba Raya project has exceeded all local labor requirements and ensured that all workers were apprised of their rights.

Rimba Raya has company regulations that are required by law for any Indonesia company, foreign or national that has more than 10 employees. These company regulations are de facto regulated "labour agreements" that have been developed through negotiation between management and employees and have been ultimately approved by the the Department of Manpower, which is the national regulatory department in charge of worker safety. They check to ensure they met all legal requirements.

During the fourth monitoring period, the national government passed two new laws relevant to worker's rights for the project.

1. Government Regulation No. 45 on 30 June, 2015, on the Arrangements for Guaranteed Pensions Program

This law requires employers to register their employees with the Social Security Employment Agency and to participate in the Pension Guarantee Program. This requires the employer and employee to invest 2% and 1% of the employee's montly wages, respectively, into the pension fund.

2. Government Regulation No. 46 on 30 June, 2015, on the Implementation of Old-Age Savings Program

This law requires employers to register their employees into a retirement fund for each employee. This requires the employer and employee to invest 3.7% and 2% of the employee's monthly wages into the retirement fund.

Both these laws have been followed for all employees in the Rimba Raya project since 7 September 2015.

Every employee has signed an employment agreement and has been provided a copy of the company regulations so they are aware of their rights, the policies of the company and can ask questions on any part they may have concerns with. Additionally, periodic reports have been provided to the Department of Manpower relating to employee relations, numbers of employees and locations in which any issues relating to labour laws can be identified and corrected. Salaries have been currently set at and will always exceed government mandated minimum wage for the areas that are being worked in.

2.4.5 Occupational Safety Assessment (G4.6)

Inherent risks arise for workers during project implementation and this monitoring period was no exception. While a majority of project activities do not entail extraordinary risk, there are some which include a degree of risk that is inherent to their nature.

The majority of worker related risks stem from the project activities of reserve patrol, fire response/brigade, and orangutan care. These risks may include violent confrontation with illegal loggers/poachers/palm oil personnel, a multitude of serious and non-serious injuries from patrolling/traveling within the reserve itself, fire burns, smoke inhalation, orangutan bites/marks/scratches and infection which may follow most of the above listed possibilities. Design and implementation of these project activities includes measures to minimize risks to worker safety.

During this monitoring period, risks were best minimized by informing workers about risk, properly training workers with best practices in order to minimize risks, and providing adequate equipment/tools. Verbally informing workers of these risks and how to minimize them is included as

part of worker training, orientation conversations and training refreshment courses. To date, these conservations have been of an informal nature with basic discussions of safety when new employees were hired, during occasional refreshment courses, and prior to field activities that require specific focus on safety issues.

Additionally, SOPs have been composed for occupational safety and health, proper use of personal protective equipment (PPE), as well as emergency situation responses (see Worker Health and Safety SOP v1.1). This SOP has been made available to project employees in the local language. PPE have been provided for current staff and will continue to be provided and emphasized from the standpoint of safety in the field. First aid and medical kits have been purchased to carry into the field when conducting field operations and larger ones have been purchased for each of the permanent field offices.

2.4.6 Financial Health of Implementing Organization(s) (G4.7)

InfiniteEARTH Ltd, the project proponent, has had revenues since 2013 when a large purchase was delivered to Allianz. Since that time, and in addition to that purchase, additional sales of several million credits have further secured and strengthened the financial positon of the project. Both Rimba Raya Reserve and InfiniteEARTH have funds available for project operations and manage their respective budgets in a fiscally conservative manner in order to enable the project to continue implementing its various initiatives without financial pressures. VCU sales information is publically available on the VCS website. Further proprietary documentation can be made available to the verification body.

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (G5.1)

In May of 2009 the government of Indonesia began formal regulation of REDD projects with the creation of a REDD project procedural document. This procedural regulation gives a legal allowance for voluntary carbon market project development. The project is following these REDD procedures in accordance with the following listed regulations:

1. Ministry of Forestry Regulation No. P.68/Menhut-I/2008 on the Implementation of Demonstration Activities on Reduction of Emissions from Deforestation and Degradation.

2. Ministry of Forestry Regulation No. P.30/Menhut-II/2009 on The Procedures for Reducing Emissions from Deforestation and Forest Degradation (REDD), dated 1 May, 2009.

3. Ministry of Forestry Regulation No. SK.159/Menhut-II/2004 on Ecosystem Restoration in Production Forest Areas.

4. Ministry of Forestry Regulation No. P.6/Menhut-II/2007 concerning work plan and annual work plan of utilization of timber forest products in natural forest and ecosystem restoration in natural forest within a production forest.

5. Ministry of Forestry Regulation No. P.61/Menhut-II/2008 concerning provisions and procedures for the application and granting of a business license for wood forest products in a forest ecosystem restoration of natural forests in a production forest.

As demonstrated with previous successful verifications, the project has been and continues to be in compliance with all national and local laws and regulations of Indonesia that are relevant to the project activities, including the two new laws discussed above. During this monitoring period, the project has continued in carrying out this same compliance.

Alongside the laws listed above, the National Registry System (SRN) is managed by the Ministry of Environment and Forestry (MoEF) through the Director General of Climate Change (DGCC). This platform reports climate change mitigation and adaptation activities in the national context. There are three main steps that project proponents developing mitigation and adaptation activities must follow: sregistration, validation, and verification. Up-to-date, Rimba Raya has completed the first stage by submitting a variety of information to the DGCC (register Number is 005-VII-2018-1070); however, there are additional technical documents to be submitted and validated in order to receive a validation number by the SRN Secretariat Team. Finally, verified activities are registered activities that have been examined to whether or not they have achieved the reported emission reductions and/or removal. The completeness of this phase provides a verification number.

2.5.2 Free, Prior and Informed Consent (G5.3)

The project has not encroached uninvited on private, community or government property. The project has not required people to relocate and has maintained the local communities' right to access the area for fishing, small scale removal of trees and collection of forest products. The project has pledged to never re-locate any people that could conceivably encroach on the project area lands, although this has been actively prevented from occurring through patrols and education.

Because no parties' lands have been affected by the project, restitution or compensation has not needed to be allocated. There have been no changes in project design and implementation during this monitoring period which merit the need for the free, prior and informed consent of those whose property rights would be affected.

One area of concern relating to the above arose in the previous monitoring period through the discovery of people from Kuala Pembuang that bought land (not legally) along the government road running through the southern part of the concession from the town to the port and established either temporary or permanent structures within the boundaries of the concession. Options for dealing with this issue were discussed with the local government and involved several possibilities including but not limited to; reimbursement by Rimba Raya for money paid for the land subject to a valid receipt,

relocation to another area by local government with an equal area of land, allowing "occupied" residents to remain and employing them as security and monitoring, and relocation of the road so that it is outside of the concession boundaries, thus less attractive from a development perspective. This issue was resolved through the signing of a new a boundary document by the MoEF, District, Sub-District, and Provincial governments. Additionally, a procedure was developed in which local communities may make individual claims to the District Land Agency by submitting all evidence they have demonstrating their ownership, and this agency is in charge of resolving the matter. However, no claims with regards to land ownership have been made at this time.

Based on consultations with community representatives, project proponents were able to determine that, with few exceptions, village and communal property lies to the east of the Seruyan River, inside the project zone but outside the project area. To the extent that community or individual villager property lies within the project area, project proponents have offered the option of integrating the property into the project's Community Agro-Forestry program or excising the land from the project area.

All project area land belongs to the Government of Indonesia, and the appropriate licenses and authorizations for management rights were put in place prior to commencement of major project activities and have been maintained during this monitoring period.

2.5.3 Property Rights Protection (G5.4)

Rimba Raya maintains the right of use for the project area. Rimba Raya's right of use to the project area is demonstrated in the 'working area map' presented below. The project has not required people to relocate and has preserved the local communities' right to access the project area for fishing, small scale removal of trees and collection of non-timber forest products. The project has pledged to never re-locate any people that could conceivably encroach on the project area lands.

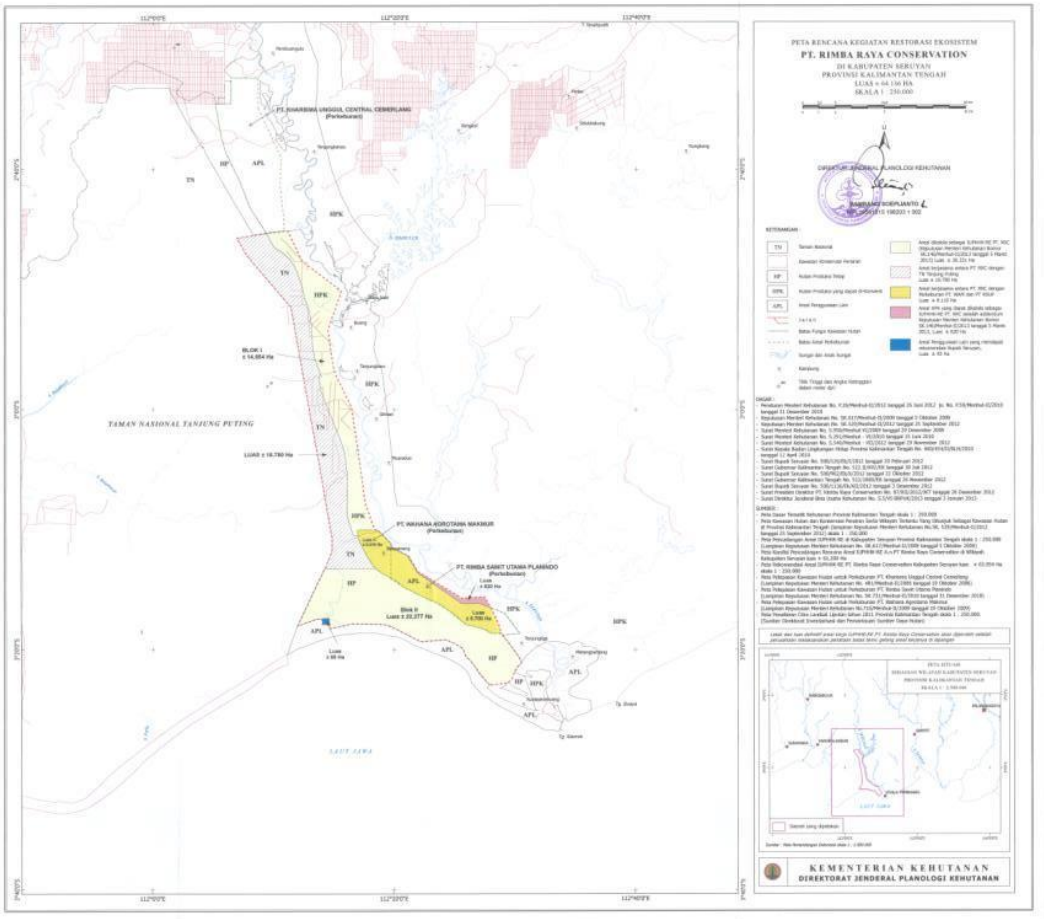

Figure 6: Original Agreements with PT Best for Conversion to Palm Oil

The agreement process with the relevant stakeholders is presented in Figure 3 above.

Customary Rights

During interviews, community members reported no traditional or customary land claims in the project zone. Unlike Dayak elsewhere in Kalimantan, the villages did not have to adapt (indigenous) rules governing the management of land. Instead, land rights are privately managed, even though ownership rights continue to be retained by the national government. Though community members do not have formal documentary evidence of management rights, they have been passed down through generations and are locally acknowledged, with different parties aware of common boundaries between adjacent properties. Community members therefore reported that they have never had local conflicts over the land tenure amongst themselves.

In the area there is another category of land status called Hutan Desa or Lahan Desa, which appears legally to belong to the Desa, or administrative township. If this is forested it is called Hutan Desa. If it is deforested it is called Lahan Desa. This land can be claimed and used by individuals for

agricultural purposes, but first they need to coordinate with the desa administration to do so. This entails requesting a Surat Keterangan Tanah (SKT), which, once received means the land rights become privately held.

2.5.4 Identification of Illegal Activity (G5.5)

The illegal activities that may be conducted from time to time in the project area and could affect the project's impacts include logging, deforestation and drainage by oil palm companies. In order to reduce these instances, the project proponent has implemented preventive measures and project activities aimed at identifying and mitigating the effects of illegal activities. The following subsections describe the activities and mitigation measures further.

Encroachment by Palm Oil Plantations

The principal illegal threat to the project's benefits has continued to be encroachment by the oil palm plantation inside the project zone, specifically to the north of the project area. The plantation has already expanded its operations beyond authorized boundaries, destroying valuable forest habitat. Moreover, the plantation's drainage canals threaten nearby peat deposits inside the project area.

Due to additionality requirements of REDD projects, the relationship between project developers and palm oil concessionaires was necessarily adversarial at project commencement. Upon project implementation, however, the relationship has become collaborative to avoid leakage. Project proponents have engaged the palm oil company with a series of steps designed to defuse threats. First, a guard post was built on the northern boundary, which serves as both a way to inhibit fire prevention and encroachment. Additionally, a pineapple plantation was built in this area between the project area and plantation, which serves as a fire break protection the forest. In exchange, project proponents have worked with plantation owners to identify and acquire viable non-peat land that has already been deforested for additional plantations.

Illegal Logging

There is a history of illegal logging inside the project area, and some indication that logging in the southern part of project area and extending into Tanjung Puting National Park has been ongoing. Social surveys of project zone communities indicate that this threat has not arisen from within the project zone, but rather from outside communities that have no legal or traditional stake in project area forests.

To mitigate this threat, project proponents have established a comprehensive network of guard towers and patrols to ensure the territorial integrity of the project area and prevent access by loggers.

Resource Use Surrounding Communities

Although minor in comparison to the threat posed by both legal and illegal palm oil plantations, the surrounding communities have placed some pressure on the physical integrity of the Rimba Raya

Reserve. Anecdotal evidence suggests that community members have engaged in limited hunting and fishing inside the project area and have occasionally logged trees for timber.

Since 2003, World Education has been working with farmers around TPNP to achieve food security and alleviate pressure on proximate forest land. In 2005, these efforts expanded into the Seruyan, beginning with the introduction of rice block management techniques to greatly reduce the impact of crop pests in four villages on the east side of TNTP. Five Seruyan villages (Tanjung Hanao, Ulak Batu, Palingkao, Buang, Muara Dua) have been participating in a program intended to yield rice self-sufficiency and diversify crops by introducing agroforestry. Where viable, WE has sought to introduce community gardens and aquaculture. One such project is the development of a pineapple plantation near the norther border of the project. This project provides co-benefits in the form of additional food security and a cash crop for community members, as well as acting as a buffer against encroachment from palm oil plantations near the area.

Under the auspices of the Rimba Raya project, this program will be expanded and extended to every village in the Project zone. Beyond that, project proponents have designed a slate of socio-economic programs designed to address poverty issues at the root of this threat. These programs, described in the Community Section, will create a social buffer and reduce this threat to project benefits.

With the exception of the oil palm encroachment, project partner, OFI has had a long and successful track record of monitoring the project area and deterring would be loggers and threats of fire such as hunters and shifting agriculture before they can do significant damage to the ecosystem, and dealing with the offenders using non-violent methods. The project field team has worked with the same techniques and in many situations along-side OFI to continue this approach so that these instances have been reduced and have been effectively managed when they occurred.

The Project does not and has not benefited from any illegal activity.

3 CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation

Data Unit / Parameter:	CF
Data unit:	Dimensionless
Description:	Carbon fraction of dry matter
Source of data:	IPCC default value = 0.50
Value applied:	0.50
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Used in multiple carbon calculations to convert biomass to carbon as detailed in VM0004.
Any comment:	NA

Data Unit / Parameter:	$A_{B,\,it,logged}$
Data unit:	Ha
Description:	Area of land logged under the baseline scenario for stratum i, in time t
Source of data:	Analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation
Value applied:	Rate 2,800 ha yr^{-1} (stratum i, time t)
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Used in Timber Extraction spreadsheet
Any comment:	The area logged was assumed to be the area cleared in all landcover types classified as forest. The expected annual rate of conversion was determined by analyzing historical rate of conversion by the baseline agent.

Data Unit / Parameter:	P
Data unit:	Dimensionless
Description:	Percent of harvest industrial roundwood going into long term wood products
Source of data:	Industry standard value: FAO 1995. FAO Yearbook: Forest products. FAO For. Serv. No. 28, FAO, Rome, 422 p.
Value applied:	0.25
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Used in Timber Extraction spreadsheet
Any comment:	In the project region, the proportion of harvested wood that goes into long-term wood products was obtained using FAO data for Indonesia cited in Winjum et al. (1998)

Data Unit / Parameter:	AP
Data unit:	m^2
Description:	Plot Area
Source of data:	Aerial plot measurement
Value applied:	10,000
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	parameter created but not used
Any comment:	Equation 38 not used as the allometric method was not selected as allowed by the methodology (p. 20); Equation 32 not used because different AIM Step calculations were made.

Data Unit / Parameter:	Φ
Data unit:	g cm^3
Description:	Volume-weighted average wood density
Source of data:	Literature Value: Reyes, Brown, Chapman and Lugo (1992) mean wood density for tropical Asia represented by 428 species, SE = 0.007
Value applied:	0.57 (SD = 0.145)
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Used in Biomass Burning Spreadsheet
Any comment:	Equation 68 used for leakage calculation; Equation 34 was not used (since BEF method not selected as allowed by the methodology (p. 20); Equation 8 was not used because different AIM Step calculations were made.

Data Unit / Parameter:	$PB_{BB,it}$
Data unit:	Dimensionless
Description:	Average proportion of $C_{B,AC,it}$ burnt under the baseline scenario in stratum i, time t
Source of data:	methodology (p. 16)
Value applied:	1
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Used in Biomass Burning -BL E51
Any comment:	As per the methodology p. 16 “because the land is being cleared for another land use in the baseline scenario, all of the biomass that is not extracted as timber is assumed to be burned and therefore in this methodology the proportion burned in the baseline $P_{BBB,it}$ is assumed to be equal to 1.”

Data Unit / Parameter:	CE
Data unit:	Dimensionless
Description:	Average biomass combustion efficiency
Source of data:	IPCC default =0.50
Value applied:	0.50
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Used in Biomass Burning spreadsheet
Any comment:	NA

Data Unit / Parameter:	$A_{cleared\ B,it}$
Data unit:	Ha
Description:	Average annual area of deforestation by the baseline agent of deforestation for the 5 years prior to project implementation
Source of data:	GPS coordinates and/or remote sensing data and or/legal parcel records
Value applied:	Rate 2,800 ha yr^{-1} (stratum i, time t)
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Quantification of baseline emissions
Any comment:	The expected annual rate of conversion was determined by analyzing historical rate of conversion by the baseline agent.

Data Unit / Parameter:	N/C ratio
Data unit:	Dimensionless
Description:	Nitrogen-carbon ratio
Source of data:	IPCC default = 0.01
Value applied:	0.01

Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	used in Biomass Burning spreadsheet
Any comment:	NA

Data Unit / Parameter:	ER_{N2O}
Data unit:	t CO_2-e (t C)$^{-1}$
Description:	Emission ratio for N_2O
Source of data:	IPCC default value =0.007
Value applied:	0.007
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	see Biomass Burning spreadsheet
Any comment:	NA

Data Unit / Parameter:	ER_{CH4}
Data unit:	t CO_2-e (t C)$^{-1}$
Description:	Emission ratio for CH_4
Source of data:	IPCC default value = 0.012
Value applied:	0.012
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	see Biomass Burning spreadsheet
Any comment:	NA

Data Unit / Parameter:	GWP_{N2O}
Data unit:	t CO_2-e (t N_2O)$^{-1}$
Description:	Global Warming Potential for N_2O
Source of data:	IPCC 4th Assessment Report

Value applied:	298
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	see Biomass Burning spreadsheet
Any comment:	Used in Equation 15. Equation 54 was not used – as palm oil plantations operate on a 25-30 year timeframe, emissions from harvest rotations were not considered in baseline estimation. This is conservative.

Data Unit / Parameter:	GWP_{CH4}
Data unit:	t CO2-e $(t\ CH_4)^{-1}$
Description:	Global Warming Potential for CH4
Source of data:	IPCC 4^{th} Assessment Report
Value applied:	25
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	see Biomass Burning spreadsheet
Any comment:	Used in Equation 16. Equation 55 is not calculated – as palm oil plantations operate on a 25-30 year timeframe, emissions from harvest rotations were not considered in baseline estimation. This is conservative.

Data Unit / Parameter:	DBH
Data unit:	cm
Description:	diameter at breast height of tree
Source of data:	Field Measurement.
Value applied:	See Carbon Survey Report data
Justification of choice of data or description of measurement methods and procedures applied	See Project Description

Purpose of the data:	Quantification of baseline emissions
Any comment:	Not used in Equation 24 and 25. DBH was used in allometric equation by Chave et al. (2005) to estimate aboveground biomass from survey plots to test/validate biomass estimation equations.

Data Unit / Parameter:	$A_{itplanted}$
Data unit:	Ha
Description:	area of biomass growth on future land use in the baseline scenario in stratum *i* at time *t*
Source of data:	Analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation
Value applied:	Rate 2,800 ha yr^{-1}
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Based on historical rate of plantation conversion by the baseline agent. See discussion Baseline Report. For values see oil palm regrowth worksheet. Annual area of planting cohorts A-F shown in columns E, I, M, Q, U, Y.
Any comment:	Strata based on concession boundaries. Time based on staggered concession development and planting north to south.

Data Unit / Parameter:	age_{peak}
Data unit:	Years
Description:	age of stand at peak production
Source of data:	Literature values: Data reported in Cannell M.G. R. 1982. World Forest Biomass and Primary Production Data. Academic Press. London. 391 pp.

Value applied:	14
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	See discussion Baseline Report Oil Palm Growth Model Data
Any comment:	NA

Data Unit / Parameter:	$D_{B,,drain,it}$
Data unit:	cm
Description:	average depth of peat drainage or average depth to water table under the baseline scenario in stratum i, time t
Source of data:	Methodology default value = 100 cm
Value applied:	100
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	See Peat Drainage spreadsheet
Any comment:	Note that peat depth across the project area is greater than the peat depth lost via subsidence and burning in the baseline scenario over the project life, therefore the net peat drainage depth of no more than 1 meter is used - Condition F of the methodology.

Data Unit / Parameter:	$A_{B,drain,it}$
Data unit:	Ha
Description:	area of drainage impact under the baseline scenario in stratum i, time t
Source of data:	Analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation
Value applied:	See Peat Drainage spreadsheet

Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Quantification of baseline emissions
Any comment:	Note peat drainage emissions are cumulative, expanding to cover the full extent of concessions, then continuing over the life of the project.

Data Unit / Parameter:	D_{peat}
Data unit:	Meters
Description:	average depth of peat in project area
Source of data:	Field Measurements
Value applied:	4.3
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	See Carbon Survey Report
Any comment:	NA

Data Unit / Parameter:	$D_{B,burn,it}$
Data unit:	cm
Description:	Depth of peat burned under the baseline scenario in stratum i at time t;
Source of data:	Combination of literature values, confirmed with field measurements.
Value applied:	The project will use the value of 0.18 m, 0.11 m, and 0.043 m for the first, second, and third fires respectively
Justification of choice of data or description of measurement methods and procedures applied	The methodology allows for the use of literature values that are confirmed by field measurements in the project accounting in section 19.2.2. Due to the nature of fires in peat, often times the burn depths decrease as an area experiences multiple burns. Two studies, Hooijer et al. 2014

	and Konecny et al. 2015 found decreasing burn depths correlated with the frequency of fire within the study area. The CAA has a history of fire that predates the project start date, which ultimately affects the burn depths that occur during fires within different parts of the CAA. The Hooijer and Konecny studies looked at fires within a study area over a period of 20 years. The project conservatively reviewed the frequency of fire within the CAA for a period of 14 years using MODIS burn area data in order to ensure that the burn depths were applicable across the same timeline. The project is applying literature values that have been confirmed to be conservative using field studies as required by the methodology. The project is also conservatively estimating historical burn data across the CAA using a shorter window of time than the literature cited, and only applying MODIS burn areas rather than a combination of MODIS burn area and burn hotspots that would show larger areas of historical fires within the CAA. This deviation does not affect the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.
Purpose of the data:	Quantification of baseline emissions
Any comment:	NA

Data Unit / Parameter:	$A_{B,burn,it}$
Data unit:	Ha
Description:	Area of peat burned under the baseline scenario in stratum i at time t;
Source of data:	Analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation
Value applied:	See Peat Burning spreadsheet
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Quantification of Baseline Scenario
Any comment:	NA

Data Unit / Parameter:	BD_i
Data unit:	g cm^{-3} = t m^{-3}
Description:	Bulk density of peat in stratum i (g cm3 = t m3)
Source of data:	Default value
Value applied:	0.1505
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Site specific values of peat bulk density are applied to all peat vegetation strata in the project area. Ex-post this value will be listed as the default value for all peat strata until (as required by the methodology) new data become available.
Any comment:	As this site specific value of peat bulk density if higher than the default value it is conservative to use it in the ex-post scenario.

Data Unit / Parameter:	EF_{CO2}
Data unit:	g CO_2 (t peat)$^{-1}$
Description:	CO_2 emissions from the combustion of peat
Source of data:	Literature value. Muraleedharan et al. (2000) cited in the methodology p. 38
Value applied:	185,000
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Peat Burning spreadsheet
Any comment:	NA

Data Unit / Parameter:	EF_{CH4}
Data unit:	g CH_4 (t peat)$^{-1}$
Description:	CH4 emissions from the combustion of peat
Source of data:	Literature value
Value applied:	5,785 g/ton peat
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Peat Burning – BL worksheet cell E6
Any comment:	NA

Data Unit / Parameter:	LDF
Data unit:	t C m^{-3}
Description:	Logging Damage Factor for calculating the biomass of dead wood created during logging operations per cubic meter extracted
Source of data:	Default value of 0.37 t C m^{-3} from 534 logging gaps measured by Winrock International in Bolivia, Belize, Mexico, the Republic of Congo, Brazil and Indonesia may be used for tropical broadleaf forests.
Value applied:	0.37
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Used in Equation 68 of VM0004
Any comment:	NA

Data Unit / Parameter:	PML_{FT}
Data unit:	%
Description:	Mean merchantable biomass as a proportion of total aboveground tree biomass for each forest type to which displacement of logging activities is likely to occur.
Source of data:	GIS data from landcover/forest maps published by Ministry of Forestry. All forest types in which commercial logging could take place within PT Best concessions were considered.
Value applied:	< 0.20
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Quantification of baseline emissions
Any comment:	There is minimal remaining forest in PT BEST concessions outside Rimba Raya, therefore a relative value of < 0.20 was sufficient for determining that PML_{FT} is > 0.15 less than PMP_i (methodology p. 41) and therefore the highest market leakage deduction factor is selected and applied. This results in the most conservative (largest) deduction from the baseline estimate for market leakage as a result of Rimba Raya's comparatively high timber volume being removed from PT BEST concession's timber potential.

Data Unit / Parameter:	$V_{B,it}$
Data unit:	m^3
Description:	Volume of timber projected to be extracted from within the project boundary during the baseline in stratum i at time t
Source of data:	Source of data same as biomass logged parameter.
Value applied:	Embedded in Equation 68, see biomass burning spreadsheet
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Note that this volume does not include logging slash left onsite. Extracted volumes reported are gross volumes removed.
Any comment:	NA

Data Unit / Parameter:	PMP_i
Data unit:	%
Description:	Merchantable biomass as a proportion of total aboveground tree biomass for stratum i within the project boundaries
Source of data:	unpublished data from Mawas, Winrock 2008
Value applied:	Mean 0.36, SD 0.169
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Same as B logged (Biomass Extracted as Merchantable Timber >30cm in Timber Extraction spreadsheet)
Any comment:	Mawas data provides complete dataset applicable to Rimba Raya project site. Average proportion of merchantable timber across 93 logging gaps

Data Unit / Parameter:	$HistHa_i$
Data unit:	Ha
Description:	Average annual area of deforestation by the baseline agent of the planned deforestation in stratum i for the 5-10 years prior to project implementation
Source of data:	Analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation
Value applied:	6113.7
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	See discussion Baseline Report
Any comment:	N/A

Data Unit / Parameter:	$A_{defLK,it}$
Data unit:	Ha
Description:	The total area of deforestation by the baseline agent of the planned deforestation in stratum i at time t
Source of data:	Analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation
Value applied:	Not calculated as of year 1 (no leakage)
Justification of choice of data or description of measurement methods and procedures applied	See Project Description
Purpose of the data:	Legal records will include government permits to deforest including concession licenses.
Any comment:	Ex-ante, project proponents shall determine and justify the likelihood of leakage based on characteristics of the baseline agent. To be calculated if activity shifting leakage is detected. See Monitoring plan discussion.

3.1.2 Data and Parameters Monitored

Data Unit / Parameter:	$N_{gapsP,\ it}$
Data unit:	Dimensionless
Description:	Number of logging gaps detected in stratum i, time t in the project area
Source of data:	Remote sensing and field data
Description of measurement methods and procedures to be applied:	Patrols frequently visit known forest access points to discourage and eliminate logging. When logging events are found, each stump is counted and the diameter of the stump measured to compare with the default 'logging gap' estimate of biomass loss. If number of logging gaps are unable to be estimated in the field, the procedures described in PD deviation 4 shall be applied.

Frequency of monitoring/recording:	Revisit annually.
Value monitored:	The number of gaps (i.e. individual trees removed) in each monitoring period
Monitoring equipment:	LandSAT images GPS Diameter tapes
QA/QC procedures to be applied:	See SOP Rimba Raya Bilingual 2017-Field Ops_v1.2
Calculation method:	Methodology Equation
Any comment:	N/A

Data Unit / Parameter:	$D_{bottom,tr,ik}$
Data unit:	Cm
Description:	Diameter at the stump end of log extracted from timber tree tr in stratum i, gap k
Source of data:	Field visit
Description of measurement methods and procedures to be applied:	See Section 3.2.2
Frequency of monitoring/recording:	NA
Value monitored:	See "Logging gap data Mawas calculation sheet 23jun08-1.xls"
Monitoring equipment:	LandSAT images GPS Diameter tapes
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	$D_{top,tr,ik}$
Data unit:	Cm
Description:	Diameter at the crown end of log extracted from timber tree tr in stratum i, gap k
Source of data:	Field visit
Description of measurement methods and procedures to be applied:	See Section 3.2.2
Frequency of monitoring/recording:	NA
Value monitored:	See "Logging gap data Mawas calculation sheet 23jun08-1.xls"
Monitoring equipment:	LandSAT images GPS

	Diameter tapes
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	ϕ_i
Data unit:	t m^{-3}
Description:	Wood density of extracted log in stratum *i*
Source of data:	Literature Value: Reyes, Brown, Chapman and Lugo (1992) mean wood density for tropical Asia represented by 428 species, SE = 0.007
Description of measurement methods and procedures to be applied:	NA
Frequency of monitoring/recording:	NA
Value monitored:	0.57 (SD = 0.145)
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Calculation method:	NA
Any comment:	NA

Data Unit / Parameter:	$D_{s,tr,ik}$
Data unit:	Cm
Description:	Diameter of the stump of the logged timber tree tr in stratum i, gap k
Source of data:	Field visit

Description of measurement methods and procedures to be applied:	See Section 3.2.2
Frequency of monitoring/recording:	NA
Value monitored:	See "Logging gap data Mawas calculation sheet 23jun08-1.xls"
Monitoring equipment:	LandSAT images GPS Diameter tapes
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	$H_{tr,ik}$
Data unit:	M
Description:	Height of tree tr in stratum i, gap k
Source of data:	Field visit
Description of measurement methods and procedures to be applied:	See Section 3.2.2
Frequency of monitoring/recording:	NA
Value monitored:	See "Logging gap data Mawas calculation sheet 23jun08-1.xls"
Monitoring equipment:	LandSAT images GPS Diameter tapes
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land

	Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	$D_{pce\text{-}b,tr,ik}$
Data unit:	Cm
Description:	Diameter of bottom end of piece left from timber tree tr in stratum i, gap k
Source of data:	Field Visit
Description of measurement methods and procedures to be applied:	See Section 3.2.2
Frequency of monitoring/recording:	NA
Value monitored:	See "Logging gap data Mawas calculation sheet 23jun08-1.xls"
Monitoring equipment:	LandSAT images GPS Diameter tapes
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	$L_{pce,tr,ik}$
Data unit:	M
Description:	Length of piece left from timber tree tr in stratum i, gap k
Source of data:	Field Visit
Description of measurement methods and procedures to be applied:	See Section 3.2.2
Frequency of monitoring/recording:	NA
Value monitored:	See "Logging gap data Mawas calculation sheet 23jun08-1.xls"
Monitoring equipment:	LandSAT images GPS Diameter tapes
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	$D_{pce-t,tr,ik}$
Data unit:	Cm
Description:	Diameter of top end of piece pce left from timber tree tr in stratum i, gap k: cm
Source of data:	Field Visit
Description of measurement methods and procedures to be applied:	See Section 3.2.2
Frequency of monitoring/recording:	NA
Value monitored:	See "Logging gap data Mawas calculation sheet 23jun08-1.xls"
Monitoring equipment:	LandSAT images GPS

	Diameter tapes
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	$D_{logging\ drain,it}$
Data unit:	Cm
Description:	Average depth of peat drainage or average depth to water table in drained area of stratum i, time t during the dry season
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	See SOP Rimba Raya Bilingual 2017-Field Ops_v1.2
Frequency of monitoring/recording:	See SOP Rimba Raya Bilingual 2017-Field Ops_v1.2
Value monitored:	NA
Monitoring equipment:	GPS Peat drill
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	Methodology equation
Any comment:	NA

Data Unit / Parameter:	$A_{logging\ peatimpact,it}$
Data unit:	Ha
Description:	Area of drainage impact in stratum i, time t
Source of data:	Peat expert consultation
Description of measurement methods and	See Section 3.2.2

procedures to be applied:	
Frequency of monitoring/recording:	See SOP Rimba Raya Bilingual 2017-Field Ops_v1.2
Value monitored:	See Description
Monitoring equipment:	NA
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire and Logging Gaps
Calculation method:	After consulting with peat expert apply buffer in GIS software
Any comment:	NA

Data Unit / Parameter:	$MC_{burnedP,AG,it}$
Data unit:	t C ha^{-1}
Description:	Estimated aboveground carbon stock after burning under the project case for stratum i, time t
Source of data:	Conservatively assume complete loss of aboveground biomass and no regrowth.
Description of measurement methods and procedures to be applied:	Annual remote sensing of burnt areas used to estimate aboveground biomass loss. Done in conjunction with annual landcover change analysis and monitoring of MODIS hotspots.
Frequency of monitoring/recording:	NA
Value monitored:	NA (not measured)
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Calculation method:	Area burnt in each strata multiplied by the biomass estimate for that strata
Any comment:	NA

Data Unit / Parameter:	N/C ratio
Data unit:	Dimensionless
Description:	Nitrogen-carbon ratio
Source of data:	IPCC default=0.01
Description of measurement methods and procedures to be applied:	NA
Frequency of monitoring/recording:	NA
Value monitored:	0.01
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Calculation method:	NA
Any comment:	NA

Data Unit / Parameter:	$A_{p,burn,it}$
Data unit:	Ha
Description:	Area burned in stratum i, time t in the project area
Source of data:	Field measurements or using high resolution digital aerial imagery
Description of measurement methods and procedures to be applied:	GIS analysis of satellite imagery and ground-truth data
Frequency of monitoring/recording:	Once during 2010- 2013. Annual from 2013.
Value monitored:	Array
Monitoring equipment:	Satellite imagery
QA/QC procedures to be applied:	LULC accuracy assessment
Calculation method:	See Section 3.2.2
Any comment:	High resolution images were not able to be accessed for effected areas due to cloud cover in this monitoring period. Therefore ground trothing of medium resolution LandSAT was undertaken.

Data Unit / Parameter:	$D_{P,burn,it}$
Data unit:	Cm
Description:	Depth of peat burned under the project scenario in stratum i at time t:
Source of data:	Methodology default value
Description of measurement methods and procedures to be applied:	The upper range of the methodology default value was applied (i.e. 55cm). This was validated with limited field measurements and further supported by relevant peer reviewed research in the same region as the Project area.
Frequency of monitoring/recording:	NA
Value monitored:	55cm
Monitoring equipment:	NA
QA/QC procedures to be applied:	NA
Calculation method:	Methodology literature value applied and validated in the field.
Any comment:	NA

Data Unit / Parameter:	$A_{P,\ LCC,\ it}$
Data unit:	Ha
Description:	Area that underwent land cover change in stratum i, monitoring year t:

Source of data:	High resolution digital aerial imagery or field measurements
Description of measurement methods and procedures to be applied:	GIS and satellite image analysis
Frequency of monitoring/recording:	Twice between 2010 and 2013. Annual from 2013 onwards.
Value monitored:	Array
Monitoring equipment:	Satellite imagery
QA/QC procedures to be applied:	Orthorectifed images must be used
Calculation method:	See Section 3.2.2
Any comment:	NA

Data Unit / Parameter:	$A^{LCCn}_{peatimpact,it}$
Data unit:	Ha
Description:	Area of drainage impact due to land cover change in stratum i, monitoring year t
Source of data:	Medium/high resolution imagery combined with field measurements as appropriate.
Description of measurement methods and procedures to be applied:	Calculated in GIS using the geoprocessing buffer function
Frequency of monitoring/recording:	Each monitoring period
Value monitored:	Array
Monitoring equipment:	Satellite imagery
QA/QC procedures to be applied:	LULC accuracy assessment
Calculation method:	The method involves mapping the extent of the drainage and buffering by anticipated area of impact based on available science/expert opinion at the time. The area under the buffer that occurs inside the CAA is considered the area of drainage impact.
Any comment:	NA

Data Unit / Parameter:	$D_{LCC\ drain,it}$
Data unit:	Cm
Description:	Average depth of peat drainage or average depth to water table in the deforested area under the project scenario in stratum i, time t
Source of data:	Field measurements or estimated from literature values if measurements not available.
Description of measurement methods and procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Frequency of monitoring/recording:	At impact
Value monitored:	Even though the description state the average should be used, the maximum drainage depth recorded of 60cm was applied.
Monitoring equipment:	Tape Measure and Measuring pole
QA/QC procedures to be applied:	Refer to Standard Operating Procedure - Monitoring for Fire, Logging Gaps and Land Cover Change
Calculation method:	See section 3.2.2
Any comment:	NA

3.1.3 Monitoring Plan

A monitoring plan was developed to collect relevant climate data. Combining early warning, ground truthing and remote sensing, the monitoring plan tracks key indicators to report on the integrity of the Reserve's carbon stocks which allows the project proponents to adapt the Reserve's management plan to changing conditions.

3.1.3.1 Purpose

The purpose of the Rimba Raya Biodiversity Reserve Project monitoring plan is to confirm that the estimates of ex-ante GHG removals presented in the VCS Project Document are being met, and to identify and account for any unplanned reductions in project carbon stocks, increase in project emissions or possible leakage outside the project boundary. Additionally, monitoring the project

implementation activities enables the project proponent to objectively identify gaps and deficiencies and use this information to improve both monitoring and management of the project.

3.1.3.2 Monitoring Organizational Structure, Responsibilities, Competencies

The monitoring plan has been implemented by the project proponent, InfiniteEARTH, and Rimba Raya staff in conjunction with Orangutan Foundation International (OFI), and EP Carbon.

InfiniteEARTH is a company dedicated to the development of economically viable solutions to climate change and environmental degradation by addressing the underlying drivers of deforestation, especially poverty. The company's projects are internally mandated to go "Beyond Carbon and Beyond Sustainability". The company was founded and is staffed by a group of seasoned professionals from broad multi-disciplinary backgrounds including: International Project Development, Sustainable Forestry, Conservation, Tropical Forest Ecology, Remote Sensing, GIS, Carbon Science, Finance and Marketing. During this monitoring period, InfiniteEARTH has contributed to the project's climate monitoring program through forest protection and monitoring, carbon monitoring, project management and carbon sales. Day to day climate monitoring activities are performed by Rimba Raya field staff operating out of the company's Sampit office and with support from the Jakarta office.

OFI and ecoPartners have also contributed to the monitoring of the project's climate related activities. OFI is a nonprofit organization dedicated to the conservation of wild orangutans and their rainforest habitat in Indonesia and Malaysia. Led by conservation pioneer and the world's foremost authority on the orangutan Dr. Biruté Mary Galdikas, OFI has had a strong presence in the region since 1986 and contributes to the project's climate monitoring program by providing forest protection and ground surveying.

EP Carbon is a forestry-based company that works with project developers, forest owners and verification bodies to build successful carbon offset projects. EP Carbon possesses expertise in the technical aspects of project design, planning and development including biometrics, accounting methodologies and remote sensing. EP Carbon has extensive experience validating and verifying projects under multiple carbon standards, including both VCS and CCB. During this monitoring period, EP Carbon has provided technical input with remote sensing, land use change analysis and project documentation as well as guidance support through verification.

InfiniteEARTH and its partners aptly possess the expertise, skills and experience that were needed to successfully carry out climate monitoring during this monitoring period.

3.1.3.3 Methods for generating, recording, storing, aggregating, collating and reporting data on monitored parameters

A key feature of the Rimba Raya climate monitoring plan is to employ spatial data and tools to systematically monitor land cover change in the project area and project buffer zone. This is combined with ground-based surveys to investigate and record information on any activities that

affect project carbon stocks and peat emissions (e.g. fire, logging). Such an approach has improved the efficiency and effectiveness of directed field visits, which has been essential for reliably monitoring the Rimba Raya project boundary in extensive and inaccessible peat swamplands.

This type of approach to field monitoring has been employed by the project partner Orangutan Foundation International since 2004 within the project area. Rimba Raya monitoring builds on the existing field reconnaissance, forest survey and GIS team training, protocols and monitoring systems that have been in place for many years. During this monitoring period, the monitoring practices followed in this structure.

The climate monitoring approach has effectively been divided into two components: 1. Proactive Patrols and 2. Reactive targeted ground surveys.

3.1.3.3.1 Proactive Patrols

Climate monitoring data has been generated throughout the monitoring period from ground patrols carried out by the Rimba Raya staff based at the Sampit office and in the three field units. During these patrols, staff have recorded any findings with GPS tagged photos and descriptions in reports that are generated on return to the office. All information is stored at all offices and copies are provided to the Executive Board during regular progress reporting meetings.

3.1.3.3.2 Reactive targeted ground surveys

Following the annual assessment of land cover analysis from remote sensing data, areas may be identified for targeted ground surveys (i.e. burnt areas, or suspected leakage activities). GPS points of the areas to visit are provided by ecoPartners to the Rimba Raya field staff. The field crew then applies the relevant standard operating procedure to collect data and report back on the field findings back to Technical Unit. The data/photos and reports are stored in the Sampit office. During this monitoring period this process led to direct monitoring of the drainage canals discussed in further detail in Section 3.2.2.1

The aggregation of climate-related data into the monitoring report is carried out by EP Carbon. The schedule for collecting data on the various monitoring components can be seen in the next section.

3.1.3.4 Monitoring Components

Monitoring activities consisted of remote sensing and GIS analysis, routine field patrols and directed field sampling in areas prioritized by systematic site assessments. The monitoring system took a hierarchical approach starting with medium resolution Landsat (30m) satellite imagery, then high resolution (3m) Planet Scope satellite imagery from Planet Labs, and finally with ground patrols. There are eight major components of monitoring: three that are focused on project conditions and forest protection (Table 6) and five that are focused on landcover change as required for carbon accounting (Table 7).

Monitoring has targeted land cover change and activities potentially affecting carbon stocks and GHG emissions in defined strata of the project boundary, project management zone (including 3km buffer) and leakage areas. Estimation, modeling, measurement and calculation approaches followed requirements of the methodology.

Routine monitoring patrols at guard posts, major waterways and project access points are monitored as part of forest protection activities throughout the project management zone. Patrol activities were compiled in quarterly reports.

Land cover change monitoring used readily available satellite imagery such as Landsat and was monitored semi-annually to ensure complete temporal and spatial coverage of the project management zone. In addition, high spatial resolution imagery for the CAA is used to record forest conditions and identify forest gaps. Detected changes were recorded by interpreting high resolution imagery which was then followed by survey patrols. These patrols were deployed as needed depending on the frequency and scale of deforestation and were used to record any new logging, canal building or other deforestation activity as described in the methodology.

Fire monitoring was conducted over a range of frequencies depending on the season and fire condition and relied on the Fire Information for Resource Management System (FIRMS) delivery of MODIS satellite maps of hotspot and fire locations. After the rainy season began, usually December, fire map data was monitored monthly. As the dry season approached, usually July, fire map data was monitored weekly. And at the height of fire season, usually August-October, fire data was monitored daily. Satellite monitoring was implemented as part of the comprehensive fire plan and was used to direct and deploy firefighting and survey teams on an as-needed basis. Fire monitoring and response activities were reported annually at the end of fire season surveys.

The project boundary and stratification were monitored for any changes to land cover that reduce project carbon stocks or increase GHG emissions. Since the project boundary is not a functionally discrete hydrological unit, a 3km buffer zone surrounding the project boundary was monitored for new drainage activities that could potentially impact peat emissions inside the project boundary.

Stratification of the project area (through land cover classification) was monitored periodically as new data became available to refine the boundary delineation and/or classification of strata. Additionally,

as suggested in the methodology, two different strata may become similar enough in terms of carbon to justify their merging. The ex post stratification monitoring (annual land cover mapping) was conducted to verify the applicability of the ex-ante stratification, and variables that influence the strata. Annual land cover map updates are also used to facilitate cost-effective, consistent and accurate monitoring of project carbon stock changes during the crediting period.

Baseline net GHG emissions did not need to be monitored in this methodology (see page 5 of the methodology). The methodology prescribes validity of the baseline identified ex ante at the start of the project activity for the crediting period, thereby avoiding the need (and associated costs) for monitoring of the baseline over the crediting period. However, technical progress and an increase in data availability may occur, allowing for altered baseline estimates (see page 69 of the methodology). While baseline monitoring is not planned for this project, if new data become available that would affect baseline calculations (e.g. refinement to stratification, site-specific peat bulk density value, etc.), adjusted baseline net GHG emissions will be presented at annual verification.

Leakage was assumed to occur as a result of economic activity displacement (e.g. shifting pattern of oil palm conversion) and it was this displaced activity that was monitored and accounted for in order to adjust net GHG emissions avoided by the project. Market leakage represented a one-time deduction to baseline emissions. Displacement leakage was monitored each crediting period. Monitoring included existing or new concessions operated by PT Best (the agent of baseline deforestation) as well as any unpermitted land conversion by PT Best. Leakage monitoring was conducted in accordance with the methodology for the first 5 years following the project start date and is no longer actively monitored. Residual leakage drainage emissions continue to be deducted from emissions reductions estimates.

Monitoring Component	Activity and Years	Times and periods	Detection frequency	Remote sensing data source	Field survey frequency	Reporting frequency
Boundary	Mark in field	Year-end	Non-specific	n/a PlanetScope 3m satellite imagery	1 field survey annually (South Unit – 2019) Patrols Replacing the broken or lost boundary signs	Annually
Forest Protection	Routine patrols and as-needed intervention (expanding coverage and intensity of intervention Yr-1 to Yr-3 in conjunction with community and stakeholder involvement)	Year-round	Quarterly	Landsat 30m satellite imagery annually.	1 patrol quarterly and as-needed (South Unit – 2019) Routine patrols Intensive patrols during fire seasons	Quarterly

Table 6. Monitoring Components: Project Conditions and Forest Protection

Monitoring Component	Activity and Years	Times and periods	Detection frequency	Remote sensing data source	Field survey frequency	Reporting frequency
Land change	Detection and area calculation of land change caused by agents other than logging or fire (e.g. mechanical clearing)	Year-round	Semi-annually	Landsat 30m for detection PlanetScope 3m satellite imagery	2-3 field surveys annually Routine patrols Intensive patrols during fire seasons	Annually
Logging	Detection and area calculation of deforestation caused by logging Detection and survey of transport canal-building associated with logging	Year-round with increased activity during wet season	Semi-annually	Landsat 30m for detection combined with field work PlanetScope 3m satellite imagery	2-3 field surveys annually Routine patrols Intensive patrols during fire seasons	Annually
Fire	Detection of fire ignitions, calculation of burn areas (deforestation associated with fire)	Year-round with increased activity during dry season	Monthly, weekly, daily	MODIS imagery (1 km thermal band detects fires as small as 100m2 and imagery is collected and posted daily) Landsat 30m for detection combined with field work PlanetScope 3m satellite imagery	2-3 field surveys completed annually by forest patrol. Frequency is expected to increase . Routine patrols Intensive patrols during fire season	Annually
Leakage	New permit activity	Year-round	Quarterly	n/a	n/a	Annually
	Spatial analysis of new palm oil in areas of possible leakage	End of year	Annually, for first 5 years of project	Landsat 30m for palm oil boundary interpretation and delineation	none	Annually

Table 7. Monitoring Components: Land Change Assessment for Carbon Accounting

3.1.3.5 The implementation of sampling approaches

Monitoring was carried out by RRC and OFI professional field and GIS teams under the direction of the project coordinator. Monitoring systems have been in place for the project management area since 2005 and have been and will continue to be improved by the project team. Permanently

constructed guard posts were staffed 24-hours with two full-time staff that carry out routine observations, nearby patrols and daily reporting via radio to the OFI office. The office operations manager recorded daily reports into a permanent log book. The GIS team led by a GIS manager collected remotely sensed imagery and conducted monitoring analyses in the office. These analyses were provided to the field manager who used this information to plan and schedule field surveys. The field manager prepared transportation and logistics and handled field budgets. Field team leaders directed staff in the field for conducting surveys, recording data and delivering data back to the GIS team who conducted data entry.

Fire monitoring was similarly implemented with a specialized fire team manager and trained fire team. Field reports were written by field team leaders and provided to the project coordinator, as were GIS data and maps. The project coordinator used this information to compile quarterly and annual reports and conduct or supervise the carbon accounting that had to be reassessed every year prior to verification.

The QA/QC plan was implemented to verify the accuracy and consistency of field measurements, ensure the integrity of data collection, analysis, management and archival during the crediting period. The QA/QC plan was improved and detailed in Years 2 and 3 as project monitoring systems were refined. The project coordinator was responsible for training staff on QA/QC plan updates.

The project coordinator also ensured the QA/QC plan was followed and was responsible for updating protocols and procedures. Data quality was key to conducting successful monitoring and was accomplished by implementing a series of protocols and standard operating procedures, conducting annual training for field staff, implementing a QA/QC plan and assigning senior personnel to supervise key phases in data handling. Field survey protocols for forest protection activities and the QA/QC plan were employed by project staff and updated annually as needed. These can be made available for verification. Further details pertaining to QA/QC are included in Section 6 of this report.

The non-permanence risk analysis was conducted by the project developer at the time of verification and is made available for verification.

The project proponent is committed to storing all project data in a secure and retrievable manner for at least two years after the end of the project crediting period. Project data is stored and regularly maintained on redundant external hard drives at onsite (Pangkalan Bun, Central Kalimantan) and offsite (Jakarta) locations and secured with backup software using standard protocols.

Project data were managed by the Rimba Raya Conservation (RRC) project coordinator in conjunction with the GIS manager to ensure security, accessibility and long-term storage. In order to facilitate project management and long-term accounting, all primary data outputs supporting annual verification including the spatial database, were stored and maintained for each 10-year crediting period. More information about data storage is included in Section 6 of this report.

3.1.4 Dissemination of Monitoring Plan and Results (CL3.2)

Field monitoring occurs within each field unit on a minimum of an annual basis, and in some locations where there is concern for, or a history of encroachment, it can be as frequently as weekly or daily. Monitoring trip reports are kept at the field unit level for each trip and compiled by field unit manager as a summary to be provided to the Sampit office on a monthly basis. Project data are stored and regularly maintained on redundant external hard drives at onsite (Sampit, Central Kalimantan) and offsite (Jakarta) locations and secured with backup software using standard protocols. Any changes in these locations are listed in annual verification reports.

In accordance with VCS, the project proponent is committed to storing all project data in a secure and retrievable manner for at least two years after the end of the project crediting period. In order to facilitate project management and long-term accounting, all primary data outputs supporting annual verification including the spatial database, will be stored and maintained for each 10-year crediting period. Project data are managed by the Rimba Raya Conservation (RRC) project coordinator in conjunction with the GIS manager to ensure security, accessibility and long-term storage. More information about data storage is included in Section 6 of this report.

The reports are available by anyone upon request and actively disseminated to all stakeholders on an annual basis prior to any upcoming audit. Summaries of the report are provided to stakeholders at community meetings that are held prior to verification events.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

In 1996, the Tanjung Puting National Park border was set and comprised 396,000ha. Each province and district in Indonesia is required to conduct ten-year spatial plans and the 2003 plan for Central Kalimantan indicated a different, smaller border. This revision to the border of the Park was agreed to by the Minister of Forestry in 2005. In the buffer area east of the park in what is now the Rimba Raya concession two timber concessions selectively logged the area during the 1980s and 1990s, PT Bina Samaktha in the northeast portion and PT Mulung Basidi in the southeast. The companies stopped operations in 1998 and 2000, respectively. Since then some of the easily accessed forest has been illegally selectively logged by nearby community members.

In 2004, five oil palm estates were formally proposed to the Bupati and the Governor that partially occupy the ex-timber concessions adjacent to the Park. By 2007, all five of these proposed estates had received the initial stage of oil palm permits from the Seruyan Bupati with the northernmost estate also being granted the estate license (HGU – Indonesian acronym). Following HGU designation, the northernmost estate was rapidly converted to oil palm plantation. This concession, managed by PT Kharisma Unngul Centratama became operational in 2007.

In November of 2008 the government issued a map decreeing the remaining four concessions in the name of Rimba Raya Conservation. The boundaries of these four concessions were used to

delineate the CAA. As a Planned Deforestation project, the baseline scenario is that without the project the entire CAA would have been cleared and converted to oil palm plantation using common practices. These common practices include draining the area and burning it before the planting of oil palm. In the baseline scenario, one of the four planned concessions was cleared annually until all four were fully operational. Thus, the baseline scenario for this project involves the entire CAA being cleared in the first four years of the project (Emissions from Timber) and burned during the first six years (Emissions from biomass and peat burning). After oil palm plantations are established it has been demonstrated that emissions from peat soil continue indefinitely in areas that had been drained. As the current monitoring period includes years 11 and 12 of the project, all baseline emissions against which emissions reductions are calculated are from peat drainage, after the growth of oil palm biomass is accounted for. The baseline emissions were calculated ex-ante and are presented in Table 8 below.

Yr of Project	Em. from timber (t CO_2-e)	Em. from biomass burning (t CO_2-e)	Growth of oil palm (t CO_2-e)	Em. from peat burning (t CO_2-e)	Em. from peat drainage (t CO_2-e)	Total CO_2-e baseline emissions (t CO_2-e)	Market Leakage Deduction (t CO_2-e)	Total emissions after Market Leakage deduction (t CO_2-e)	Total cumulative CO_2-e emissions (t CO_2-e)
1	558,684	557,304	0.00	764,128	582,096	2,462,212	0	2,462,212	2,462,212
2	942,209	932,655	0.00	1,269,325	1,708,385	4,852,575	(1,198,394)	3,654,181	6,116,393
3	691,873	932,655	(65,314)	1,269,325	2,785,138	5,613,677	(2,021,067)	3,592,611	9,709,003
4	62,147	749,749	(161,729)	1,018,935	3,939,956	5,609,057	(1,484,087)	4,124,970	13,833,973
5	0	517,836	(301,696)	700,845	4,578,892	5,495,876	(133,306)	5,362,569	19,196,543
6	0	225,690	(467,616)	396,528	4,915,015	5,069,617	0	5,069,617	24,266,160
7	0	0	(635,119)	0	4,915,015	4,279,896	0	4,279,896	28,546,056
8	0	0	(776,046)	0	4,915,015	4,138,969	0	4,036,912	32,582,968
9	0	0	(888,679)	0	4,915,015	4,026,336	0	4,128,393	36,711,361
10	0	0	(934,685)	0	4,915,015	3,980,330	0	3,980,330	40,691,691
11	0	0	(928,570)	0	4,915,015	3,986,445	0	3,986,445	44,678,136
12	0	0	(886,764)	0	4,915,015	4,028,251	0	4,028,251	48,706,387

Table 8: Calculations for Baseline Emissions in the Ex-Ante Scenario

3.2.2 Project Emissions

Project Emissions from three sources (selective logging- degradation, fire and deforestation) are calculated in accordance Equations 89 and 90 of VM0004.[1]

$$C_{PRJ} = \sum_{t=1}^{t*} \sum_{i=1}^{mPS} C_{P,it} \qquad \text{VM0004 – 89}$$

$$C_{P'it} = E_{P'it}^{logging} + E_{P'it}^{fire} + E_{P'it}^{LCC} \qquad \text{VM0004 – 90}$$

where;

C_{PRJ} Sum of emissions that occur within the project boundary as a result of emissions that were unanticipated and/or unable to be avoided by project activities; tCO_2-e

$C_{P'it}$ Sum of emissions that occur within the project boundary in stratum *i* at time *t* as a result of emissions that were unanticipated and /or unable to be avoided by project activities; tCO_2-e

$E_{P'it}^{logging}$ GHG emissions due to logging in stratum *i*, time *t*; tCO_2-e

$E_{P'it}^{fire}$ GHG emissions due to fire in stratum *i*, time *t*; tCO_2-e

$E_{P'it}^{LCC}$ GHG emissions due to land use/land cover change in stratum *i*, time *t*; tCO_2-e

i 1,2,3,…..m_{PS} strata

t 1,2,3,…t* years

Total project emissions are calculated within an accounting model developed for the Rimba Raya project and which has been shared with auditors. Project emissions are found on the "Summary Monitoring Emissions" worksheet. Peat drainage emissions are calculated using EFs calculated based on a full year (365 days) of drainage. Since the prior monitoring period ended on 30 June 2019 and the current monitoring period ended on 30 June 2021, the monitoring period extends for over 2 years. In order to account for this, accounting for year 11 of the project has been extended to 366 days in order to ensure project emissions are conservatively calculated. Thus, where drainage emissions are reported on an annual basis below, for year 11 of the project (the first year of this monitoring period) they were multiplied by a factor of 366/365 within the actual accounting model. Any total project emissions reported below for project year 11 take this into account.

1 See page 71 of VM0004.

3.2.2.1 Estimation of GHG emissions due to selective logging ($E_{P,it}^{logging}$)

The GHG emissions attributable to logging within the project boundary over the monitoring period are estimated is accordance with Equation 91 of VM0004.

$$E_{P,it}^{logging} = \left(N_{P,it}^{gaps} \times EF_{logging,i}\right) + E_{drainage,it}^{logging} \qquad \text{VM0004 – 91}$$

where;

$E_{P,it}^{logging}$	GHG emissions due to logging in stratum *i*, time *t*; tCO_2-e
$N_{P,it}^{gaps}$	number of logging gaps detected in stratum *i*, *time t*, in the project area; dimensionless
$EF_{logging,i}$	average logging emission factor for stratum *i*,; tCO_2-e (logging gap)$^{-1}$
$E_{drainage,it}^{logging}$	CO_2 emissions from peat drainage in stratum *i*, time *t*; tCO_2-e

This calculation is performed on the worksheet Timber Extraction of the accounting model. In accordance with the methodology the Logging Gap Emissions Factor was estimated at the beginning of the project and is described in the validated Monitoring Plan. Therefore only the activities involved with monitoring existing canals and identifying new areas of illegal logging in the CAA are covered in this section.

Survey and calculation methods comprised five steps:

Step 1: Detect all logging gaps

In accordance with the methodology the logging gaps identified in the baseline were revisited in 2019 to survey the state and extent of ongoing logging in these areas.

Step 2. Conduct surveys of timber extracted at logging sites

During field survey it was found no new logging canals had been built and the existing canals had not been extended. No trees have been extracted from pre-existing log sites. As part of monitoring, new logging gaps are identified using aerial imagery. Refer to supporting reports which can be made available on request. Field surveys identified 3 new logging gaps during this monitoring period (see " 20210621_Rekap Patroli 2019-2020_2021").

Step 3. Estimate an average logging emissions factor for each stratum

There were 3 logging gaps identified within the Project area in the monitoring period. **The emissions associated with the logging gaps totaled 16 tCO_2-e.**

This calculation is performed in the Timber Extraction worksheet of the accounting model.

Step 4. Calculate CO_2 emissions from peat drainage

No new logging canals were identified in the Project area. The emissions from peat drainage were based on the tracklogs of travelling the extent of the canals in 2014[2] combined with the applied buffer of 500m to determine the area of impact from the peat drainage. This approach is very conservative as the field visits to the existing logging canals indicated that these canals are no longer in use as evidenced by the vegetation overgrowth.

Stratum	Soil Classification	Canal 1 Area (ha)	Canal 2 Area (ha)	Canal 3 Area (ha)	Total Area (ha)	Annual Drainage Emissions ($tCO_2e\ yr^{-1}$)
Data gap	non-peat	0	0	0	0	0
Coastal forest	non-peat	0	0	0	0	0
Grass	non-peat	0	0	0	0	0
Low, sparse veg.	non-peat	0	29	0	29	0
Peat swamp forest	peat	318	44	121	483	30,927
Riparian forest	non-peat	0	0	0	0	0
Shrubland	peat	11	264	100	374	18,766
Water	non-peat	0	21	20	40	0
Wetlands	non-peat	49	47	109	205	0
Total		**378**	**404**	**350**	**1,132**	49,693

Table 9: Pre-existing logging canals area of impact and annual drainage emissions

The total area of peat soil impacted by these pre-existing logging canals is **857 hectares.**

The following equations were subsequently applied:

$$E^{logging}_{drainage,it} = A^{logging}_{dd,itpeatimpact,it} \times ME^{logging}_{dd,it} \quad \text{VM0004 – 107}$$

and:

$$ME^{logging}_{dd,it} = f\left(D^{logging}_{drain,it}\right) \quad \text{VM0004 – 108}$$

where;

$E^{logging}_{drainage,it}$	CO_2 emissions from peat in stratum i at time t; t CO_2-e
$A^{logging}_{peatimpact,it}$	area of drainage impact in stratum i, time t; ha
$ME^{logging}_{dd,it}$	mean CO_2 emissions from drained peat in stratum i, time *t*; t CO_2-e ha^{-1}
$D^{logging}_{drain,it}$	average depth of peat drainage or average depth of water table in drained area of stratum i, time t during the dry season, cm

Ex-post calculations relied on the linear drainage function presented in the VCS PD, using the methodology default value of .91 t CO2 ha-1 y-1 cm (depth)-1

[2] Refer to methodology page 78 Step 7 which states that the canals should be regularly monitored to account for changes in total length and potential expansion.

$F(^{DLCC})^{=}.91*D_{drain.it}$

p. 78 of methodology

Prior monitoring of these canals found they had an average drainage depth of 55 cm, resulting in an EF of 50.1 tCO2e ha-1 y-1. The total annual emissions from logging canals in the project area were subsequently estimated to be 49,693.5tCO2e yr-1. Over the two year monitoring period this totals 99,387t CO2e.

Emissions from the three logging canals were monitored and accounted for in all previous monitoring periods. However, monitoring activities have identified two additional canals that may be having an impact on the hydrology of the CAA. The first is a road that runs from the community of Ulak Batu to the community of Baung, intersecting the buffer zone and CAA in the northeastern sector of the project (Figure 7). Since a drainage canal was constructed parallel to the road, a monitoring SOP was developed in order to directly monitor the impacts of this canal on peat drainage emissions within the CAA. The SOP and results of this monitoring have been provided to auditors in the Peat Drainage Impact Report. The general procedure was to measure drainage depth every 100m along the extent of the canal near the project and buffer area, along with identifying the soil type as peat or mineral soil. It was conservatively assumed that if a monitored point was identified as peat the entire area between the two closest measured points were entirely peat as well. These peat areas were then buffered by 500m along the length of the canal and the area of peat impact of this new buffer within the CAA was calculated (Table 10).

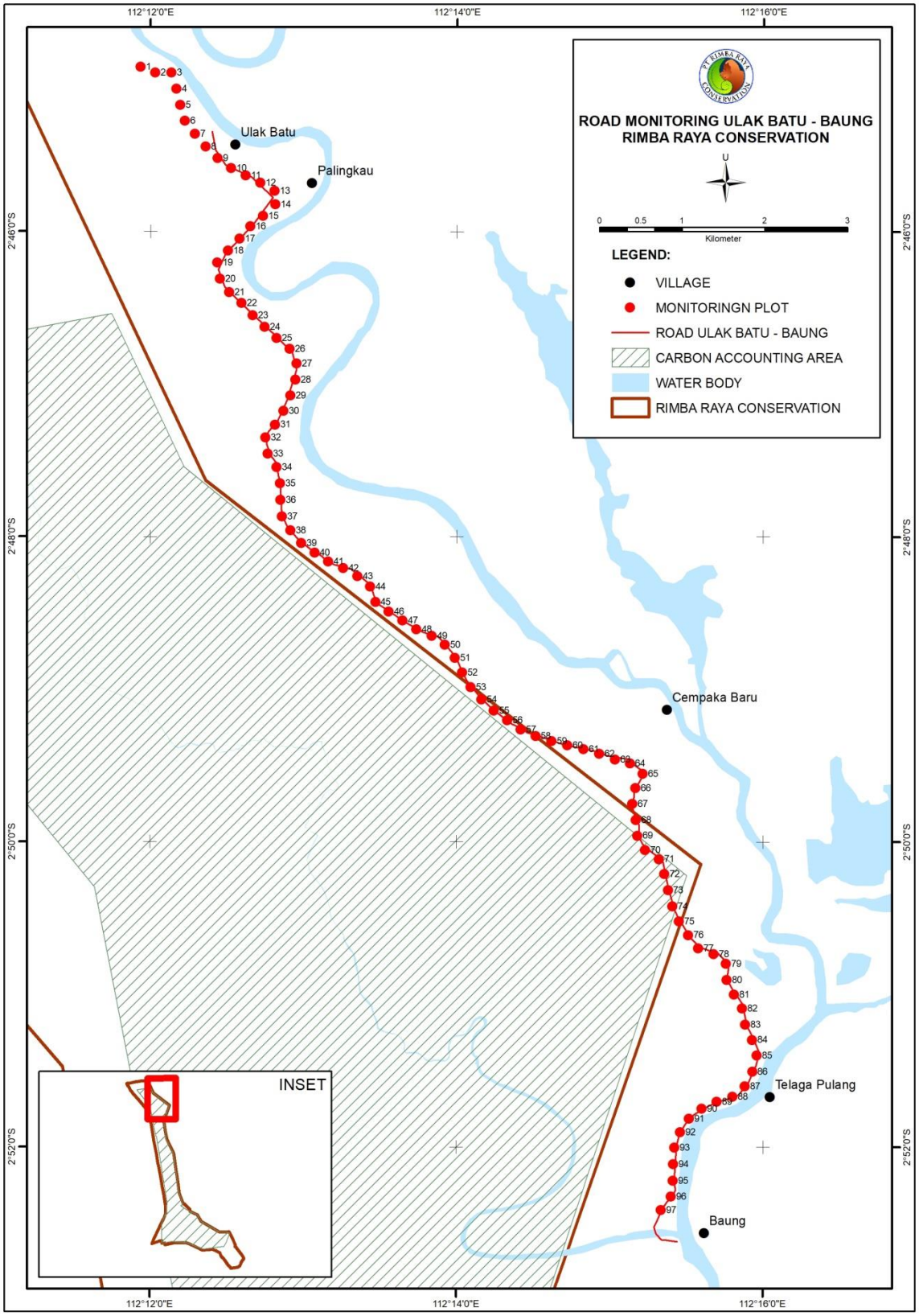

Figure 7: Location of Ulak Batu-Baung Road and monitoring plots relative to Rimba Raya project

The second canal was created by local communities in the Kudung region near the southern border of the Rimba Raya project (figure 8). Rimba Raya surveyed community members after

learning of the canals construction and the stated they had not realized the Kudung Canal had been located within the project area. They have committed to filling the canal with assistance from Rimba Raya staff in order to eliminate future drainage emissions. However, until that has been completed and it is demonstrated that this canal is no longer having an impact on the hydrology within the CAA, the project is committed to conservative accounting for this canal. A similar monitoring procedure to the one described above was completed on this canal in order to monitor drainage depth and the area of impact of this canal on peatlands within the CAA. As this canal enters directly into the CAA, a higher density of monitoring plots was located within the project area than outside it.

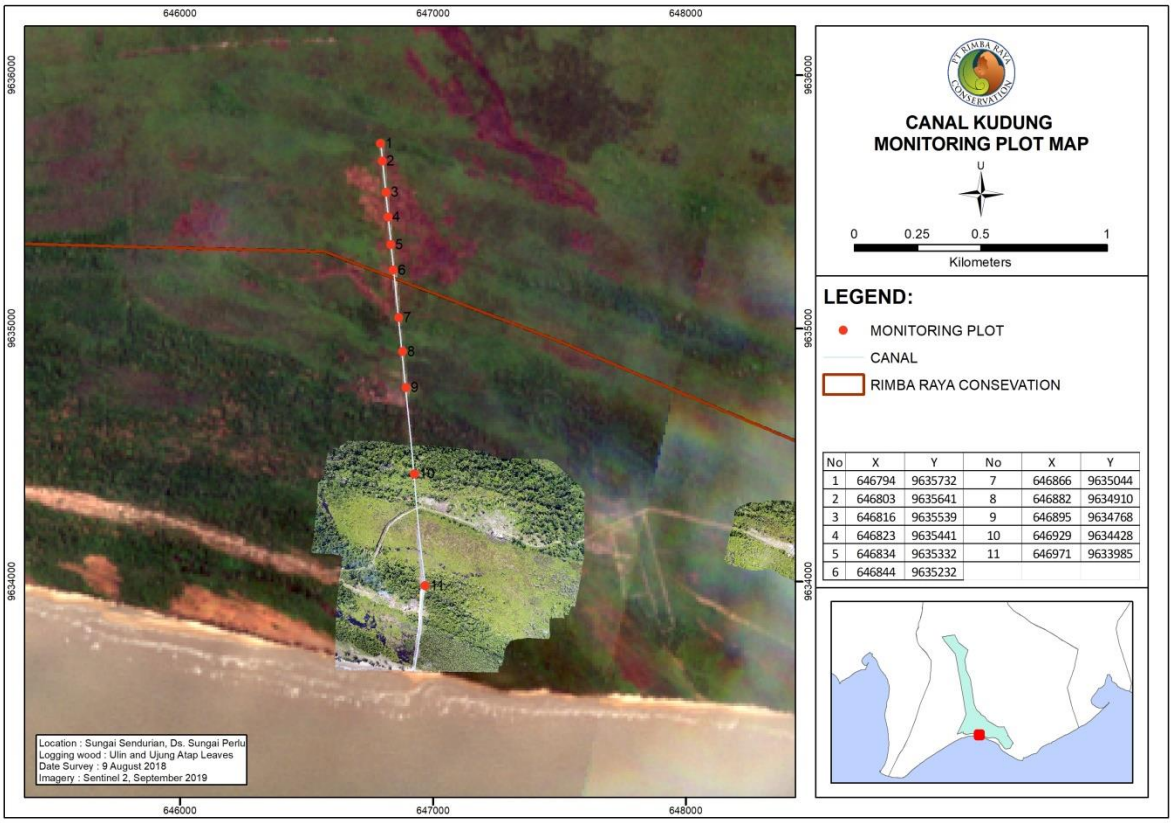

Figure 8: Location of Kudung Canal and monitoring plots relative to Rimba Raya project

Although these canals were not constructed for logging purposes, the same procedures and equations were applied to them in order to account for emissions since they are the most appropriate available in the VM0004 methodology. A separate EF was estimated for each new canal by inputting the average drainage depth of each canal into equation 108 of the VM0004 methodology. The canal along the northern road had an average drainage depth of 19 cm, resulting in an EF of 17.28 tCO2e ha-1 yr-1. The southern canal had an average drainage depth of 54 cm and an EF of 49.05 tCO2e ha-1 yr-1. Results of this analysis can be found in Table 10.

Stratum	Soil Classification	Northern Road Canal	Southern Road Canal

		Area of Impact (ha)	Annual Drainage Emissions ($tCO_2e\ yr^{-1}$)	Area of Impact (ha)	Annual Drainage Emissions ($tCO_2e\ yr^{-1}$)
Data gap	non-peat	0	0	0	0
Coastal forest	non-peat	0	0	0	0
Grass	non-peat	0	0	0	0
Low, sparse veg.	non-peat	0	0	0	0
Peat swamp forest	**peat**	132.3	2,286	90.7	4,449
Riparian forest	non-peat	0	0	0	0
Shrubland	**peat**	0	0	0	0
Water	non-peat	0	0	0	0
Wetlands	non-peat	0	0	0	0
Total		**132.3**	**10,001**	**90.7**	**6,281**

Table 10: Newly monitored canals area of impact and annual drainage emissions

All relevant calculations are performed in the Drainage Emissions worksheet of the accounting model.

Step 5. Calculate GHG emissions attributable to logging

The total emissions attributable to logging and canal drainage in the Project area were determined to be 99,403 t CO2e for this monitoring period.

3.2.2.2 GHG Emissions due to fire (E_{it}^{fire})

All fires that occur within the project boundary must be reported over the life of the project and the associated GHG emissions from both biomass burnt and peat burnt resulting from these fires must be accounted for. However, there have been no fires observed within the Rimba Raya CAA during this monitoring period. This includes on the ground patrols completed monthly by Rimba Raya staff as well as remote sensing imagery. Monthly reports produced by a Fire Control Manager working as a part of Rimba Raya staff did not mention any evidence of fires. Remote sensing data such as MODIS hotspot data and Sentinel-2 and PlanetScope imagery were also used to identify any potential fires. While some of the imagery used does show evidence of fires within the CAA, most of this imagery had acquisition dates outside of the monitoring period end date. These fires were identified and delineated following the procedures developed in previous monitoring periods but additional imagery was utilized to produce a likely burn date for each identified burn. Every burn area was identified as being burned following the end of the monitoring period. The project remains committed to accounting for these burn areas at the next verification.

The project obsereved 12 burns within the CAA during this monitoring period, and thus project emissions from both biomass and peat burning during this monitoring period are 122,153 tCO_2e.

3.2.2.3 GHG Emissions due to land clearing ($E_{P,it}^{LCC}$)

LandSAT and PlanetScoper imagery were used to detect deforestation not due to fire or logging within the CAA. This is the forest area that transitioned during this monitoring period but didn't

overlap with logging gaps or the burn area.

The GHG emissions attributable to deforestation are estimated according to Equation 121.

$$E_{P,it}^{LLC} = \sum_{t=1}^{t*} \sum_{i=1}^{Mps} \left(A_{P,LCC,it} \times EF_{P,LCC,AG,it}\right) + \left(A_{peatimpact,it}^{LCC} \times EF_{peatdrainage,it}\right)$$ VM0004 - 121

where;

$E_{P,it}^{LLC}$	GHG emissions due to land cover change in the project area; tCO_2-e
$A_{P,LCC,it}$	GHG emissions due to land cover change in the project area; t CO_2-e
$A_{peatimpact,it}^{LLC}$	area of drainage impact due to land cover change in stratum *i*, monitoring year *t*; ha
$EF_{P,LCC,AG,it}$	average deforestation emission factor for stratum *i*, monitoring year *t*; t CO_2-e ha^{-1}
$EF_{Peat\ drainage,it}$	average peat drainage emission factor for stratum *i*, monitoring year *t*; t CO_2-e ha^{-1}

Within the CAA and a 3km buffer zone surrounding the project area, deforestation was spatially delineated using Sentinel-2 and PlanetScope imagery to produce an LULC classification. The VM0004 Methodology requires this classification achieve an overall accuracy of 80% or more, which was analysed using an accuracy assessment.

In accordance with the methodology it was conservatively assumed that the area affected by land cover change (not related to fire or logging) was equal to 100% of the converted area (AP,LLC,it). Additionally, it is conservatively estimated that all aboveground biomass is emitted from forsest strata, following the procedure provided by equation 122 of the methodology, which is used to calculate $EF_{P\ LCC\ AG\ it}$.

An updated LULC classification was conducted this monitoring period and the results are presented below.

Classification	Cover Type	2019 (Ha)	2021 (Ha)	Difference	Total 2021 (Ha)
Forest	Coastal Forest	96.7	8.9	(87.8)	15,186.9
	Peat Swamp Forest	15,091.1	15,178.0	86.9	
Non-forest	Grass	521.1	520.4	(0.7)	32,271.4
	Low, sparse vegetation	5,132.9	5,227.0	94.1	
	Shrubland	24,867.1	25,040.5	173.4	
	Water	60.0	136.3	76.3	
	Wetlands	1,468.2	1,347.2	(121)	
	Cloud Gap	0	0	0	

Table 11: Cover type hectares in the carbon accouting area.

The results of the deforestation analysis can be found in table 12 below. Deforestation activities resulted in 392.1 ha of conversion during this monitoring period, 90.6 ha of which is classified as deforestation.This deforestation activity is predominately driven by the local coastal communities

in the southern project area, a finding that is consistent with results from prior monitoring periods.

Stratum	Area Transitioned (ha)	$EF_{P,LCC,AG,it}$ ($tCO_2e\ ha^{-1}$)	Monitoring Period Deforestation Emissions (tCO_2e)	Legacy Peat Drainage Emissions (tCO_2e)	Total Deforestation Emissions (tCO_2e)
Data gap	0.0	0.0	0.0	0.0	0.0
Coastal forest	64.4	157.7	10,157.0	0.0	10,157.0
Grass	57.9	0.0	0.0	0.0	0.0
Low, sparse veg.	0.0	0.0	0.0	0.0	0.0
Peat swamp forest	26.2	377.7	9,886.7	8,561.5	18,448.2
Riparian forest	0.0	377.7	0.0	0.0	0.0
Shrubland	0.0	0.0	0.0	1,235.4	1,235.4
Water	19.5	0.0	0.0	0.0	0.0
Wetlands	224.1	0.0	0.0	0.0	0.0
Total	**392.1**	**913.0**	**20,043.7**	**9,796.9**	**29,840.6**

Table 12: Monitored area deforested during monitoring period and related deforestation emissions

Deforestation activities did not result in any peat drainage since there was no conversion to plantation and the associated peat drainage activities did not occur. Therefore emissions from the deforestation activities in peat swamp forest only impacted aboveground biomass. Some legacy drainage emissions were identified in previous monitoring periods due to the encroachment of oil palm into the northern buffer zone and these legacy emissions within the CAA continue to be included in accounting.

3.2.2.4 Treatment of Uncertainty Ex-Post

Total uncertainty is calculated using equation 130 of VM0004, which combines baseline emissions and uncertainty with project monitoring period emissions and uncertainty to calculate overall uncertainty for the monitoring period. Total uncertainty per equation 130 is estimated at 10.5%, and since this exceeds the 10% threshold a deduction is being applied to emissions reductions during this monitoring period. Emissions reductions have been adjusted using this uncertainty percentage using equation 131 of the methodology.

Uncertainty for the ex-post, with-project scenario was estimated for the current reporting period as the weighted geometric average of $U_{P,SS,i}$ across all strata *i,* where $U_{P,SS,i}$ is the percentage uncertainty expressed as a margin of error at the 90% confidence level relative to emissions for stratum *i* at time *t* as defined in equations 127 and 128 of VM0004.

Assumptions of uncertainty were made for several monitoring variables:

The uncertainty of $N\_(P,i)^{gaps}$ = 0, as the number of logging gaps is known and uncertainty of $A_{peatimpact,ilogging}$ = 0 as the area of logging impact was directly measured in the field and not from imagery. The variable *CE* is an IPCC default value, and is a constant with no associated

uncertainty. The uncertainty for both market effects leakage and activity displacement leakage was found to be zero. No emissions from market effects leakage were accounted for during this monitoring period, therefore the uncertainty for this estimate is 0. Additionally, the area of activity displacement leakage was zero for this monitoring period, as the methodology does not require the monitoring of activity displacement leakage after the first 5 years of the project lifetime. Likewise, for market effects leakage, the variable $C_{B,XBT,it}$, which is the carbon emissions due to displaced timber harvests in the baseline scenario in stratum i, time t, is zero for this monitoring period.

As illustrated in the conceptual diagram of monitoring equations, Figure 4 in Section 19.3 of VM0004, and Figure 3 in Section 10.2.2, equations 91, 109, 121, and 66 are the equations that comprise the calculation of leakage and project emissions. These equations give us the final emissions estimates for $E_{P,SS,it}$, as defined by equation 127 (shown below). We quantify $U_{P,SS,i}$ for all variables specified in Figure 4 of the VM0004 methodology, and multiply that uncertainty against the associated emissions source, $E_{P,SS,it}$, that is associated with each variable. Hence the combined uncertainty is calculated as

$$Uncertainty_{P,it} = \frac{\sqrt{\left(U_{P,SS1,i} * E_{P,SS1,it}\right)^2 + \left(U_{P,SS2,i} * E_{P,SS2,it}\right)^2 \ldots + \ldots \left(U_{P,SSn,i} * E_{P,SSn,it}\right)^2}}{E_{P,SS1,it} + E_{P,SS2,it} \ldots + \ldots E_{P,SSn,it}}$$

where $U_{P,SS1,i}$ is the uncertainty for each variable specified in the VM0004 methodology with associated uncertainty in the project boundary and associated with emissions due to logging, fire and land clearing (deforestation), market effects leakage and activity displacement leakage.

$Uncertainty_{P,it}$ has been calculated to be 2.0% for this monitoring period, but as monitoring period emissions in the baseline scenario greatly exceed those estimated in the project scenario, the application of equation 130 results in a total uncertainty of 10.5% for this monitoring period.

3.2.3 Leakage

Expansion of PT BEST concessions were not monitored during this monitoring period, as the methodology requires only 5 years of leakage monitoring from the project start date. This is consistent with what the methodology, which states, “Leakage monitoring is conducted for five years beyond the date at which deforestation was projected to occur in the baseline“. As the project start date is 1 July 2009, this 5 year period extended through the end of June 2014, outside the bounds of this monitoring period. Although activity shifting leakage is no longer actively monitored, residual peat drainage emissions from areas of expansion by PT BEST continue to be included in accounting. The only leakage emissions accounted for are due to peat drainage in leakage areas that had already been classified as deforested in previous monitoring periods. The results of the prior monitoring of PT BEST concessions can be found in figure 9 below.

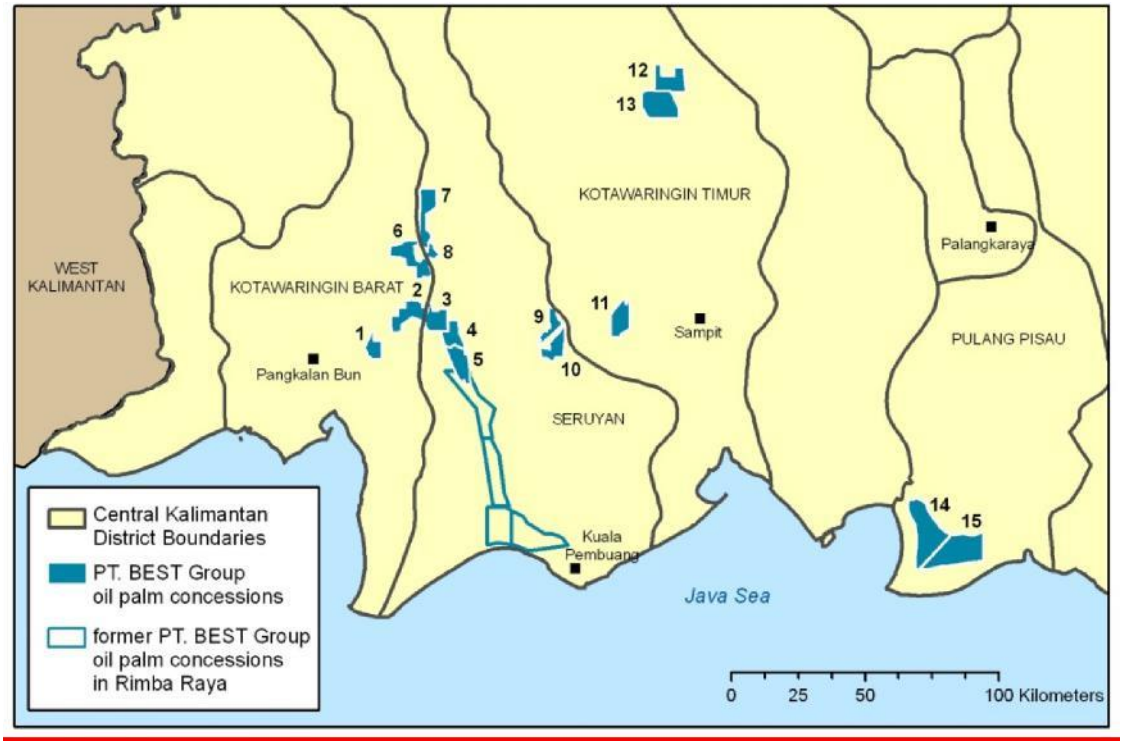

Figure 9: Map of PT BEST Oil Palm Concessions

Continued emissions from peat drainage were calculated using equation 82 below:

$$\Delta C_{it\_continued} = ME_{B,dd,it} \quad \text{(VM004 – 82)}$$

Where:

$\Delta C_{it\_continued}$ = average greenhouse gas emissions resulting from continued peat drainage or soil emissions in stratum i; t CO_2-e ha^{-1}.

$ME_{B,dd,it}$ = mean CO_2 emissions from drained peat in stratum i, time t; t CO_2 ha^{-1}

$ME_{B,dd,it}$ was calculated by multiplying average emissions within oil palm plantations for each cm of drainage depth by the measured drainage depth within these plantations. The validated value for average emissions of 1.3 tCO_2 ha^{-1} y^{-1} multiplied by the measured drainage depth results in an EF of 73.2 tCO_2 ha^{-1} yr^{-1}. Since conversion of peat swamp forest to plantation was found to occur on a total of 1,279 ha in the 5 year period of monitoring leakage, annual leakage was calculated as shown below:

73.15 t CO_2 ha^{-1} y^{-1} * 1,279 ha = 93,537 t CO_2e y^{-1}

Legacy activity shifting leakage emissions are 187,330 tCO_2e for this monitoring period.

3.2.4 Net GHG Emission Reductions and Removals

The calculation of project emissions over the monitoring period is performed within the accounting model provided to the audit team. Baseline, project and leakage emissions are summarized for this monitoring period by vintage year in Table 13 below. All emissions are initially calculated based on project year and are distributed between vintage year based on the proportion of days in the calendar year relative to the total number of days in the project year.

Vintage Year	Baseline Emissions (tCO_2e)	Project Emissions from Logging (tCO_2e)	Project Emissions from Fire (tCO_2e)	Project Emissions from Deforestation (tCO2e)	Total Project Emissions (tCO_2e)	Emissions from Activity-Shifting Leakage (tCO2e)
2019	2,004,115	25,017	30,747	7,511	63,275	47,153
2020	3,991,936	49,770	61,160	14,941	125,870	93,793
2021	1,976,840	24,617	30,246	7,389	62,251	46,384
Total	**7,972,891**	**99,403**	122,153	**29,841**	251,396	**187,330**

Table 13: Summary of project and leakage emissions during this monitoring period for each vintage year

3.2.4.1 Logging ($E_{P,it}^{logging}$)

Emissions related to illegal timber extraction and drainage from (illegal) timber extraction were estimated to be **99,403 tCO_2e.**

3.2.4.2 Fire ($E_{P,it}^{fire}$)

Emissions related to fire were estimated to be **122,153 tCO_2e.**

3.2.4.3 Land Use / Land Cover (LU/LC) changes ($E_{P,it}^{LUC}$)

Emissions related to deforestation were estimated to be **29,841 tCO_2e.**

3.2.4.4 Activity Shifting Leakage

Emissions from activity shifting leakage were estimated to be **187,330 tCO_2e.**

3.2.4.5 Summary of Carbon Accounting for Current Monitoring Period

Actual net greenhouse gas emissions avoided up to and including M6 are presented in table 14 below.

The buffer allocation was calculated using the VCS AFOLU Non-Permanence Risk Tool V4.0. The project was calculated to have a risk rating of 10%, the lowest risk rating allowable under the VCS Non-Permanence Risk assessment.

The total net issuable VCUs generated during the Monitoring period covered by this report (i.e. 1 July 2019 – 30 June 2021) are estimated to be 6,760,255 tCO2e.

The VCUs are presented by project year in Table 14 to facilitate reporting of emissions by project year as required by the Projects registry and Table 15 shows VCU generation by vintage year.

Project Year	Monitoring Dates (Day/Month/Year)	Net VCU Allocation (tCO_2e)	Buffer Allocation (tCO2e)	Buffer Release (tCO2e)
1	1/7/2009 - 30/6/2010	2,181,352	242,372	36,355
2	1/7/2010 - 30/6/2011	2,453,742	433,013	187,639
3	1/7/2011 - 30/6/2012	2,788,156	492,027	213,211
4	1/7/2012 - 30/6/2013	3,347,516	601,138	260,493
5	1/7/2013 - 30/6/2014	4,393,291	672,485	232,783
6	1/7/2014 - 30/6/2015	3,885,255	442,088	66,313
7	1/7/2015 - 30/6/2016	3,172,906	362,938	54,441
8	1/7/2016 - 22/6/2017	4,063,462	339,175	50,876
9	23/6/2017 - 30/6/2018	3,509,354	402,900	0
10	1/7/2018 - 30/6/2019	3,381,583	388,335	0

11	1/7/2019 – 30/6/2020	3,361,160	386,058	0
12	1/7/2020 – 30/6/2021	3,399,115	390,272	0
Total		**39,936,517**	**5,152,801**	**1,102,111**

Table 14: Voluntary Carbon Unit (VCU) Vintages (grey shaded years represent previously issued VCs; white years represent current monitoring period)

Project Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)*
1	2,462,212	(38,488)	0	2,423,724
2	3,654,181	(767,425)	0	2,886,756
3	3,592,611	(312,427)	0	3,280,184
4	4,124,970	(117,382)	(58,934)	3,948,654
5	5,362,569	(189,603)	(93,537)	5,079,431
6	5,069,617	(648,737)	(93,537)	4,327,344
7	4,279,896	(650,514)	(93,537)	3,535,845
8	4,036,912	(645,155)	(91,230)	3,300,526
9	4,128,393	(99,385)	(96,099)	3,932,908
10	3,980,330	(96,972)	(93,537)	3,789,820

11	3,986,445	(125,862)	93,793	3,766,791
12	4,028,251	(125,534)	93,537	3,809,180
Total	**48,706,387**	**(3,817,484)**	**(807,741)**	**44,081,162**

Table 15: Total GHG Emissions Reductions generated over the project lifetime summarized by project year
*Prior to uncertainty adjustment

Table 16 includes final estimates for emissions reductions, buffer allocation, and VCUs (rounded down as required by the latest version of AFOLU Requirements), calculated for each vintage year within the monitoring period.

Year	Net GHG Emission Reductions or Removals (tCO2e)	Annual Buffer Allocation (tCO2e)	Net Verified Carbon Units (tCO2e)
2019	1,893,687	194,084	1,689,763
2020	3,793,348	388,714	3,384,923
2021	1,888,936	193,532	1,685,589
Total	7,575,970	776,330	6,760,275

Table 16: NER and VCU estimates based on vintage year within monitoring period

3.3 Optional Criterion: Climate Change Adaptation Benefits

The project is pursuing Gold Level certification for Climate Change Adaptation Benefits under the CCB standard on the basis of providing significant support to communities and biodiversity in adapting to the impacts of climate change. The following sections demonstrate how the project successfully fulfils the requirements for demonstrating climate level gold certification.

Anticipated Local Climate Change Scenario

Tropical peat land ecosystems, in addition to storing and sequestering carbon (Neuzil 1995) and harboring unique biodiversity (Whitmore 1984), provide economically valuable timber and non-timber resources to communities (Parish 2002). Peatlands also serve as water catchments, flood control systems and act as a coastal buffer between salt and fresh water hydrologic systems

(Rieley et al. 1997, Page et al. 1999). These ecosystem services are essential to communities whose livelihoods are tightly linked to their environment. Likewise, disruption to the peatland ecosystem, through climate change, is likely to negatively impact resource-dependent communities, both human and non-human, in a number of ways.

The Rimba Raya peatland ecosystem is adapted to seasonal flooding and drying on an annual basis. Ombrogenous (rain fed) peat swamp forests are seasonally inundated during the wet season, which may vary annually by several months, typically November-June. Water levels drop significantly during the dry season, July-October, and some areas of peat swamp forest may dry completely. More infrequent and prolonged droughts naturally occur in association with El Nino Southern Oscillation (ENSO) events across Borneo historically every 6-7 years (Sakai 2006). Drought conditions cause lowland forest dipterocarp trees and a suite of co-evolved plant families to synchronously flower and fruit, producing an abundant food supply to vertebrate populations during “mast” years.

Annual and periodic droughts underlie the spatial and temporal distribution and ecology of forest plant and animal species, and are a natural ecosystem process which structures biodiversity and forest-based community resources. In human-influenced ecosystems, such as Rimba Raya, droughts can also promote the uncontrolled spread of fire. The interaction between drought and fire has led to extensive and devastating loss of forest in the region, especially during ENSO events on the islands of Borneo and Sumatra (Goldammer and Mutch 2001; Tacconi 2003). During 1997-98, a strong El Nino associated with extremely dry conditions, caused fires to burn more than 5 million hectares of forest in the province of East Kalimantan alone (Page et al 2002).

Fragmented and degraded forests are more susceptible to fire than intact forests since they are drier due to increased evapotranspiration and carry higher fuel loads (Cochrane et al. 1999; Laurance 2003), especially since these areas often lie in close proximity to active and incidental fires associated with human activity. Degraded peatlands are especially prone to extensive and severe fires where exposed peat and low water tables create conditions conducive to long-burning below-ground fires. Therefore, peatland forests already impacted by human activities, such as those in Rimba Raya, are at moderately high risk for deforestation.

The frequency and severity of ENSO-driven drought has increased substantially in the past three decades (Harrison 2001) and climate models suggest this may be the result of climate change (e.g. Timmermann et al. 1999). Kalimantan experienced major landscape-altering fires in 1982-83, 1997-98 and 2006. In Rimba Raya, drought and fire have been, and are expected to be, the primary drivers of climate change-related impacts on community and biodiversity into the future.

Predicted Climate Change Impacts on Communities and Biodiversity along with Mitigation Techniques

Four areas of risk due to climate change were identified along with brief descriptions of project activities that mitigate them and provide further benefits. These are:

- ***Food security*:** In the absence of project activities, drought and fire would be expected to reduce food security. Agricultural productivity would be expected to decline as a direct

result of drought-induced water shortage and soil nutrient loss from fire, as well as crop loss due to flooding. At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase risk of hunger. Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries. Project activities which mitigate this risk include:

- Fire suppression, education and training
- Reforestation/Agro-Forestry-Afforestation
- Crop diversification, harvest rotation and application of new technologies for improved production
- Protect and manage large patches of contiguous forest

- ***Income***: Communities in the project management zone historically have had limited means of earning cash income with primary dependence on fishing, farming and collecting timber and non-timber resources from local forests. This natural resource based economy is especially vulnerable to climate change including the cascading effects from drought and fire that lead to reduced agricultural and fish harvests. The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events. Additionally, fire-driven forest loss and damage directly reduce forest-sourced products, further reducing cash income. Project activities which mitigate this risk include:
  - Fire suppression, education and training
  - Reforestation/Agro-Forestry-Afforestation
  - Crop diversification, harvest rotation and application of new technologies for improved production
  - Aquaponics
  - Protect and manage large patches of contiguous forest
- ***Health***: Climate change and associated drought and fire would be expected to have a negative impact on water quality and health in the absence of the project. Peatlands act as water catchment and buffering systems providing water storage and protecting against flooding. Ecosystem damage would negatively impact this ecosystem function. Communities are dependent on the Seruyan River for all their water needs and project activities include improving access to clean drinking water, which is not readily available in Seruyan villages. Drought and flooding, predicted with climate change would be expected to constrain clean water access and increase the prevalence of water-borne

disease in the absence of the project.

Increased water temperatures associated with climate change would also be expected to increase the prevalence and toxicity of cholera outbreaks; increases malnutrition and consequent disorders, with implications for child growth and development; increase deaths, disease and injury due to heat waves, floods, storms, fires and droughts; increase the burden of diarrheal disease; increase the frequency of cardio-respiratory diseases due to higher concentrations of ground level ozone related to climate change; and alter the spatial distribution of some infectious disease vectors. These issues are expected to affect the health of millions of people, especially those with low adaptive capacity. Project activities which mitigate this risk include:

- Water conservation, improved irrigation techniques
- Community education and build clinics to provide better access to healthcare

- ***Biodiversity:*** Climate change, drought and fire would be expected to have independent and compounding negative impacts on biodiversity in the absence of the project. Fire and drought will impact tree mortality, contributing to species extirpation and habitat fragmentation, as well as changing in pattern of fruiting. Shift in fruiting patters may disrupt or change synchronous fruiting unique to Bornean ecosystems with negative consequences on the project areas biodiversity.

  Climate change has already caused numerous shifts in species distributions and abundance over the last three decades (Thomas et al. 2004), which can cause population fragmentation and decline leading to species extinction. As much as 50% of Asia's biodiversity is at risk of extinction due to climate change (Cruz et al. 2007). In Borneo, climate change driven fires are expected to directly impact species populations and biodiversity (CIFOR 2006). Forest fire is the primary driver of deforestation, which has accelerated in the last decade and is projected to cause the near-complete deforestation in Rimba Raya by 2020 in the absence of the project activities aimed at protecting and connecting large habitat patches. Such forest loss would cause severe declines in biodiversity and further threaten at-risk populations of globally endangered species including a number of primates.

  The orangutan, whose distribution declined by 91% this century (UNEP 2007), continues to suffer population losses due in part to climate change induced fire, habitat loss and fragmentation (Wich et al. 2008). Shifts in the timing and extent of dry seasons and fruit abundance are also likely to affect orangutan and other populations by reducing food availability and interrupting breeding and birth cycles. Fire and drought that reduce abundance of fruits will negatively impact orangutan populations because females are more likely to conceive during periods when food resources are not limited (WWF 2002). Project activities which mitigate this risk include:

  - Fire suppression, education and training

- Reforestation/Agro-Forestry-Afforestation
- Protect and manage large patches of contiguous forest

Community and Biodiversity Vulnerability to Climate Change

Communities and biodiversity in the Rimba Raya project zone are especially vulnerable to the negative impacts of local climate change.

Communities remain dependent on a resource-based economy centered on subsistence farming, fishing and resource extraction from nearby forests; therefore any loss or change to these resources has an immediate and direct effect on communities. Loss of farmland, loss of forest, declining water quality and soil loss, lack of diversity in livelihood resources, and lack of capacity for developing new livelihood strategies have created poor communities with little resilience to climate change in the absence of the project.

Biodiversity is similarly at risk from local climate change, which has already caused more frequent severe droughts leading to more destructive fires causing forest loss and degradation, with major landscape-altering fires occurring in Kalimantan in 1982-83, 1997-98 and 2006. Such fires have been shown to dramatically reduce structural and biological complexity (Schindele et al. 1989), reduce tree biodiversity (Slik 2004) and cause population declines and local extinction of forest-dependent animal species (Peres et al 2003) because of severe declines in food resources (Frederikkson et al. 2006).

Maintaining biodiversity in the project is dependent on stabilizing and improving habitat for small populations at risk of extinction. The interaction of expected climate change effects (drought) and human activities (fire) would be expected to lead to complete deforestation with a dramatic loss of biodiversity in the absence of project activities aimed at protecting and restoring habitats and managing human resource use and activity.

Analyzing Climate Change Impacts

In order to demonstrate the interrelated effects of climate change on community and biodiversity, path analysis diagrams are used to identify impacts and illustrate the ways in which drought and fire affect community (food security, health, income) and biodiversity. These diagrams also aid in the assessment of how impacts are minimized and mitigated and provide a context for adaptation to climate change.

Food Security

In the absence of project activities, drought and fire would be expected to reduce food security through multiple pathways. Agricultural productivity would be expected to decline as a direct result of drought-induced water shortage and soil nutrient loss from fire. Agricultural crop loss due to flooding would also be expected to become more prevalent in the absence of the project. Peatlands act as flood control systems where forest and peat remains intact. Fire damage to forests and peat negatively impact these flood control services. Erosion and siltation of rivers would be expected to accompany fire damage to forests. This, coupled with direct loss of

fisheries due to fire, would be expected to reduce fish catches. Given the current dependence on farming and fishing, climate change related impacts would have a significant negative impact on the food security of communities.

Income

Communities in the project management zone historically have had limited means of earning cash income with primary dependence on fishing, farming and collecting timber and non-timber resources from local forests This natural resource based economy is especially vulnerable to climate change including the cascading effects from drought and fire that lead to reduced agricultural and fish harvests. Additionally, fire-driven forest loss and damage directly reduce forest-sourced products, further reducing cash income.

Health

Climate change and associated drought and fire would be expected to have a negative impact on water quality and health in the absence of the project. Peatlands act as water catchment and buffering systems providing water storage and protecting against flooding. Ecosystem damage would negatively impact this ecosystem function. Communities are dependent on the Seruyan River for all their water needs and project activities include improving access to clean drinking water, which is not readily available in Seruyan villages. Drought and flooding, predicted with climate change would be expected to constrain clean water access and increase the prevalence of water-borne disease in the absence of the project. Increased water temperatures associated with climate change would also be expected to increase the prevalence and toxicity of cholera outbreaks.

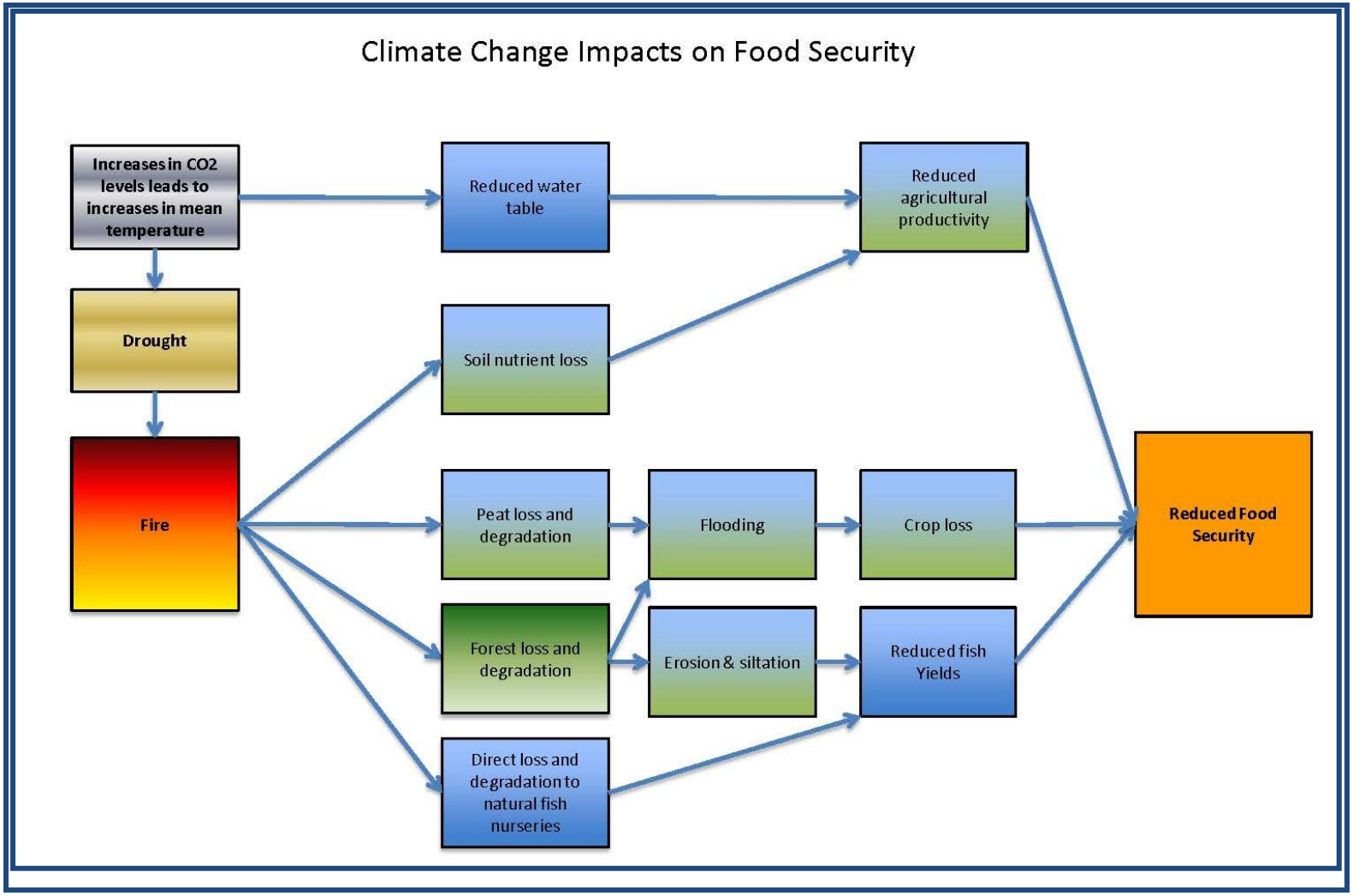

Figure 10: Climate Change Impacts on Food Security

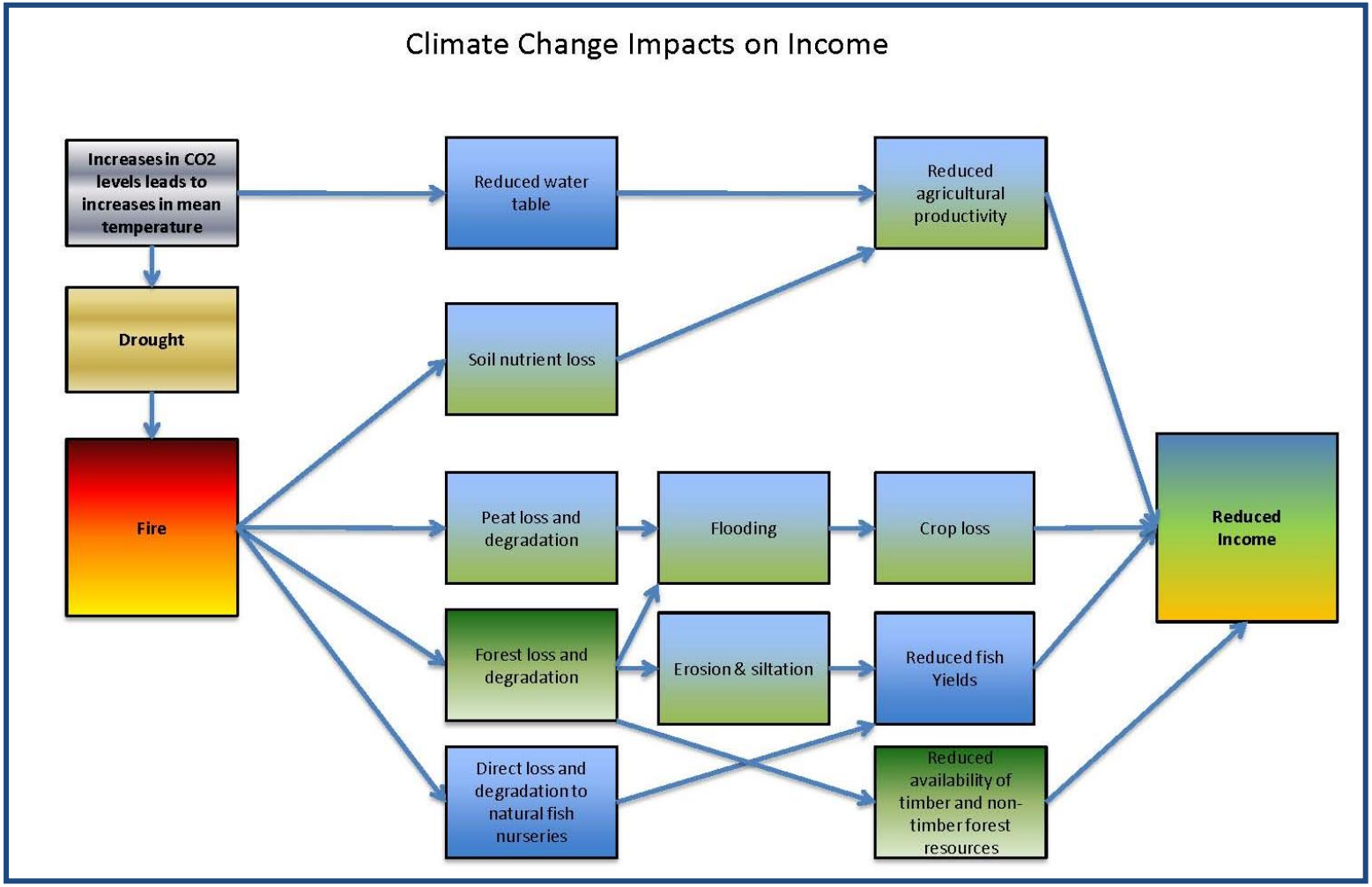

Figure 11: Climate Change Impacts on Income

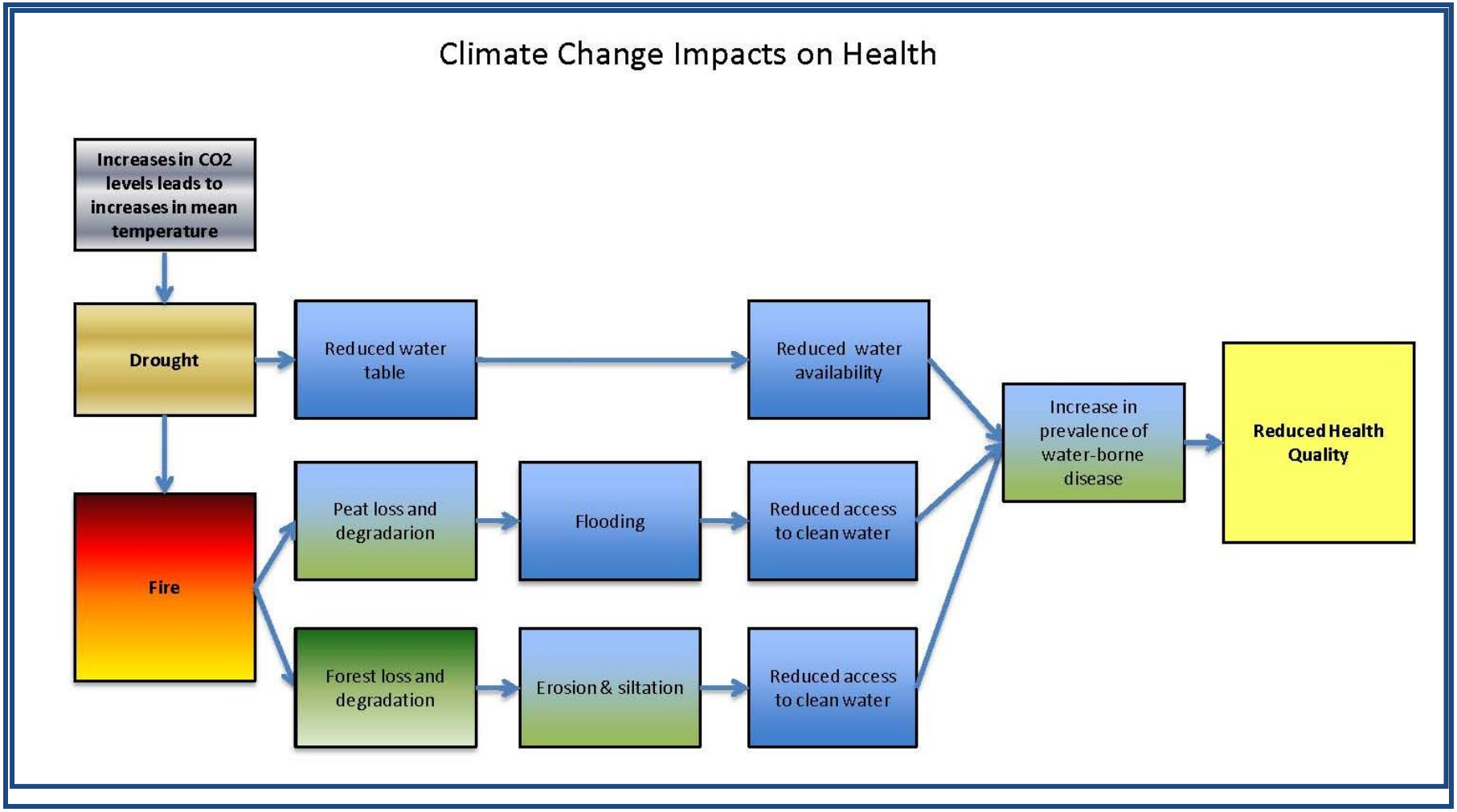

Figure 12: Climate Change Impacts on Health

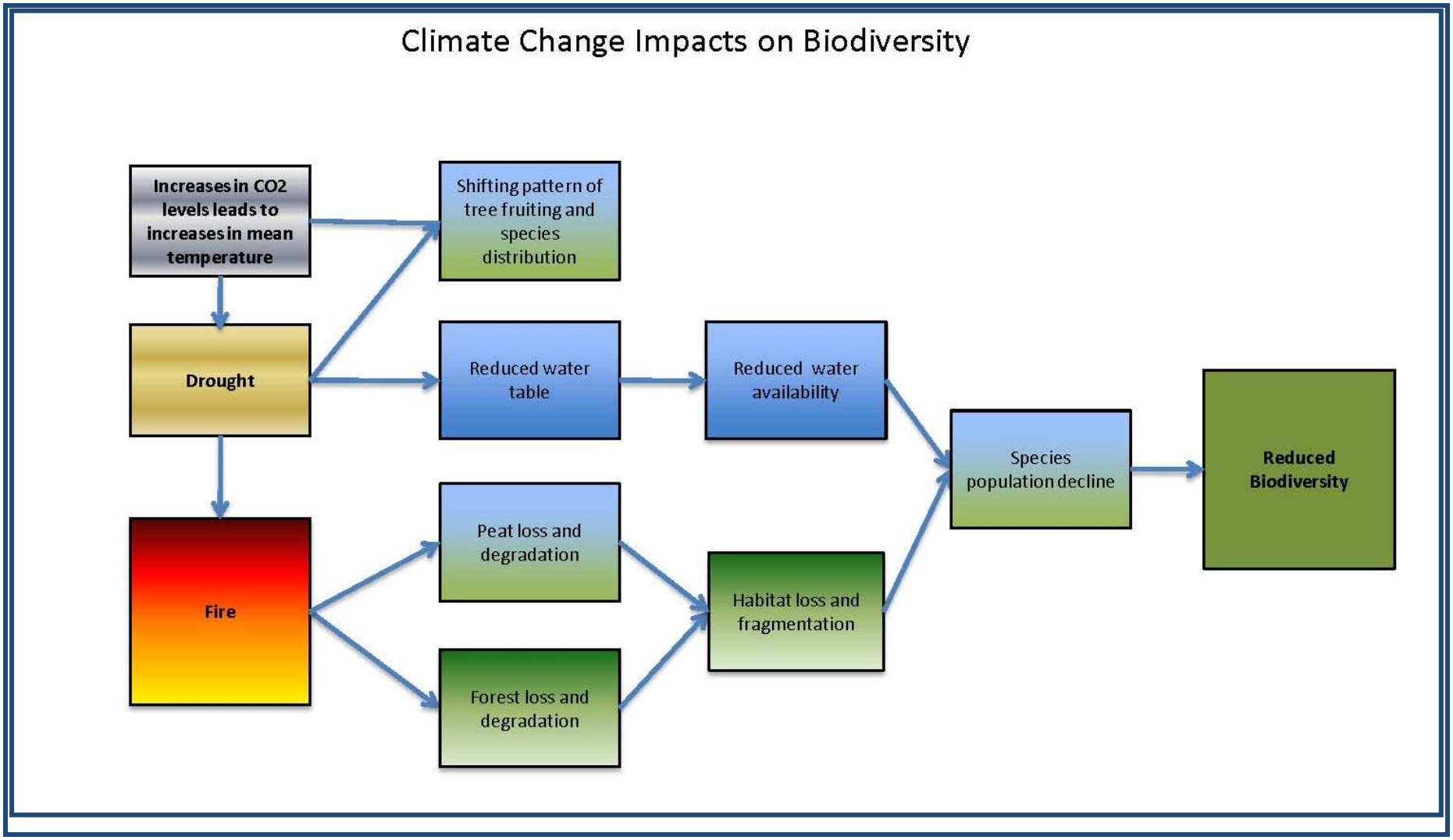

Figure 13: Climate Change Impacts on Biodiversity

Biodiversity

Climate change, drought and fire would be expected to have independent and compounding negative impacts on biodiversity in the absence of the project. Fire can have a devastating impact on biodiversity, causing high rates of tree mortality contributing to species extirpation and habitat fragmentation that reduces habitat quality and value for many forest-requiring species. Drought can also have a direct impact on forests through tree mortality, which is expected to increase with increased frequency of drought (Nishimua et al. 2006). Warmer temperatures and drought, especially severe droughts associated with ENSO events may cause changes in the patterns of fruiting. The ENSO cycle currently repeats roughly 2–3 times per decade, a pattern has potentially changed relatively recently (Cannon et al 2007), and is likely to shift due to climate change (Trenberth & Hoar 1997). Such shifts may disrupt or change synchronous fruiting unique to Bornean ecosystems with cascading effects on plant and animal species (Cannon et al. 2007) and negative consequence for biodiversity.

3.3.1 Activities and/or Processes Implemented for Adaptation (GL1.4)

Many climate change impacts can be avoided, reduced or delayed by mitigation. Project activities have been designed to address the negative impacts associated with drought and fire - the primary drivers of environmental degradation associated with climate change. This has also made project benefits more resilient to local climate change since programs were already in place to address these impacts e.g. soil enrichment being used to improve crop production and also sustain this benefit even with expected climate change impacts. Given the adaptive management framework of the project, the location, frequency, level and duration of interventions such as soil enrichment will be adjusted as needed to achieve project benefits in an expectedly variable and changing environment.

Furthermore, the climate project benefits have been and will continue to be protected, monitored, quantified and closely tracked in order to meet the requirements of avoided emissions under the Voluntary Carbon Standard (VCS). Since the primary objectives are to protect peat and forests, these activities have, and are expected to continue to stabilize and mediate predicted climate change impacts.

While it should be cautioned that climate change can slow the pace of sustainable development, implementation of well-designed development activities can also reduce the vulnerability to climate change by enhancing adaptive capacity and increasing resilience. Some impacts can be mitigated, but for unavoidable impacts, adaptation is the only available and appropriate response (Case et al. 2008). Adaptation is necessary to address climate change impacts that are already in process (IPCC 2007), especially those addressing near-term impacts (Case et al. 2008). Activities to assist communities and biodiversity adapt to climate change are summarized below.

Case et al. 2008 suggest there is value in adopting a portfolio or mix of strategies that includes mitigation, adaptation, technological development and capacity building (to enhance both adaptation and mitigation) and research (on climate science, impacts, adaptation and mitigation). The Rimba Raya project employs such a range of strategies and is working to combine policies, incentive-based approaches, and actions across stakeholders including community members, regional and national government and agencies and NGOs.

By targeting climate change impacts in project development the Rimba Raya project has increased adaptive capacity of biodiversity (biological systems) and community. Project proponents also recognize that impacts of climate change vary spatially and temporally within the region and project, and are committed to meeting the expected increasing costs of implementing programs and activities to mitigate impacts of climate change to project benefits.

The tables below (Tables 17-21) summarize activities that used to minimize, mitigate and/or assist communities and biodiversity adapt to climate change impacts that could affect project benefits.

Climate Change Associated Risk	Impact Addressed	Activity	Minimize Impact	Mitigate Impact
Fire	Peat loss and damage, forest loss and damage	Fire suppression, education and training	**X**	
Drought & Fire	Peat drying and oxidation	Peat re-wetting (see Couwenberg 2009)	**X**	
Fire	Forest loss and damage	Reforestation/Agro-Forestry-Afforestation		**X**

Table 17. Climate Project Benefit: Reduced GHG Emissions

Climate Change Associated Risk	Impact Addressed	Activity	Minimize Impact	Mitigate Impact	Adapt to Impact
Fire	Peat loss and damage, forest loss and damage	Fire suppression, education and training	**X**		
Drought	Reduced water table	Water conservation, improved irrigation techniques		**X**	
Fire and forest loss and damage	Erosion, siltation	Reforestation & Agro-Forestry		**X**	
Multiple Climate-driven environmental changes	Reduced agricultural productivity and crop loss	Crop diversification, harvest rotation and application of new technologies for improved production			**X**
Multiple Climate-driven environmental changes	Reduced fish yields	Aquaponics			**X**

Table 18. Community Project Benefit: Improved Food Security

Climate Change Associated Risk	Impact Addressed	Activity	Minimize Impact	Mitigate Impact	Adapt to Impact
Multiple Climate-driven environmental changes	Same impacts to forest, agriculture and fishing described in Food Security Project Benefits	Same activities as those described in Food Security Project Benefits	**X**	**X**	

Fire	Reduced income from forest products,	New agroforestry development and application of technology for sustainable yields			**X**
Multiple Climate-driven environmental changes	Reduced income from agriculture and fishing	Capacity building for income diversification			**X**

Table 19. Community Project Benefit: Increased Income

Climate Change Associated Risk	Impact Addressed	Activity	Minimize Impact	Mitigate Impact	Adapt to Impact
Fire	Peat loss and damage, forest loss and damage which leads to flooding	Fire suppression, education and training	**X**		
	Forest loss and damage and flooding	Reforestation & Agro-Forestry		**X**	
Drought	Reduced water table	Water conservation, improved irrigation techniques		**X**	
Multiple Climate-driven environmental changes	Increased Disease	Community education and build clinics to provide better access to healthcare			**X**

Table 20. Community Project Benefit: Improved Health

Climate Change Associated Risk	Impact Addressed	Activity	Minimize Impact	Mitigate Impact	Adapt to Impact
Fire	Forest loss and damage which leads to habitat loss and fragmentation	Fire suppression, education and training	**X**		
	Forest loss and damage which leads to habitat loss and fragmentation	Protect and manage large patches of contiguous forest			**X**
Multiple Climate-driven environmental changes	Change in pattern of forest fruiting (impacting vertebrate fauna)	Protect and manage large patches of contiguous forest			**X**

Table 21. Biodiversity Project Benefit: Longterm Maintenance of Biodiversity

Table 22 summarizes progress made during this monitoring period by carrying out project activities aimed at minimizing, mitigating and /or assisting communities and biodiversity adaptations to climate change impacts. It shows the implementation status of various activities throughout the project lifetime along with the results achieved during this monitoring period.

Activities	Status	Implementation details	Start date	Finish date	Steps necessary to start/finish activity	Responsibility
Fire suppression, education and training	Started	2 fire towers were built in Natai Kopi, Ulak Batu village and Sungai Mahat, Muara Dua village. 1 additional fire tower is projected to be completed in Q4 2021 in Pematang Limau due to severe flooding events. This delay was a consequence of flooding events. Guard post locations: • Natai– Kopi (North Unit) • Tatah Ji - Muara Dua (Central Unit) • Sigintung Area – Muara Dua (Central Unit) – in Collaboration area with TNTP – only for transit/staying over but not fully guarded 24/7. • Kudung – in collaboration with BPBD (south unit) – plan to be active in 2022 as the MOU with BPBD is still under development. patrols are routinely performed by firefighting staff • Routine patrols • Intensive patrols during fire seasons	May-10	On-going		RRC General Manager

Activities	Status	Implementation details	Start date	Finish date	Steps necessary to start/finish activity	Responsibility
		8 Hydrants were built in year July 2019 - June 2021 (Batu Hirang, Tj. Rangas, Tatah Ondol, Sungai Empa, menara Pantau Api Natai, Tabukan Batu Hirang, Tabukan Ji, Danau Kapar) 6 additional Hydrant well are currently under planning (3 Tatah Ji, 1 Kudung, 1 Sungai Mahat, 1 Sungai Ringgit) Refreshment trainings for fire suppression and equipment utilization were done in 2019 and 2021.				
Reforestation/Agro-Forestry-Afforestation	Started	139,354 seedlings planted during monitoring period over an area of 137.5 hectares Two new mangrove nurseries were established, and mangrove replanting initiative was carried out to plant 74,850 seedlings in the coastal zone of the project the program planting of pineapple and djengkol has continued to be supported during the monitoring period 5.000, type: Jengkol (Archidendron pauciflorum), Petai (Parkia speciosa), Ubar (Syzygium sp), Rambutan (Nephelium lappaceum), Rambai (Baccaurea motleyana), Cempedak (Artocarpus	Aug-13	On-going		RRC General Manager

Activities	Status	Implementation details	Start date	Finish date	Steps necessary to start/finish activity	Responsibility
		integer), Jambu monyet (Anacardium occidentale), location: Block Endemik, Natai Kopi, Ulak Batu village.				
Crop diversification, harvest rotation and application of new technologies for improved production	Started	A FFS program was carried out in 2018 at the Danau Sebuluh middle school, with 238 cucumber plants and 94 peanut plants, however the program was not continued in 2019 due to changes in the school's programs. The FFS developed 2 working groups of adults in Baung and Jahitan that continue vegetable and horticultural gardening in the demo plots and continued growing food for the community in 2020 and 2021. 2 nurseries were staffed and maintained in Ulak Batu and Muara Dua by locals for the replanting activity process, from creating the nurseries, taking care of the nurseries, and planting the seedlings.	May-13	On-going	Individual village spatial and economic plans and allocation of funds.	RRC General Manager
Community education and provide access to clinics to provide better access to healthcare	Started	Rimba Raya floating clinic is providing periodic health care to marginalized villages in Rimba Raya: Ulak Batu, Palingkau, Muara Dua (including Belanti and Tampudau hamlets), Jahitan, Tanjung Rangas and Pematang Limau. 1,849 community members received medical care during this monitoring period.	Sep-13	On-going	Prioritise suggested actions. Set up a budget and plan to implement actions.	RRC General Manager
Protect and manage large patches of contiguous forest	Started	The project has received full license from the Indonesian government, and has continued its patrolling activities throughout the monitoring period.	2009	On-going	Annual remote sensing and ground based measurements as	RRC General Manager

Activities	Status	Implementation details	Start date	Finish date	Steps necessary to start/finish activity	Responsibility
					described in the monitoring plan. Continual patrols along the ERC boundary demarcation.	

Table 22: Community and Biodiversity Related Activities

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM1.1)

The project's community benefits represent a net positive benefit for all community groups. Attaining positive impacts on communities within the project zone has been an extremely important aspect of this project. Nearly every step of the project has involved the feedback and participation of community members in one form or another. Community members have been vital to the design and implementation of the project. Without the feedback and participation of community members, this project would not exist. Project activities have been designed to incorporate community needs and concerns so that the project may be truly impactful not only in terms of climate and biodiversity objectives but in terms of community goals.

Furthermore, these benefits have been provided in a manner which has maintained one of the most important local assets of the project communities: the natural capital of local forests and the ecosystem services they sustain. These resources have remained intact and available for current and future generations. This benefit is in direct contrast to livelihood opportunities that would have been generated through the palm oil conversion, through which the area's natural capital would be eroded and become unavailable over a relatively short period of time. To evaluate these benefits, impacts were analyzed using the United Nation's Sustainable Development Goals, and more recently, the project has begun to implement the use of the Theory of Change (TOC) framework as a tool for community project activity design and monitoring.

Throughout theTOC exercise, the Rimba Raya project identified four broad categories for all project activities that are being implemented. These categories are Access to Resources, Education, Inclusion, and Enterprise. On a broad level, these categories also work to address the Sustainable Development Goals identified below. By providing access to resources, education, inclusion, and enterprise, the project activities can directly improve the well-being of communities within the project zone. A detailed TOC model was developed in order to trace both the positive and potential negative impacts that project activities might have on communities (for example see the TOC models for Chicken Farm and Water Filter). While the SDGs are important targets for the project to aim for, it is important to consider the specific dynamics of the communities and their individual needs in order to minimize the negative and optimize the positive impacts. For this reason, the project is focusing on using the TOC as a tool going forward to achieve its specified community objectives, including the SDGs listed below.

The Sustainable Development Goals (SDGs) are the United Nations quantified targets for addressing extreme poverty in its many dimensions – income poverty, hunger, disease, lack of adequate shelter and exclusion – while promoting gender equality, education, and environmental sustainability. They are also basic human rights – the rights of each person on the planet to health, education, shelter, and security. In an effort to create a social buffer for the project area and nearby Tanjung Puting National Park, InfiniteEARTH has designed many project activities around targets and success indicators proposed by the SDG program for Indonesia. The project has worked and continues to work to accomplish these goals and ensure that the net impact of

the project on communities within the project zone is positive. The SDG success indicators include:

- Goal 1: End poverty in all its forms everywhere
- Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3: Ensure healthy lives and promote well-being for all at all ages
- Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5: Achieve gender equality and empower all women and girls
- Goal 6: Ensure availability and sustainable management of water and sanitation for all
- Goal 7: Ensure access to affordable, reliable, sustainable, and modern energy for all
- Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10: Reduce inequality within and among countries
- Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable
- Goal 12: Ensure sustainable consumption and production patterns
- Goal 13: Take urgent action to combat climate change and its impacts
- Goal 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
- Goal 15: Protect, restore, and premote sustainable use of terrestrial ecosystems, sustainable manage forests, combat desertification, and halt and reverse land degradation and biodiversity loss
- Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels
- Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

The project has also identified clear objectives related to the protection of poor and marginalized

individuals within communities. As discussed previously in Section 3.1.3 and later in this report in Section 4.3 field monitoring occurs within each field unit on a minimum of a weekly basis, and in some locations where there is concern for, or a history of encroachment, it can be as frequently as daily. Monitoring trip reports are kept at the field unit level for each trip and compiled by the field unit manager as a summary to be provided to the Sampit office on a monthly basis. The reports are available by anyone upon request and actively disseminated to all stakeholders on an annual basis prior to any upcoming audit. Summaries of monitoring results in the local language are disseminated within communities using the community information boards.

There are three new community objectives are as follows:

- At least 25% of the poorest people in each community where the project works will benefit from the project
- Engage with 25% of the poorest people in each community that the project works with to identify and overcome barriers and risks to project benefits
- Avoid or mitigate negative impacts in each community that the project works with, including for the women, as well as poor, vulnerable, or marginalized individuals.

Sustainable Development Goals were used as key rationale to assess the project's progress in terms of community benefits because they are the standards created and used by the United Nations to address the universal needs of the world's poorest. Although Indonesia is the largest economy in Southeast Asia and has made considerable advances in recent years in reducing poverty among its inhabitants, it is still considered a medium development country where many inhabitants, especially those in rural areas, are directly affected by poverty. The location of the project, in the rural Seruyan Regency of the province of Central Kalimantan, has been identified as one of the poorest districts in Indonesia.

Seeing as communities within the project zone are some of the world's most impoverished people, application of these development goals are appropriate. Moreover, the SDGs encompass issues which are directly pertinent with those that have arisen within the project. Thus, inclusion of the SDGs makes sense as their ultimate purposes are almost entirely the same as those outlined by the project, and they are part of a pre-approved and applied system. Greater detail about how the project activities work to reach the Sustainable Development Goals and Indonesia's Sustainable Development Goals can be viewed in the project's SD VISta project description document and monitoring report.

Community Groups

The project was designed to include communities affected by activities which occur within the project zone. Communities have been defined as all groups of people, including Indigenous peoples, migratory, and other local groups who live within or adjacent to the project zone, as well as any groups that regularly visit the area and derive income, livelihood, or cultural values from the area. Using this definition, project community groups which were previously identified in the validated PDD include:

1. Communities in the Project Zone - Communities with land rights in the project zone. These include villages along the Seruyan River, which forms the eastern border of the project.

2. Communities that travel to the Project Zone **-** Communities in which certain individuals travel some distance into the project zone to log, hunt or collect forest products.

Planned and Unplanned Impacts on Community Groups

During this monitoring period, project activities created significant planned and unplanned impacts on the above-identified community groups. Impacts from some of the project activities are described below, and a full analysis of the activity outputs, outcomes, and impacts is shown in TOC Activity Matrix v1.10.xlsm (a simplified summary version can be found as Theory of Change Monitoring – Climate Community & Biodiversity.xlsm). While communities in the project zone that were engaged in the project had the opportunity to provide feedback and shape the project positively in their favor, communities that travel to the project zone were impacted both positively and potentially negatively. Positive and negative impacts which occurred and affected both groups were both planned and unplanned. Project activities that were carried out during this monitoring period and their impacts on community groups are further explained below.

Construction and operation of Guard & Fire Towers and Orangutan Care Facilities

For both communities within the project zone and communities that travel to the project zone, the continued construction and operation of the guard and fire towers, as well as the orangutan care facilities provided positive impacts in the form of employment opportunities, and thus alternative streams of revenue. It should be noted that individuals within the project zone were given priority during the hiring process. Providing employment opportunities was a planned impact for community members. Community members from outside of the project zone which traveled to the project zone in order to illegally log may have been negatively impacted by the project because they were no longer allowed to log and there was security present to deter them from logging. No unplanned impacts on community groups were found as a result of these developments.

Distribution of Water Filters

As there have been increased instances of flooding in the Seruyan River watershed, Project zone communities continue to have trouble gaining access to clean water resources. Based on community surveys taken in previous monitoring periods that were intended to help project proponents prioritize social programs, it has been determined that clean water is one of the largest priorities for those living in the communities. During the last monitoring period, 300 water filters were distributed to the villages in order to improve the health of communities within the project zone. During this monitoring period, 280 of the filters were repaired. Three (3) Water Purification Systems (WPS) were installed in stakeholder villages in 2019, which provide over 200 liters of clean water per year for 900 households. 5 more WPS are in the process of construction, with scheduled completion by October 2021 after which all stakeholder villages in the Project will have access to clean water. The anticipated impacts of water filter distribution were multifaceted. By distributing water filters, some of the short-term outcomes that were expected included fewer sick days for adults and children, lower medical costs for families due to fewer illnesses, an

overall reduction in waterborne illnesses, and improvements in water quality throughout the project zone. Longer-term impacts were identified that included benefits to the local economy due to higher worker productivity, empowerment of vulnerable or marginal groups due to the knowledge gained from trainings on water filtration systems, reduction in maternal illnesses and infant mortality, and the distribution of benefits to poorer and more vulnerable groups. Some negative identified impacts were the dependence on spare parts for water filtration systems that might not be locally available, however the project has worked to mitigate this need by supplying and providing access to spare parts when needed.

An example of the Theory of Change outputs, outcomes, and impacts for this activity is illustrated in TOC Activity Matrix v1.10 - Water Filter.pdf as well as the Theory of Change summary document mentioned above.

Carbon, Community, & Biodiversity Monitoring

For both communities within the project zone and communities that travel to the project zone, CCB monitoring provided positive impacts in the form of employment opportunities and alternative streams of revenue.

Providing employment opportunities was a planned impact for community members inside the project zone, as well as those who traveled to the project zone. It should be noted that individuals within the project zone were given and continue to be given priority during the hiring process. No unplanned negative impacts on community groups have been found or reported as a result of CCB monitoring. In fact, community members have been able to benefit in unplanned ways, such as allowing villagers to rent the boats used for monitoring when they aren't being used for the project.

Capacity Building Programs

Capacity building efforts brought planned positive impacts to both community groups. Capacity building allowed community members within the project area to train and pursue the learning of alternative skills and livelihood capabilities. In expanding worker skills sets and abilities, community members located within the project zone have been positively influenced as they are able to advance their socio-economic statuses. Likewise, community members that traveled to the project zone also positively benefited from planned capacity building programs as they are able to participate in the programs in order to develop alternative livelihood skills and pursue opportunities that would not be available without the presence of the project. There have been no negative impacts on either community group due to the implementation of capacity building programs and no unplanned impacts have been found or reported.

Community center and library

The community center/library has created positive impacts on both communities within the project zone and communities which traveled to the project zone. Both community groups benefited because it provided employment opportunities and upon provided a communal space for congregation and learning. However, there was one negative unplanned impact in that this structure has resulted in some jealousy in communities that don't have their own

community center, even though they're allowed to use it. However, Rimba Raya hopes to address this through the establishment of additional libraries.

Micro-credit Programs

Micro-credit programs were planned project activities which provided positive benefits for community groups - those who lived within the project zone and those which traveled to the project zone. Micro-credit programs provided financial and entrepreneurial support so that various working groups – shrimp paste and chicken meat production – could operate. In doing so, community members from inside and outside of the project zone were able to make revenue from alternative, sustainable practices. Making money outside of the palm oil industry allows community members safer, more empowered livelihoods. The increase in production of chicken farming was considered to have the potential negative effect of contaminating the water supply, however the project is taking measures to reduce this negative impact through its water filtration system and the monitoring of water quality in the project zone.

A full assessment of the impacts from chicken farming can be shown in TOC Activity Matrix v1.10 - Chicken Farm.pdf. The TOC model also shows the direct outputs, outcomes and impacts from all micro credit activities and how they positively impact communities.

Restoration Project through community based agro-forestry and aquaponics

Forest restoration through community based agro-forestry and aquaponics has created planned positive impacts on both communities within the project zone and communities that traveled to the project zone. Community based agro-forestry and aquaponics programs such as the pineapple plantation and shrimp paste programs have allowed community members to be more financially independent and have greater access to food. There were no unplanned impacts and no negative impacts identified for either of the community groups.

4.1.2 Net Positive Community Well-Being Impacts (CM1.1)

As defined in the validated Project Description Documentation, the approach to demonstrate net community benefits in the Project area is based on an assessment of 'with' and 'without' project scenarios in relation to project goals. A description of how these goals are addressed in the baseline scenario compared with the project scenario is summarized below.

4.1.2.1 Baseline Scenario

Goal 1: End poverty in all its forms everywhere / Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Palm oil is Indonesia's second most successful agricultural product, after rice, and the largest agricultural export. It provides a means of income and economic development to a large number Indonesia's rural poor[3]. With over half of Indonesia's population living in rural areas—of which over 20 percent live below the poverty line—the palm oil industry provides an incomparable

[3] See 'the Economic benefit of Palm oil to Indonesia. A report by World Growth. Available at http://worldgrowth.org/site/wp-content/uploads/2012/06/WG_Indonesian_Palm_Oil_Benefits_Report-2_11.pdf

means of poverty alleviation (Budidarsono, et al , 2013; Norwana; et al 2011). It allows small landholders to participate in the cash economy and often results in improvements to local infrastructure and greater access to services. In some areas, the cultivation of oil palm has replaced traditional practices, often due to the higher income potential of palm oil (Budidarsono, et al , 2013; Norwana; et al 2011).

However, in some cases, land has been developed by oil palm plantations without consultation or compensation of the indigenous people occupying the land which has led to conflict, including conflict in Indonesia. Additionally, some Indonesian oil palm plantations are dependent on imported labor or undocumented immigrants, which have raised concerns about the working conditions and social impacts of these practices[4].

Plantations systematically destroy the rainforest land that the local people depend on; communities are continuously finding themselves with no choice but to become plantation workers. Faced with poor and degrading working conditions, they often earn barely enough income to survive and support their families. Instead of being able to sustain themselves, indigenous communities become reliant on the success of the palm oil industry for their income and survival, leaving these community members incredibly vulnerable to the world market price of palm oil which they have no control over. In the baseline scenario, the majority of community members - would continue to depend on the palm oil industry for employment.

This would likely be the case for the two identified community groups in the project – those communities living in the project zone and those which travel to the project zone for logging, hunting or for collecting non-timber forest products. Prior to project creation, the area in which the project area exists was part of several concessions that were planned to become a palm oil plantation. Therefore, it can likely be assumed that in the absence of the project, the land would have been converted to palm oil plantation. Community members living in the project zone would likely become employed by the palm oil company and lose their local forest. This would leave them vulnerable to the associated palm oil industry issues, as described above. This would include vulnerability to poverty and hunger. Likewise, community groups that did not live in the project zone but traveled to the project zone for logging, hunting and non-timber forest products (NTFP) would either see the same fate as community groups living within the project zone (employed by the palm oil industry, losing their local forest and being susceptible to poverty and/or hunger) or they would travel elsewhere to access forestland for logging, hunting and NTFP and likely, to access employment as well. With the absence of these plantations, it is likely that fewer people from outside the area moved into the project zone for employment. However, those that have traveled to the project zone are eligible for employment in the Rimba Raya Project. Additionally, while they are discouraged from conducting illegal deforestation in order to secure the project area, they are permitted small harvests like all other community members, and are granted the same access rights for hunting and NTFP.

Goal 3: Ensure healthy lives and promote well-being for all at all ages / Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

[4] See Ghosts of our Land. Indonesian oil plam smallholders and the roundtable on sustainable palm oil. Forest Peoples Programme. Available at: http://www.forestpeoples.org/sites/fpp/files/publication/2011/02/ghostsonourownlandtxt06eng.pdf.

Whilst the development of lands into palm oil plantations can be associated with increases in other services, an Indonesian study has found that access to elementary schools and medical facilities was similar for communities who rely on oil palm compared to communities who don't. However, distances to schools, hospitals and other medical services were significantly higher in communities relying on oil pam industry compared to those who don't. This was likely because the communities which rely on oil palm are more remote, public/government facility developments are not prioritized in these remote areas (Budidarsono, et al , 2013), and the oil palm plantations are not filling the gap in providing these services.

Furthermore, community members working in oil palm plantations are often women and children. The jobs associated with harmful health practices, such as the spraying of pesticides, is often performed by women and children as it seen as less laborious[5]. This contributes to worsening health conditions for women and children due to employment by palm oil.

Under the baseline scenario, these conditions for women and children of both community groups (groups which live in the project zone and groups which travel to the project zone) would likely continue. As such, access to education would be limited and health conditions for women and children would continue to decline.

Alongside conditions in palm oil plantations, communities in the project area are faced with the threat of many treatable or curable diseases. However, as tropical forests decline, the opportunities they hold for many treatments or cures will decline as well.

Plants that may help treat or cure diseases such as cancer, AIDS and malaria have been found in the forests of the heart of Borneo, but the realization of these plants' medical potential is at risk due to wide scale conversion of natural forests to palm oil plantations[6].

According to WWF[7], 422 new plant species have been discovered in Borneo in the last 25 years, and many other species are waiting to be found and studied, some of which could hold potentially important medical properties. However, these promising discoveries could be eventually lost if the disappearing rainforests of the heart of Borneo are not adequately protected.

Scientists are currently testing samples collected in the Malaysian states of Sabah and Sarawak, as well as in Kalimantan, the Indonesian part of Borneo. They hope to develop drugs that could contribute to the treatment of major, deadly human diseases.

Scientists have found a unique chemical in latex produced by the Bintangor tree which is endemic to Indonesian rainforests. The compound, Calanolide A, appears to be effective against the replication of the Human Immunodeficiency Virus (HIV), as well as the tuberculosis bacterium, which affects many AIDS patients. The discovery is particularly important as, to date, no single

[5] See http://www.ran.org/campaigns/rainforest_agribusiness/resources/fact_sheets/hostile_harvest_us_agribusinesses_and_labor_rights_abuses/

[6] See http://news.mongabay.com/2006/0426-wwf.html#6YKqycezKKq4g470.99

[7] Biodiscoveries. Borneos Botanical Secret. World Wildlife Fund. Available at: http://wwf.panda.org/about_our_earth/all_publications/?71901/Report-Biodiscoveries-Borneos-Botanical-Secret

drug has been able to treat both HIV and TB. If clinically proven, Calanolide A could be a major development for the health of many millions of people worldwide.

Researchers have also found a powerful and previously unknown anti-malarial agent in the bark of a local tree traditionally used by the Kenyah people of Kalimantan to treat malaria. The substance — a triterpenoid — apparently kills the human malaria parasite Plasmodium falciparum in laboratory tests.

The report notes that more forest destruction (as is expected under the baseline scenario) could well deny science the opportunity to discover and develop further potential sources of life-saving medication.

Within the communities themselves, especially rural communities, medical and health services are often difficult to access. Palm oil plantations, which often dominate the existence of many rural communities, often do not provide these services to their employees. Therefore, community members themselves lack the resources for disease treatment. This would likely affect both community groups – those living inside the area that would be the project zone and those which travel to the area that would be the project zone. Notably, with community groups that travel to the area that would be the project zone, distance would be increased and thus access to health care and medical assistance would be increasingly difficult to reach.

Under the baseline scenario, conversion of tropical peatland forests to palm oil plantation would continue to destroy forests whose plants may hold cures and treatment abilities for some of the world's most deadly diseases. Likewise, continuation of all types of community members lacking access to proper medical care would likely also occur under the baseline scenario.

Goal 5: Achieve gender equality and empower all women and girls

In the baseline scenario, work in oil palm plantations is hard for both men and women, though quite different. It is quite frequent that women help their husbands in the plantations to meet demanding production quotas, usually doing unpaid work. In the baseline scenario, this would likely be applicable for both community groups – those which lived in the area which would be the project zone and those which traveled to the area which would be the project zone.

In the case that women work on a hired basis, they often receive lower wages than men. This discrimination is set on the grounds that their work is easier than that of men. According to an article by Rainforest Action Network[8], women are often assigned tasks that seem less onerous, but which are actually more dangerous and physically demanding than that of their male counterparts. In Indonesia, women are often designated to spray pesticides because it is less physically taxing than other plantation work. Unfortunately, they are rarely given proper protective gear like gloves and masks and thus are susceptible to becoming sick or injured by the dangerous chemicals present in most industrial pesticides and insecticides.

Outside of working in the palm oil plantation, women fulfill other roles. In the baseline scenario women have to take care of the children, prepare food and collect firewood and water, (which are

[8] http://wrm.org.uy/oldsite/bulletin/134/Indonesia.html

often made farther due to destruction of the forest by the oil palm plantations). While women are rarely the heads of households, they often are responsible for the management of a functioning household. If working, such as at a plantation or helping out in the processing of fish products if their husbands are fishermen, when they return home, women have to prepare food for their families, often with pesticide residue still on their skin and clothes[9]. Women, whether working or not, are still responsible for the management of the home and children, with little time, resources, or opportunity for other ventures, private activities, or means of personal investment/empowerment. For working women that are part of community groups that travel to the area where the project area would be, even more time would be spent traveling to and from the plantations.

Under the baseline scenario, these conditions for women (in both identified community groups) would likely persist as palm oil plantations dominate the employment opportunities and there would likely be not many, if any, opportunities to become financially independent or programs which promote the empowerment of women.

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and biodiversity loss

Although the rapid expansion of the palm oil industry in recent decades has generated considerable economic growth in tropical developing countries, this development has come at an extremely high cost to the environment (Fitzherbert et al., 2008; Danielsen et al., 2009).

Millions of hectares of tropical forests have been destroyed to make way for oil palm plantations (Koh et al., 2011), in the process destroying critical habitat for endangered species, including orangutans, tigers, elephants, and rhinos. The serious environmental challenges associated with palm oil production include:

- Biodiversity loss, including loss of rare and endangered species
- Pollution of soil, air, and water
- Soil erosion
- Greenhouse gas (GHG) emissions and climate change
- Loss of key ecosystem services

Deforestation also has significant social implications and can be very damaging for the communities that depend upon these forests for their livelihoods (Colchester, 2011). Serious conflicts can arise when palm oil companies disregard the rights of local communities. Social impacts of palm oil production can include:

[9] See http://www.ran.org/campaigns/rainforest_agribusiness/resources/fact_sheets/hostile_harvest_us_agribusinesses_and_labor_rights_abuses/

- Land grabs
- Loss of livelihoods
- Social conflict
- Forced migration
- Loss of social/cultural identity associated with land
- Loss of access to non-timber forest products

Under the baseline scenario, continued deforestation would be expected. Correspondingly, the detrimental social and environmental effects which accompany deforestation would also persist for both community groups – those living in the area that would be the project zone and those which travel to the area that would be the project zone for hunting, logging, and collection of NTFP. Specifically, both groups would need to travel elsewhere, likely farther in distance, in order to access forests for their needs.

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

In the baseline scenario, the area which would comprise the project area would likely be converted to palm oil plantation. Although Indonesia has been working towards creating a sustainable palm oil industry, the country as a whole has a long way to go. As of 2017, only 12% of the approximately 11.9 million hectares of palm oil plantations are Indonesia Sustainable Palm Oil (ISPO) certified[10]. ISPO standards require producers to fulfill certain environmental as well as labor and social standards; implementation of these standards helps to create a global partnership for development as it promotes international principles centered on sustainable social development for impoverished communities worldwide. Because ISPO corresponds with UNDP (United Nations Development Program), which created the Sustainable Development Goals, the baseline scenario would only meet the goal of developing a global partnership for development if the plantation met the ISPO requirements.

If this were the case, community groups (both those in the area that would be the project zone and those who travel to the area that would be project zone) may receive fair social and labor treatment if employed by the plantation. In doing so, this would contribute to Indonesia's progress in developing a global partnership for development.

However, because sustainable palm oil production is currently a very small percentage of the country's output, it is more than likely that the palm oil plantation that would be developed in the absence of the project would not be sustainable under ISPO standards, only two of which are located near the project area. While several plantation companies in Central Kalimantan are ISPO certified, only two near the project area, PT Bangun Jaya Alam Permai & PT Wana Sawit Subur Lestari, have received their ISPO certification as of 2016. Both are located just north of

[10] See http://www.thejakartapost.com/news/2017/04/12/only-12-of-indonesias-oil-palm-plantations-ispo-certified.html

TPNP. Also, as of 2016, only 132 companies of the 562 companies[11] that applied for certification had received an ISPO certification. Thus, it is likely that the proposed plantations in the plantation scenario would likely not provide environmental, social and labor related rights to both identified community groups that would be employed as plantation workers.

4.1.2.2 Project Scenario

In comparison with the expected community conditions under the baseline scenario, the project scenario demonstrates the net positive community benefits that are expected and that have been created by the presence of the project. A Theory of Change exercise was conducted in order to demonstrate the causal relationship between project activities and their direct and indirect impacts. By identifying each project activity's outputs and short-term outcomes, it was possible to then link these to longer term impacts within the project zone that are consistent with the Sustainable Development Goals that were outlined for the project.

The project has had an overwhelmingly net positive impact on communities within the project zone, as is summarized below:

Goal 1: End poverty in all its forms everywhere

In operating under the presence of the project, the eradication of extreme poverty has been a primary objective. As identified in the baseline section above, the creation of palm oil plantations is dualistic. While palm oil plantations have provided employment opportunities for many of Indonesia's citizens, they often cause a lot of harm by encroaching without consultation on indigenous and/or community forests that are depended upon for survival. Often imposing degrading and unsafe working conditions, palm oil employment creates a paradigm where communities are dependent on unfair and unsustainable systems and are left vulnerable to business and market changes.

The implementation of the Rimba Raya project has been influential in reducing local poverty by creating sustainable and self-reliant forms of employment and food production for communities living in and that travel to the project zone. Among the most prevalent project activities that contribute to accomplishing this objective are project related employment opportunities through climate/biodiversity monitoring, guard patrols and fire brigade/ firefighting. These positions are directly involved in the maintenance of the project thus they provide an opportunity for community members to contribute to a larger system that, in turn, directly and decently benefits them. Additionally, the project has made significant headway in the development of chicken farms to provide communities with stable sources of protein, along with the cultivation of vegetables and the production of shrimp paste. These diversified food sources provide new opportunities for employment within the communities, and increase the resilience of communities food supply.

With regards to employment through Rimba Raya, community members are given priority for these positions and positions are made available throughout the year for various needs. The demand for these positions is ongoing, thus workers are not vulnerable to changes in production or market influences which may render them jobless. The project strictly exercises operational

[11] http://www.majalahhortus.com/hukum/item/213-46-perusahaan-sawit-terima-serifikat-ispo.html

safety techniques and trainings so that employees remain protected while working. Furthermore, the project ensures that labor rights are being appropriately applied at all times and that workers are made aware of their rights. When employed by sustainable means where workers are protected and conditions are safe, community members have been able to lift themselves out of extreme poverty.

In creating long-term and rights-oriented employment, the eradication of extreme poverty has been made increasingly possible within the presence of the project.

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Additionally, the ending of hunger has been a primary objective of the project. The implementation of the Rimba Raya project has been influential in reducing hunger by creating sustainable and self-reliant forms of food production for communities living in and that travel to the project zone. The project has made significant headway in the development of chicken farms to provide communities with stable sources of protein, along with the cultivation of vegetables and the production of shrimp paste. These diversified food sources provide new opportunities for employment within the communities, and increase the resilience of communities food supply.

Other project activities which have contributed to the reduction of hunger include community based agroforestry programs, establishment of fisheries and micro-credit programs, access to clean water mechanisms, and capacity building programs such as the Farmer Field School.

Pineapple and djemgkol have been grown using sustainable agroforestry techniques. This has provided community members with food and with opportunities to sell food to make additional income. Likewise, establishment of the microcredit program has allowed financial support and training for community members, notably women, to create working groups which allow them to create alternative streams of revenue and additional food security. Because of funding for the micro-credit program, working groups have been established for producing and selling shrimp paste and chicken meat.

Capacity building exercises have been included as part of implementing many of the above project activities. For example, the Farmer Field School is a learning-based interactive communal activity created to improve skills of adults of the project communities working as farmers, fishermen, livestock breeders and businessmen. The Farmer Field School operates as a learning-based approach which has helped community members to launch and successfully carry out the community agroforestry program as well as all of the working groups involved in the micro-credit program.

In creating alternative sources of food production and income generation, the eradication of hunger has been made increasingly possible within the presence of the project.

Goal 3: Ensure healthy lives and promote well-being for all at all ages

During this monitoring period, the project has treated 1,849 people in its floating clinic across 8 different villages and 2 hamlets. 985 Women received access to medical services, and 468 pairs of reading glasses were distributed. This increase in healthcare access due to the project will allow for community members regardless of age or sex to lead healthier lives and have increased well-being. These activities contribute to the overall increase of coverage of essential health services to those affected by the project.

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities

As described above in the baseline scenario, availability of schools are often limited for communities entrenched in working for the palm oil industry. Also, women and children frequently end up working on oil palm plantations due to a lack of other opportunities, often in positions that have hidden risks such as spreading pesticides. In contrast, the project has been effective in making these services available to community groups and to provide other opportunities and interests for villagers to pursue. By putting a focus on such activities, these goals are much further advanced within the project area than they would be under the baseline scenario.

Since the development of a library and community center, these resources have provided educational materials, meeting space, and training center. Such events can build social and human capital within these communities as relationships are strengthened and knowledge is spread. Women and children especially benefit from community centers and libraries in comparison to the baseline scenario, since instead of many of them working on palm oil plantations, they potentially have more free time to pursue other activities. These activities have provided places for them to learn about healthcare and ways they can take care of their own health and the health of their community as a whole. These will make it much more likely that child mortality will be reduced and maternal health will improve than would be possible under the baseline scenario. They also provide areas for training on the transmission of diseases and ways to reduce the risks.

Additionally, the project has distributed 24 scholarships for community members. 10 of those recipients will be for increased education in high school, and 5 will move forward with university.

Goal 5: Achieve gender equality and empower all women and girls

The project has worked toward improving gender equality within the project area through the employment of women and through women-run initiatives. Currently, 27% of all Rimba Raya staff are women, and 8 women own and operate chicken farms and shrimp paste businesses through financial and technical support from the Community Enterprise Grants Program. By providing these grants, the project is investing in women owned business and is improving the lives of women and girls in the project area.
In addition to these grants, employment, and women's business ventures, the project has also increased access to women's essential healthcare services, through the deployment of the floating health clinic, making access to women's healthcare much easier for women and girls in the project area.

Goal 6: Ensure availability and sustainable management of water and sanitation for all

The construction of Water Purification Systems (WPS) has helped towards the advancement of this goal. During this monitoring period, 2,173 households across 9 villages (74% of households within the project area) had improved access to clean water through these water filtration and purification systems. All communities received training in how to use this new infrastructure, and additionally, the project kept up regular maintenance on these systems throughout the monitoring period.
By providing easy access to clean water, they've reduced the likelihood of getting sick due to the consumption of dirty water, to which children are especially susceptible. The benefits go further than this, though, since improving these activities have made managing a household more efficient. Not only are these activities providing straightforward health benefits, but they also allow for additional long-term benefits that will have a positive impact on community members.

Goal 7: Ensure access to affordable, reliable, sustainable, and modern energy for all

During this monitoring period, 1,794 households across 9 villages (61% of households within the project area) received access to solar power through the distribution of solar lanterns and construction of 2 solar power plants. This endeavor has produced 5,076 khw/year of green energy. The construction of these power plants, as well as the distribution of solar lanterns, has increase access to affordable, reliable, sustainable, and modern energy within the project area. Additionally, the project keeps up with regular maintenance of these systems to ensure that the energy will stay reliable and consistent for community members.

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

To promote sustained economic growth and decent work for all, the project hires an average of 114 seasonal or activity-based employees from local communities to assist with or support the implementation of various project activities or initiatives. Additionally, the women's business grants and the Community Enterprise Grants Program promote full and productive employment. This monitoring period, the Rimba Raya project hired a total of 99 employees, providing a sustained and alternative form of employment to oil palm agriculture.

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

The project continues to positively contribute to infrastructure through the building of clean water and solar power infrastructure (as mentioned above) and hosting trainings on upkeep and maintenance for these systems. Additionally, the project has constructed 2 fire towers for firefighting infrastructure, 1 community center and several libraries to improve access to community organizing, engagement, and governance.

Goal 10: Reduce inequality within and among countries

By providing project employment, food security programs, clean water systems, floating clinic access, increased access to education, improved programs for fostering gender equality, clean solar energy, protection of forested areas, and diversion away from a palm oil livelihood the project is actively reducing inequality within and among countries. Access to sustainable development mechanisms that target making impacts from root causes actively decreases inequality.

Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable

To make settlements inclusive, the project is funding women's business ventures and providing women's healthcare through the floating clinic. Safety is insured through access to clean water through the WPS systems as well as active fire patrols. Resilience and sustainability targets are hit through the shifting away from a palm-oil based livelihood that destroys ecosystems and does not provide safe employment for community members. Instead, the project is working toward sustainable farming and food production initiatives, funding increased solar power access in communities, and providing gainful employment.

Goal 12: Ensure sustainable consumption and production patterns

During this monitoring period, 610 students received education from a sustainability awareness campaign with the Seruyan River Cleaning Program. An additional 90 people attended other sustainability trainings. By hosting these workshops, the project is promoting sustainability education that will be seen across all sectors as students implement

what they learn. With this program and the sustainable farming initiatives mentioned earlier, the project is actively contributing to sustainable consumption patterns.

Goal 13: Take urgent action to combat climate change and its impacts

This monitoring period, the project produced 7,575,970 tCO2e of net estimated emissions reductions by conserving 47,237 hectares of forest through patrols, firefighting, and prevention of conversion to palm oil.

Goal 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development

The project has planted 74,850 mangrove seeds and has collected and diverted 18.9 tonnes of garbage from the Seruyan River and its shores.

Goal 15: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainable manage forests, combat desertification, and halt and reverse land degradation and biodiversity loss

The baseline effects of deforestation within the project zone would be devastating to the environment and would have severe negative impacts on communities as well. The conversion of peat forests and shrubland to plantations would degrade the soil and water quality throughout the area, having detrimental impacts on the health of communities. Additionally, deforestation from palm oil companies would likely spur the displacement of local people, the loss of livelihoods and ancestral lands, as well as a loss of access to essential non-timber forest products.

By providing local communities with sustainable forms of employment throughout the project zone and protecting the forest within the project area from conversion to palm oil plantations, the project has mitigated many of the negative impacts expected in the baseline scenario. Communities have been able to maintain or improve their livelihoods and retain their access to land, while maintaining goals for sustainable development.

Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels

By building 2 community centers, the project has increased organizational capacity for communities and created inclusive hubs where community members can gather and organize. Additionally, the project has sent out surveys of project effectiveness with an 82% satisfaction rate of respondents.

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

The final Sustainable Development Goal is the development of global partnerships. This has been a goal of the project proponents so that the project may be strengthened by engaging with a wide range of stakeholders that can provide expertise and long-term support. From the beginning, a key component of the project has been multi-stakeholder support for all projects. Forest and biodiversity protection were designed with support from OFI, which has been working in TPNP since 1986. Educational goals and the establishment of the various working groups for the project were implemented through World Education, which was established in 1951. By developing working groups made up by local community members, this has provided these villagers with opportunities to connect and discuss their ideas with an international community they didn't have access to before. Both of these are international organizations that have staff in the area that have been working there for many

years. They know both community development in the region and how to connect with other international organizations.

Since these organizations already worked in the area prior to the project implementation, they would likely be continuing their work there without the project. However, support from Rimba Raya has been critical for the expansion of new activities within the region. In many cases, Rimba Raya has provided financial and organizational support, such as for the chicken farms and working groups. This has allowed these organizations to use their experience and expertise to increase the effectiveness of these projects. One great success of this project has been due to the commitment from the beginning to work with international organizations in helping local villagers create their own institutions and organizations that have allowed them to connect with the global community. This is being done much more frequently than would have ever been possible if the project area had been converted to palm oil plantation.

Indicators and monitoring results with respect to the effectiveness of community-related activities are based on the activities, outputs, outcomes and impacts for each community-related project activity area. The table below demonstrates the linkage between these activities and overall community impacts as demonstrated through the progress made during this monitoring period.

Project Activity	**Output (from this monitoring period)**	**Outcome (from this monitoring period)**	**Impact**
Employment opportunities through Monitoring activities	Construction of 2 fire towers in Ulak Batu and Muara Dua villages, continued operation of Batu Hirang fire tower and guard posts 2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff. Trainings for fire suppression and equipment utilization.	Increased employment of community members. Increased number of community members with alternative revenue streams.	Eradicate extreme poverty and hunger

Community based agro-forestry	Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program.	Development of community-based food sources	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members	Increased number of community members with access to clean water. Decreased number of community members becoming ill due to water-borne and sanitation-related illnesses	
Micro Credit Program	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of community members (notably women) pursuing independent, sustainable sources of income based off of learning new skills/knowledge. Increase in independent food production	

Community centers in strategically selected villages inside the Project zone.	3 new libraries opened and continued operation of community centers during the monitoring period.	Provision of a central community space and building for educational activities to occur/educational resources to exist. Increased number of people with access to educational spaces/educational material	Achieve universal primary education
Extend World Education's ongoing programs for food security, access to government services, and capacity building within the project zone	Continuation of working groups – shrimp paste and chicken meat production Additional 8 women-owned enterprises added this monitoring period	Increased number of community members (notably women) gaining skills and education from capacity building	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Increased number of community members with clean water awareness and gained knowledge about safe drinking habits and sanitation	

Protect all remaining forests (esp. natural forests) and wetlands from periodic fire; prevent further conversion to industrial scale agriculture, which increases fire risk; reduce possible deliberate use of fire for renewal of shallow water fishing grounds through education and awareness campaigns	15,187 hectares of forest continued to be protected within the 47,237 hectare project area	Increased awareness of the importance of forest protection and forest health	
Employment of women in project related employment	10 women employed during this monitoring period in project activities	Increased number of women that are financially self-sufficient	Promote gender equality and empower women
Micro Credit Programs	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of women pursuing independent, sustainable sources of income	

Women Capacity Building (peningkatan kapasitas perempuan)	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of women pursuing independent, sustainable sources of income	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Decrease in number of children sick/dying from unclean water and issues related to open defecation/sanitation related sicknesses	Reduce child mortality
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Increased number of people with access to clean water. Decreased number of people becoming sick/dying due to water borne illnesses. Increased awareness about water borne diseases, sanitation, and transmission of diseases through mosquitoes	Ensure environmental sustainability

Employment opportunities through construction & operation of guard & fire towers	Construction of 2 fire towers in Ulak Batu and Muara Dua villages, continued operation of Batu Hirang fire tower and guard posts 2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff. 8 hydrant wells were installed in throughout the project area	Increased forest protection. Increased employment in environmentally sustainable jobs	
Employment opportunities through Orangutan Care Facilities	25 orangutans released	Increased protection for endangered orangutans and orangutan habitat	
Community based agro-forestry	Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program.	Decrease in unsustainable forest clearing for agriculture. Increase in sustainable agro-forestry land	

Prevent further oil palm expansion; maintain and enhance remaining forests in the Project zone; possibly rehabilitate select riparian forest zones; prevent spread of forest fires, specially into peat areas with direct impact on water quality of the Seruyan	15,310 hectares of forest continued to be protected Replanting of 139,354 seedlings	Increase in forest cover in riparian zones. Increase in protection of already intact forests and peatlands	
Protect all remaining forests (esp. natural forests) and wetlands from periodic fire; prevent further conversion to industrial scale agriculture, which increases fire risk; reduce possible deliberate use of fire for renewal of shallow water fishing grounds through education and awareness campaigns	15,310 hectares of forest continued to be protected 2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff	Increase in protected forest and peatlands from fire and palm oil development. Increase in awareness about importance of forest protection	
Buffer Planting Program	139,354 seedlings planted that are sourced from community-run nurseries	Increase in forest cover in buffer zone	

Prevention of forest loss by oil palm expansion and possible development of local bodies to manage communal forest areas in a more structured fashion to promote chances for long-term sustainability of forest areas	15,310 hectares of forest continued to be protected Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program.	Increase in sustainably managed agroforestry land. Improved community correspondence and collaboration in relation to long-term sustainable management	
Employment opportunities through Monitoring activities	Employment of 99 staff and community staff	Increased number of people involved in climate, forest and biodiversity monitoring of forested areas	
Building materials: Prevention of forest loss by oil palm expansion and possible development of local bodies to manage local timber harvesting levels to promote chances for long-term sustainable supplies.	Planting of 139,354 seedlings	Increase in use of sustainable forest products. Decrease in deforestation/degradation for forest products creation	
Extend World Education's ongoing programs for food security, access to government services, and capacity building within the project zone	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increase in correspondence and collaboration among community members and larger organizations involved in the project or making connections with project	

Employment opportunities through Monitoring activities	Construction of 2 fire towers in Ulak Batu and Muara Dua villages, continued operation of Batu Hirang fire tower and guard posts 2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff. Trainings for fire suppression and equipment utilization.	Increased employment of community members. Increased number of community members with alternative revenue streams..	
Community based agro-forestry	Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program.	Development of community-based food sources	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Increased number of community members with access to clean water. Decreased number of community members becoming ill due to water-borne and sanitation-related illnesses	

Micro Credit Program	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of community members (notably women) pursuing independent, sustainable sources of income based off of learning new skills/knowledge. Increase in independent food production	
Community centers in strategically selected villages inside the Project zone.	3 new libraries opened and continued operation of community centers during the monitoring period	Provision of a central community space and building for educational activities to occur/educational resources to exist. Increased number of people with access to educational spaces/educational material	
Extend World Education's ongoing programs for food security, access to government services, and capacity building within the project zone	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of community members (notably women) gaining skills and education from capacity building	Develop a Global Partnership for Development

Prevention of forest loss by oil palm expansion and possible development of local bodies to manage communal forest areas in a more structured fashion to promote chances for long-term sustainability of forest areas	15,310 hectares of forest continued to Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program. Replanting of forest trees (139,354 seedlings planted).	Increase in correspondence and collaboration among community members and project partners with palm oil companies and other parties in the area	

Table 23: Summary of Theory of Change Exercise for Community Goals

4.1.3 Protection of High Conservation Values (CM1.2)

Maintaining and enhancing forests and other natural ecosystems is key to protecting HCVs 4-6 and their associated sub-values in the project zone, as described and identified in the previously validated PDD. Community based HCVs that have been identified as present in the project zone are show in Table 24 below:

	High Conservation Value
4.1	Areas or Ecosystems Important for the Provision of Water and Prevention of Floods for Downstream Communities
4.3	Areas that Function as Natural Barriers to the Spread of Forest or Ground Fire
5	Natural Areas Critical for Meeting the Basic Needs of Local People
6	Areas Critical for Maintaining the Cultural Identity of Local Communities

Table 24: Protection of Community Based HCVs

Some of these HCV sub-values require attention to specific areas within the project zone, including: preserving mature forest for natural fire breaks near sources of fire in the south; protecting shoreline forest or other natural vegetation along Lake Sembuluh; rehabilitating riparian forest zones along the Seruyan and its major tributaries; and monitoring communal forest areas used for subsistence timber production outside of the Project area, but inside the project zone east of the Seruyan. Additionally, maintenance of some HCVs requires education programs for local communities, e.g. to reduce or eliminate the use of fire in the open wetlands in the south where it has been suggested that fishermen do this periodically to renew seasonal shallow water fishing grounds. Table 25 summarizes progress made during this monitoring period by project activities targeted specifically at community HCVs.

Activities	Status	Implementation details	Start date	Finish date
Work group assistancy: Indah Berseri (chicken farm - in Baung)	initiative	continue	2/17/2017	ongoing
Work group assistancy: Putri Baung Bakena (egg chicken farm -in Baung)	initiative	discontinued - not feasible as the egg production decreased significantly	4/1/2017	Discontinued.
Work group assistancy: Manuk Taheta (chicken farm in Jahitan)	initiative	continue	3/24/2017	ongoing
Work group assistancy: Karya Bersama (dried fish - hamlet Tampudau)	initiative	discontinued - the fishermen prefer to sell fresh fish without additional value since they can get money to cover the transport cost too.	3/24/2017	Discontinued.
Work group assistancy: Harapan Berkembang (fishery in Tanjung Rangas)	initiative	continue - still looking for the good juveniles	8/4/2016	Discontinued.
Work group assistancy: Zuper (shrimpaste in Sungai Perlu - located in Kuala Pembuang 1)	initiative	In 2021, RR temporally discontinued the support for ZUPER and it is creating the enabling conditions to form a new Working Group in another village in 2022.	2015	Temporally discontinued.
Zero Iliteracy Program (non formal school- Kejar Paket)	educative	still under plan for further steps	8/1/2017	Discontinued.

SFS Telaga Pulang assistancy	educative	discontinue since 2018 - change of curricullum and change the teacher- (farming)	6/1/2018	Rimba Raya continues developing Farmer Working Groups where participants are community members
Village library assistancy Muara Dua "Harati Bersama"	educative	continue	5/1/2017	Ongoing
Village library assistancy Ulak Batu "Rekreasi Ulba"	educative	continue	1/1/2017	Ongoing
NZ aid fund for Solar power electrification	pilot project	Discontinued - funded by HEF NZ Embassy - handed over to villagers	7/20/2018	Nov-18 RR support the maintenance and procurement for replacing malfunctioning parts.

Reading Glases program Ulba, Palingkau and Cempaka Baru Reading Glasses program for 6 villages: Ulba, Palingkau, Cempaka Baru, Baung, Muara Dua, and Sungai Perlu. 2 Hamlets: Tampudau and Belanti.	health	Between Ulak Batu and Palingkau, 61 pairs of reading glasses were provided in this monitoring period. Total 468 for 248 Males and 220 Females	Ulak Batu: 2018/03: Palingkau: 2019/03/08 1. 2019 Cempaka Baru 23 Okt 2019 2. 2020 Muara Dua 14 Aug 2020, Baung 15 Aug 2020, and Belanti 16 Aug 2020 3. 2021 Tampudau 16 July 2021, Belanti 17 July 2021, Cempaka Baru 21 July 2021, Palingkau 22 Jui 2021, Ulak Batu 23 July 2021 Sungai Perlu Village will be executed in Q1 2022	Ulak Batu: Complete, Palingkau: Complete
Rimba Raya Staff computer training - capacity building	educative	continue - in the unit (staff who can operate computer teach to the staff who is not able to develop simple report/filling up the form)	• Starting in Q1 - 2021 • Frequency: every one – two months. For introductory stage. • Participants: All Rimba Raya Staff • Trainer: HR Department Rimba Raya will hire computer trainer to provide training more frequently starting 2022	ongoing

Ecotourism prospect	initiation	idle - need to have further review (already in the plan)		
Comparative study by 2 Malaysian researchers	initiation	discontinue - the researchers only did comparative study in Rimba Raya	9/10/2017	9/21/2017
Solar Lantern monitoring report (survey)	health, educative, economy	The Monitoring and Evaluation for solar lantern has been discontinued; however, the community members continue benefit from the solar lantern. Rimba Raya scaled-up the electricity use in villages through solar power electrification in Ulak Batu, Muara Dua and Tampudau. And it is projected to complete the construction of solar power electrification in Belanti village by Q4-2021	2016	ongoing

Water Filter monitoring report (survey)	health	The Monitoring and Evaluation for water filter has been discontinued; however, the community members continue benefit from the water filters. Rimba Raya scaled-up the purified water use in villages through water purification system in Baung, Muara Dua and Jahitan. In 2021, 05 additional are being constructed in Ulak Batu, Cempaka Baru, Tanjung Rangas, Pematang Limau and Palingkau	9/1/2013	ongoing
Participatory mapping	non-routine (educative)	RR has been conducting PM in 7 villages - final and sign 4 villages (3 more to follow up) and 3 more villages are under plan to execute the process. 7 villages have signed the Participatory mapping: Ulak Batu, Telaga Pulang, Baung, Muara Dua, Jahitan, Tanjung Rangas, and Pematang Limau	2013	ongoing

Road Illumination in Muara Dua	initiation	Rimba Raya scaled-up the electricity use in villages through solar power electrification in Ulak Batu, Muara Dua and Tampudau. And it is projected to complete the construction of solar power electrification in Belanti village by Q4-2021	10/2/2017	discontinued
Establish village bulletin board to update Rimba Raya program status	initiation - should be updated per 6 months	Provision of program status and provide information on climate and environmental issue.		On going
Floating Clinic	routine - every 3 month but we just have 1 trial period - will do again on December 2019	Continue	2016	ongoing

Seruyan River cleaning	non-routine (educative)	Between July 2020 and December 2020, 13.8 tons of garbage were collected from the Seruyan River and its shores 2021 RR developed Village clean program in 9 villages: Palingkau, Cempaka Baru, Telaga Pulang, Baung, Jahitan, Muara Dua, Tanjung Rangas, Persil Raya and Pematang Limau and a cleaning task force with 9 members from 7 villages: Ulak Batu, Palingkau, Cempaka Baru, Baung, Jahitan, Tanjung Rangas, and Pematang Limau.	Ongoing	period 2019-2019 done, continue with period 2019-2020

Scholarship to Senior High School	non-routine (educative)	RR Scholarship for Senior High School 1. Period 2018 – 2021: 24 students received RR Scholarship (finished) 2. Period 2021 – 10 students received RR Scholarship RR Scholarship for University: Period 2021 – 3 students received RR Scholarship	1/1/2018	ongoing
Village water purifying system (WPS)	1 WPS as pilot project in Baung village	Installation of 2 more WPS in Muara Dua and Jahitan will be completed in Dec 2019, we continue with another 8 WPS for another 6 villages and 2 hamlets Rimba Raya scaled-up the purified water use in villages through water purification system in Baung, Muara Dua and Jahitan. In 2021, 05 additional are being constructed in Ulak Batu, Cempaka Baru, Tanjung Rangas, Pematang Limau and Palingkau	10/1/2019	Oct-19

Solar Power Electrification (SPE) - NEW PROGRAM	health, educative, economy	2 units of SPE are being installed for Tampudau and Belanti hamlets Q4 2021 for Belanti	11/1/2019	Dec-19

Table 25: Progress of Community Based HCV Protection during the Current Monitoring Period

None of the planned project activities have had, nor are intended to have, a negative impact on HCVs in the Project zone. Project activities have been heavily focused on maintaining and enhancing forests and natural ecosystems, along with the environmental, social, and cultural benefits derived from them. Such activities have had a strong positive impact on HCVs 4-6. In the table below, key threats to HCVs and recommended project activities to address threats within the framework of the project are shown. The table identifies activities that have been undertaken and others that are planned for the future.

The project collected preliminary socio-economic data during the PDD development and this data has continued to be collected in order to determine the effectiveness of the project activities. One of the major stated objectives of the project has been to bring the most benefits the poorest people of the community. This data (a) allows the project proponent to identify by family, who these individuals are, and (b) focus or tailor efforts to ensure they are a major beneficiary of the positive results of the project activities. Additionally, women in Indonesia are known to primarily be located in the poorest quartile of citizens and the project has been and will continue to be focused on improving their lives through employment opportunities (non-field and hard labor related) as well as through specific project activities such as the micro-credit program.

HCV	Threats to HCV	Management Recommendation & Activities
4.1	Oil palm expansion and deforestation leading to continued pollution and degradation of the watershed draining into the Seruyan River on which communities depend for water & fisheries (see also HCV 5)	Prevent further oil palm expansion; maintain and enhance remaining forests in the Project zone; possibly rehabilitate select riparian forest zones; prevent spread of forest fires, especially into peat areas with direct impact on water quality of the Seruyan
4.2	Deemed not present	N/A
4.3	Continued fire, illegal logging, and oil palm expansion	Protect all remaining forests (esp. natural forests) and wetlands from periodic fire; prevent further conversion to industrial scale agriculture, which increases fire risk; reduce possible deliberate use of fire for renewal of shallow water fishing grounds through education and awareness campaigns

5	Water: pollution and sedimentation of the Seruyan from oil palm; pollution from local human populations, in particular river use for sanitation purposes; conversion of riparian forests.	Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.
	Fisheries: same as for water.	Fisheries: same as for water above, plus planned efforts to explore potential for facilitating communities to organize and establish a fisheries cooperative, local rules and management regulations, and associated local enforcement bodies.
	Building Materials: forest loss, especially through land clearance related to oil palm expansion, but also including small scale agriculture.	Building materials: Prevention of forest loss by oil palm expansion and possible development of local bodies to manage local timber harvesting levels to promote chances for long-term sustainable supplies.
	Fuel wood: forest loss (more data required on exactly where such fuel wood is sourced.	Fuel wood: prevention of large-scale natural vegetation clearance for oil palm.
6	HCV deemed unlikely but potentially present in the form of remnant natural forest areas east of the Seruyan (outside the Project area but inside the Project zone) that are managed communally for subsistence wood production; further research is required to understand if such forests have cultural meaning in addition to their utility as wood sources.	Prevention of forest loss by oil palm expansion and possible development of local bodies to manage communal forest areas in a more structured fashion to promote chances for long-term sustainability of forest areas.

Table 26. Threats and management recommendations for HCVs 4-6 in the Project zone

4.2 Offsite Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM2.2)

Although the project was designed to positively impact the community, it was necessary to identify potential negative impacts on community members and other stakeholders. Potential negative impacts on stakeholders are described below along with mitigation techniques that would be employed if a negative impact did occur.

Subsistence Livelihoods

Project Proponents recognize that one of the fundamental components to Rimba Raya's success is the participation and support of affected communities. Villages have patterns of hunting and harvesting that are both steeped in tradition and contribute to local economies.

Consequently, it is important that efforts at protecting the forest do not inadvertently infringe upon these activities. Concurrently, there are concerns that a reduction in regional palm activity would diminish employment opportunities on plantations, further harming local economies. Taken together, it is necessary to address possible negative community impacts from the project.

Although InfiniteEARTH has aimed to safeguard the forest against the incursion of palm oil plantations, there has not been an imposition of curbs to traditional modes of hunting and harvesting. InfiniteEARTH recognizes the economic and cultural value of such activities, and does not seek to restrain them. In fact, curbs are largely unnecessary, as hunting and harvesting from the forest are not significant contributors to local economies. Moreover, the opportunity cost of jobs from palm is minimal, as most labor is hired from outside of local communities. InfiniteEARTH provides employment through the provision of social service and forest protection programs in order to offset any loss of livelihood due to project implementation.

Hunting

Communities in the project zone are predominantly Muslim. To that end, they tend not to engage in the hunting of bush meat – such as wild boar – that are common in other parts of Indonesia. Social surveys indicated that hunting is limited to deer which can be found in and around the project area. Animal protein is largely acquired through fishing in the Seruyan River and project area as well as the raising of poultry in villages. Potential negative impacts, though limited, may include stakeholders obtaining less animal protein in their diets because of the presence of the project and social pressures to not hunt within the project area.

However, negative impacts expected on stakeholders in terms of hunting have been limited because a) Hunting is not limited by the project because it contributes minimally to deforestation and forest degradation and b) the project activities related to the maintenance of local peat swamp and other forest types has actually helped to improve fish and game stocks used by communities. This is because the creation of the Reserve protects crucial habitat for game species which allows those species to flourish. Furthermore, project activities such as fishery creation and allocating micro-credit for shrimp paste and poultry production have provided community members with alternative sources of protein as well as avenues for alternative sources of revenue. Although the project proponent recognizes that there may be limited negative impacts on stakeholders in terms of hunting, the project proponent aims to mitigate these impacts through project activities.

Forest Harvesting

In the past, many communities planted dry rice and vegetables and collected rubber from rubber gardens in order to sell. Evidence of selective extraction for canoes and housing was found as well as expansion of subsistence gardens on degraded lands. From 2005 – 2008, however, monthly flooding limited their livelihood activities to fishing and palm sugar production (from the tree Arenga pinnata). Surveys indicated that project zone communities are not actively engaged in the harvesting of forest beyond simple usage. As such, the project does not inhibit community members from traditional forest harvesting practices because they do not substantially contribute to deforestation and forest degradation. However, it is recognized that potential negative

impacts may include stakeholders partaking in forest harvesting less and less due to social pressures created by the presence of the project. As a result, this may contribute to a decrease in revenue streams for project stakeholders and other community members.

As a means to mitigate these potential negative impacts, the project has provided further revenue sources to the communities from sustainable activities; examples include the pineapple plantation and development of a chicken farm, so that community members may have a sustainable source of revenue. During this monitoring period the project has also furthered its agroforestry program through the planting and continued upkeep of sustainable pineapple and djengkol plantations.

There is also a history of illegal logging inside the Project area and extending into Tanjung Puting National Park, and evidence has surfaced that some illegal logging activities may be ongoing in the southern portion of the project area. While this may or may not be directly related to project stakeholders, it has been necessary to confront the issue and provide alternative choices for those partaking, or at the very least, try to offset the forest loss itself. If the project were to crack down on illegal logging and not provide an alternative route, project stakeholders may experience the negative impacts of revenue loss or loss of firewood needed for cooking.

As such, the project has planted seedlings from a variety of different species within the project buffer area during this monitoring period. Seedlings were purchased from village nurseries that are supported by individuals and families who provide the labor to grow the seedlings.

The project has also worked to prevent forest loss by oil palm expansion through stakeholder-engaged management of communal forest areas. This has been structured in a fashion to promote chances for long-term sustainability of forest areas and of timber supply. In doing so, the project has reforested 137.5 ha of peat swamp forest, with 139,354 seedlings grown in community-run nurseries during this monitoring period.

If project activities are successful in protecting these forests and eliminating the threat of illegal logging, then individuals who rely on this practice for their livelihoods will see their benefits reduced. However, available information indicates that most if not all large-scale illegal logging is undertaken by communities from outside the Project zone, and that they have no traditional or communal claims to the land. The loss of benefits derived from such illegal activities is outside the scope of project requirements as defined by the CCB standard. For those project stakeholders who partake in illegal forest harvesting and who may be negatively impacted by the presence of the project, the project activities, such as those listed above, have been aimed at mitigating these impacts and providing alternative livelihoods that are safer and more sustainable.

Employment

In Kalimantan, a standard palm oil plantation employs one person per every eight hectares of land. The communities within Rimba Raya comprise roughly 2,000 families. Given the size of Rimba Raya, the number of workers required to work on palm concessions would comfortably exceed the supply of labor provided by Project zone communities. To compensate for the shortfall, the majority of laborers who would work in palm would be, and often have been in the past, hired from other parts of Indonesia (primarily Java). It has been common for palm companies to hire laborers from outside of local communities. There have been two

reasons for this: migrant laborers are less concerned with protecting local forests; and as migrant laborers become economically dependent on palm, they tend to be more loyal to the company. Palm companies' preference for hiring outside labor thereby has limited opportunities for project zone communities to benefit from palm employment. The opportunity costs associated with palm employment have thus far not hard a large impact on project zone communities.

If the project successfully prevents oil palm companies from operating in the project area, some people who might have been employed by these companies may not have access to employment in the region. The overwhelming trend in standard employment practices of local palm oil companies is to hire trans-migrant labor from offsite locations such as Java and Sumatra. Therefore, in practice, very few of these employees would have been hired from inside project zone communities and those that would be employed would most likely be hired on an "as needed" seasonal basis. During interviews with the local communities, project proponents, World Education and OFI, all independently found that only a handful of community members were employed by the large palm oil operator on the northern border of Rimba Raya.

In addition to the positive externalities generated by implementing UN Sustainable Development Goals, the foundation has created direct employment in fire prevention, forest security, and Orangutan care. Increased access to education, healthcare and microfinance has also helped to positively affect communities and mitigate any potential negative impacts.

As a matter of policy, members of project zone communities have been given priority in hiring for most project-related positions. To the extent that positions are not filled internally, however, they have been offered at large. Offsite stakeholders who have been negatively impacted by the loss of oil palm employment opportunities may apply as well.

Finally, for those people who have been working in the active plantation to the north of the project area and who may be negatively impacted by the project's plans to prevent further expansion of that plantation into the Project area (expansion that is currently illegal by the terms of the plantation's license), the project intends, via leakage mitigation contracts, to undertake a cooperative forest rehabilitation program that would offer these stakeholders additional employment opportunities. To date the Project has directly employed 99 community members as permanent full-time staff.

4.2.2 Net Impacts on Other Stakeholders (CM2.3)

Despite the recognition of potential negative effects on stakeholders, Indicators and monitoring results with respect to the effectiveness of community-related activities were deemed to have an overall positive effect. Results were based on the activities, outputs, outcomes and impacts for each community-related project activity area. These can be reviewed more clearly in the Theory of Change and its summary.

All off-site stakeholders negatively impacted by project activities have been found to either belong to an inchoate group (displaced oil palm plantations) or have been engaged in illegal activities (logging operations). Conversely, project activities have been shown to result in substantial positive off-site impacts both from maintenance and improvements in ecosystem services and

from secondary and indirect effects of social and economic programs undertaken by project proponents.

Ultimately, estimating net impacts on off-site stakeholders is too speculative to be of much use, although it should be noted that the total potential off-site impacts are minor in comparison to the significant and overwhelmingly positive on-site stakeholder impacts of proposed project activities.

4.3 Community Impact Monitoring

4.3.1 Community Monitoring Plan Development (CM3.3)

The Rimba Raya project is committed to the development of sustainable livelihoods for communities in the project zone. Monitoring activities used to measure the project's impact on community livelihoods have been designed to suit specific goals and interventions. A Theory of Change framework was used to guide this process in order to provide more direct links between monitoring indicators and long-term project impacts. A detailed TOC analysis was conducted and relevant project activity outputs/monitoring indicators were identified.

Project Activity	Output (from this monitoring period)	Outcome (from this monitoring period)	Impact
Employment opportunities through Monitoring activities	# of fire towers constructed # of guard posts staffed # of trainings for fire suppression	Increased employment of community members. Increased number of community members with alternative revenue streams..	Eradicate extreme poverty and hunger
Community based agro-forestry	# of hectares of community based agroforestry	Development of community based food sources	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	# of water filters distributed and WPS facilities constructed	Increased number of community members with access to clean water. Decreased number of community members becoming ill due to water-borne and sanitation-related illnesses	

Micro Credit Program	# of individuals involved in shrimp paste and chicken meat production	Increased number of community members (notably women) pursuing independent, sustainable sources of income based off of learning new skills/knowledge. Increase in independent food production	
Community centers in strategically selected villages inside the Project zone.	Operation of libraries and continued operation of community centers during the monitoring period	Provision of a central community space and building for educational activities to occur/educational resources to exist. Increased number of people with access to educational spaces/educational material	Achieve universal primary education
Extend World Education's ongoing programs for food security, access to government services, and capacity building within the project zone	Continuation of working groups – shrimp paste and chicken meat production	Increased number of community members (notably women) gaining skills and education from capacity building	

Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	# of water filters distributed and WPS facilities constructed.	Increased number of community members with clean water awareness and gained knowledge about safe drinking habits and sanitation	
Protect all remaining forests (esp. natural forests) and wetlands from periodic fire; prevent further conversion to industrial scale agriculture, which increases fire risk; reduce possible deliberate use of fire for renewal of shallow water fishing grounds through education and awareness campaigns	# of hectares of forest protected # of hectares of total land area protected	Increased awareness of the importance of forest protection and forest health	
Employment of women in project related employment	# of women employed in project activities	Increased number of women that are financially self-sufficient	Promote gender equality and empower women
Micro Credit Programs	Continuation of working groups – shrimp paste and chicken meat production	Increased number of women pursuing independent, sustainable sources of income	

Women Capacity Building (peningkatan kapasitas perempuan)	Continuation of working groups – shrimp paste and chicken meat production	Increased number of women pursuing independent, sustainable sources of income	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	# of water filters distributed and WPS facilities constructued	Decrease in number of children sick/dying from unclean water and issues related to open defecation/sanitation related sicknesses	Reduce child mortality
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	# of water filters distributed and WPS facilities constructed	Increased number of people with access to clean water. Decreased number of people becoming sick/dying due to water borne illnesses. Increased awareness about water borne diseases, sanitation, and transmission of diseases through mosquitoes	
Employment opportunities through construction & operation of guard & fire towers	# of fire towers constructed # of guard posts staffed # of trainings for fire suppression	Increased forest protection. Increased employment in environmentally sustainable jobs	Ensure environmental

Employment opportunities through Orangutan Care Facilities	# of orangutans released	Increased protection for endangered orangutans and orangutan habitat	sustainability
Community based agro-forestry	# hectares of agroforestry plantations established	Decrease in unsustainable forest clearing for agriculture. Increase in sustainable agro-forestry land	
Prevent further oil palm expansion; maintain and enhance remaining forests in the Project zone; possibly rehabilitate select riparian forest zones; prevent spread of forest fires, specially into peat areas with direct impact on water quality of the Seruyan	# of hectares of forest continued to be protected # of seedlings replanted	Increase in forest cover in riparian zones. Increase in protection of already intact forests and peatlands	
Protect all remaining forests (esp. natural forests) and wetlands from periodic fire; prevent further conversion to industrial scale agriculture, which increases fire risk; reduce possible deliberate use of fire for renewal of shallow water fishing grounds through education and awareness campaigns	# of hectares of forest continued to be protected # of guard posts manned	Increase in protected forest and peatlands from fire and palm oil development. Increase in awareness about importance of forest protection	

Buffer Planting Program	# of seedlings planted that are sourced from community-run nurseries	Increase in forest cover in buffer zone	
Prevention of forest loss by oil palm expansion and possible development of local bodies to manage communal forest areas in a more structured fashion to promote chances for long-term sustainability of forest areas	# of hectares of forest continued to be protected Pineapple and djengkol planting has continued as part of agroforestry program.	Increase in sustainably managed agroforestry land. Improved community correspondence and collaboration in relation to long-term sustainable management	
Employment opportunities through Monitoring activities	# of staff and community staff employed	Increased number of people involved in climate, forest and biodiversity monitoring of forested areas	
Building materials: Prevention of forest loss by oil palm expansion and possible development of local bodies to manage local timber harvesting levels to promote chances for long-term sustainable supplies.	Planting of 70,000 seedlings	Increase in use of sustainable forest products. Decrease in deforestation/degradation for forest products creation	

Extend World Education's ongoing programs for food security, access to government services, and capacity building within the project zone	Continuation of working groups – shrimp paste and chicken meat production	Increase in correspondence and collaboration among community members and larger organizations involved in the project or making connections with project	Develop a Global Partnership for Development
Prevention of forest loss by oil palm expansion and possible development of local bodies to manage communal forest areas in a more structured fashion to promote chances for long-term sustainability of forest areas	# of hectares of forest continued to Pineapple and djengkol planting has continued as part of agroforestry program. # of seedlings replanted	Increase in correspondence and collaboration among community members and project partners with palm oil companies and other parties in the area	

Community Needs Assessment

An in-depth community needs assessment was carried out in 2018 for each community in the Project zone prior to any on-the-ground project implementation, and will continue to be carried out every 3 to 5 years prior to future community project activities. The next community needs assessment is scheduled for completion in 2022. Such an assessment is important for identifying gaps between community needs and desired conditions with regard to all five capital assets (as described in Section CM3.1 above) – the foundation for creating sustainable livelihoods. This information has fed into all elements of project development, and particularly guides the design of suitable community development programs. Importantly, it also initiates relationship-building, crucial to project success. Engaging communities early in the project, with a focus on their needs, is also an important way to build a sense of belonging to the project. It must be noted that this can also be one of the riskiest stages in project development as it is often the stage where communities' hopes are raised and expectations can soar. Communities will be hoping for programs that offer immediate tangible benefits (jobs, healthcare, and other income-related activities). If such hopes are unwittingly created during this initial engagement, and subsequently unmet, conflict will likely arise, risking project success. It is critical that this assessment is undertaken in a manner that manages this risk. To avoid these risks, this assessment has been undertaken in cooperation with World Education, which has active programs and a productive working relationship in three Project zone villages (Baung, Ulak Batu and Palingkau). The last needs assessment and baseline survey, as outlined in Table 27 below was conducted during the previous monitoring period.

Monitoring Component		Activity
Initial Community Monitoring Component	Physical	Number of households that have upgraded from leaf to aluminum roofs.
		Number of individuals with fishing boats or other fishing equipment.
	Financial	Income and expenditures of families (e.g., proportion of households with income higher than the current level of income).
		Employment rates (e.g., number of family members with a job or business; distribution of job opportunities across gender and social status).
	Social	Number of households with members involved in at least one community organization or program.
		Proportion of families who participate in the formal electoral process (Number of households with actual voters).

Monitoring Component		Activity
		Number of grievances recorded against oil palm companies declines.
		Level of adherence to laws and frequency of penalties being given for those breaking them.
	Natural	Assess any decrease in flooding of their agricultural land and/or an increase in productivity of arable land.
		Assess that forests and agricultural areas that are important to meeting basic needs have become available.
		Assess water quality for turbidity and pollution and that draining of peat swamps in the area has stopped.
	Human	Check improvement in proportion of households or individuals with knowledge and information on hygiene
		Check number of incidence of diarrhea, typhoid
		Check proportion of households with sanitary toilet facilities (not excreting into the Seruyan River where they wash dishes and bathe)
		Check for improved sanitation facilities (hand washing soap, safe water containers, water treatment)
		Check percentage of households with access to clean water
		Check number of water treatment facilities in a village
		Check mortality rates (infant, child, mother)
		Existence of medical centers (including number of doctors and nurses and number of patient visits)
		Check prevalence of acute and chronic malnutrition and disease
		Check number of children attending school

Monitoring Component		Activity
		Check percent of family members who go/have gone to school
		Check number of family members who are able to read and write
		Check number of family members who have attended some type of livelihood related training
Comprehensive Community Monitoring Component	Preliminary High Conservation Monitoring Plan	Mapping of HCV5(basic needs) and HCV6 (Cultural Identity) areas
	Community Needs assessment	In depth community needs assessment in each village prior to any on the ground project implementation in coordination with World Education. To identify gaps between community needs and desired conditions with regard to all five capital assets as shown above.
	Illegal logging	Mapping of real actors of illegal logging
	Job Opportunities with the Rimba Raya Project	Develop a strategy to provide training and other educational programs with the goal of increasing local capacity to fill more skilled and permanent positions within the project organization. Check local capacity has increased within the project organization.

Table 27. Parameters for the Community-based needs survey

Job Opportunities with the Rimba Raya Project

Conflict between projects and local communities often occur when projects hire non-locals for all skilled and senior positions, offering only unskilled jobs to local community members (e.g., casual work during planting or harvesting seasons in oil palm plantations). The Rimba Raya project has been investing in a strong strategy to provide training and other educational programs with the goal of increasing local capacity to fill more skilled and permanent positions within the project organization.

Illegal logging

Illegal logging has been an on-going threat to forests and biodiversity in the Project area. Mapping the real actors involved in this illegal activity (including the building of roads and canals) is the first step in preparing strategies to resolve the issue. Given that a number of village heads is important to gain a clear picture of these individuals, their involvement, and their level of influence over community members.

4.3.2 Community Monitoring Plan Results (CM3.1, CM3.2, GL2.5)

The Results of community monitoring are shown in the table below. Table 28 below directly relates to monitoring results for poorer and more marginalized groups identified in Section 4.4. Field monitoring occurs within each field unit on a minimum of a weekly basis, and in some locations where there is concern for, or a history of encroachment, it can be as frequently as daily. Monitoring trip reports are kept at the field unit level for each trip and compiled by the field unit manager as a summary to be provided to the Sampit office on a monthly basis. The reports are available by anyone upon request and actively disseminated to all stakeholders on an annual basis prior to any upcoming audit. Summaries of monitoring results in the local language are disseminated within communities using the community information boards.

The TOC analysis was also used to identify new monitoring indicators here.

Project Activity	Output (from this monitoring period)	Outcome (from this monitoring period)	Impact
Employment opportunities through Monitoring activities	Construction of 2 fire towers in Ulak Batu and Muara Dua villages, continued operation of Batu Hirang fire tower and guard posts 2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff. Trainings for fire suppression and equipment utilization.	Increased employment of community members. Increased number of community members with alternative revenue streams.	Eradicate extreme poverty and hunger
Community based agro-forestry	Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program.	Development of community-based food sources	

Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Increased number of community members with access to clean water. Decreased number of community members becoming ill due to water-borne and sanitation-related illnesses	
Micro Credit Program	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of community members (notably women) pursuing independent, sustainable sources of income based off of learning new skills/knowledge. Increase in independent food production	
Community centers in strategically selected villages inside the Project zone.	3 new libraries improved/constructed and continued operation of community centers during the monitoring period	Provision of a central community space and building for educational activities to occur/educational resources to exist. Increased number of people with access to educational spaces/educational material	Achieve universal primary education

Extend World Education's ongoing programs for food security, access to government services, and capacity building within the project zone	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of community members (notably women) gaining skills and education from capacity building	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Increased number of community members with clean water awareness and gained knowledge about safe drinking habits and sanitation	
Protect all remaining forests (esp. natural forests) and wetlands from periodic fire; prevent further conversion to industrial scale agriculture, which increases fire risk; reduce possible deliberate use of fire for renewal of shallow water fishing grounds through education and awareness campaigns	15,187 hectares of forest continued to be protected within the 47,237 hectare project area	Increased awareness of the importance of forest protection and forest health	

Employment of women in project related employment	10 women employed during this monitoring period in project activities	Increased number of women that are financially self-sufficient	Promote gender equality and empower women
Micro Credit Programs	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of women pursuing independent, sustainable sources of income	
Women Capacity Building (peningkatan kapasitas perempuan)	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increased number of women pursuing independent, sustainable sources of income	
Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Decrease in number of children sick/dying from unclean water and issues related to open defecation/sanitation related sicknesses	Reduce child mortality

Water: Prevention of further oil palm expansion; education and outreach to create viable safer alternative for public sanitation; prevention of further conversion and loss of riparian forests, as well as possible rehabilitation of key riparian zones.	Construction of WPSs in 3 villages (Baung, Jahitan, Muara Dua) providing clean water for 3,037 community members.	Increased number of people with access to clean water. Decreased number of people becoming sick/dying due to water borne illnesses. Increased awareness about water borne diseases, sanitation, and transmission of diseases through mosquitoes	
Employment opportunities through construction & operation of guard & fire towers	Construction of 2 fire towers in Ulak Batu and Muara Dua villages, continued operation of Batu Hirang fire tower and guard posts2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff. 8 hydrant wells were installed throughout the project area	Increased forest protection. Increased employment in environmentally sustainable jobs	Ensure environmental sustainability
Employment opportunities through Orangutan Care Facilities	Continued monitoring of 25 orangutans released in the project area	Increased protection for endangered orangutans and orangutan habitat	
Community based agro-forestry	Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program.	Decrease in unsustainable forest clearing for agriculture. Increase in sustainable agro-forestry land	

Prevent further oil palm expansion; maintain and enhance remaining forests in the Project zone; possibly rehabilitate select riparian forest zones; prevent spread of forest fires, specially into peat areas with direct impact on water quality of the Seruyan	15,310 hectares of forest continued to be protected Replanting of 139,354 seedlings	Increase in forest cover in riparian zones. Increase in protection of already intact forests and peatlands	
Protect all remaining forests (esp. natural forests) and wetlands from periodic fire; prevent further conversion to industrial scale agriculture, which increases fire risk; reduce possible deliberate use of fire for renewal of shallow water fishing grounds through education and awareness campaigns	15,310 hectares of forest continued to be protected 2 guard posts in area of Segintung River and Natai manned 24/7 by North Unit field staff	Increase in protected forest and peatlands from fire and palm oil development. Increase in awareness about importance of forest protection	
Buffer Planting Program	139,354 seedlings planted that are sourced from community-run nurseries	Increase in forest cover in buffer zone	

Prevention of forest loss by oil palm expansion and possible development of local bodies to manage communal forest areas in a more structured fashion to promote chances for long-term sustainability of forest areas	15,310 hectares of forest continued to be protected Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program.	Increase in sustainably managed agroforestry land. Improved community correspondence and collaboration in relation to long-term sustainable management	
Employment opportunities through Monitoring activities	Employment of 99 staff and community staff	Increased number of people involved in climate, forest and biodiversity monitoring of forested areas	
Building materials: Prevention of forest loss by oil palm expansion and possible development of local bodies to manage local timber harvesting levels to promote chances for long-term sustainable supplies.	Planting of 139,354 seedlings	Increase in use of sustainable forest products. Decrease in deforestation/degradation for forest products creation	
Extend World Education's ongoing programs for food security, access to government services, and capacity building within the project zone	Continuation of working groups – shrimp paste and chicken meat production. Additional 8 women-owned enterprises added this monitoring period	Increase in correspondence and collaboration among community members and larger organizations involved in the project or making connections with project	Develop a Global Partnership for Development

Prevention of forest loss by oil palm expansion and possible development of local bodies to manage communal forest areas in a more structured fashion to promote chances for long-term sustainability of forest areas	15,310 hectares of forest continued to Pineapple, djengkol, and other multi-use tree species planting has continued as part of agroforestry program. Replanting of forest trees (139,354 seedlings planted).	Increase in correspondence and collaboration among community members and project partners with palm oil companies and other parties in the area	

Table 28. Monitoring outputs for activities that provide benefits to poor, marginalized, and vulnerable groups.

4.3.3 Dissemination of Monitoring Plan and Results (CM3.3)

Field monitoring occurs within each field unit on a minimum of a weekly basis, and in some locations where there is concern for, or a history of encroachment, it can be as frequently as daily. Monitoring trip reports are kept at the field unit level for each trip and compiled by the field unit manager as a summary to be provided to the Sampit office on a monthly basis. The reports are available by anyone upon request and actively disseminated to all stakeholders on an annual basis prior to any upcoming audit. Summaries of monitoring results in the local language are disseminated within communities using the community information boards.

4.4 Optional Criterion: Exceptional Community Benefits

The Rimba Raya project is applying for Gold Level verification status under the CCB standard on the basis of the exceptional community benefits described below.

Human Development Ranking

Indonesia is a Medium Human Development country on the UNDP Human Development Index (UNDP 2007). Poverty level of the administrative area of the project, therefore, is used to qualify for Criterion GL2.1. The Rimba Raya Project is located in the Seruyan District (Kabupaten) of Central Kalimantan. At least 50% of the population of the Seruyan District is below the national poverty line.

In 2015, the Seruyan District was designated as the underdeveloped district for the years 2015-2019 (Adriannoor, 2016). This means that based on the economy, human resources, infrastructure, financial ability, and accessibility, this district remains in need of additional development support. One noted area of special concern has been the lack of infrastructure within the district, which raises the transaction costs of development much higher. Basic social services are extremely limited. Social service disparity encompasses lack of access to electricity,

quality education, public health facilities, clean drinking water, and sanitation systems.

Despite differing thresholds for the national poverty line, the Seruyan District exceeds all on a per capita basis. The national poverty line in Indonesia, set by the Indonesian Bureau of Statistics (Badan Pusat Statistic – BPS), is defined by household ability to afford a specified minimum food intake and other essential non-food items. The Indonesian poverty line is lower than that commonly used by international organizations, such as the World Bank and UN. In 2015, the World Bank updated the International Poverty Line to $1.90/day. In contrast, the national poverty line in Indonesia in 2017 was set at IDR 385,621/month (approximately $0.9 USD/day) for urban areas and IDR 361,469/month (approximately $0.88 USD/day) for rural areas (BPS 2017). This nearly 100% difference of almost $1 USD/day between international and national standards has a profound impact on poverty statistics – tens of millions of Indonesian households meet World Bank and UN definitions of poverty.

The national government sets the specific poverty level for each region and for Central Kalimantan; the poverty level was set at IDR 414,002 per month (approximately $1.01 USD/day) for rural areas[12] (BPS 2017). National census data are not available for 2017. However, in 2017 the project proponent conducted a survey of 239 respondents that live within 8 villages inside the project zone, inside the Seruyan District. These data show that the average household income is IDR 1.65 million/month (approximately $4.06 USD/day) and average household size (including head of household) is 4.95 persons. This equates to a per capita income of 333,333/month (approximately $0.82 USD/day) which is well below the national poverty line, the poverty line for Central Kalimantan and the World Bank International Poverty Line.

The most recent census data for Seruyan District is from 2008 and can be seen in the table below (Table 29). This data indicates that the average household income in the Project zone for 2008-2009 was 500,000 Indonesian rupiah or USD$58.50/month (using a historic exchange rate IDR 0.000091/USD). Of a total population of 11,343 in 2,886 households this equates to approximately 3.9 people per household, resulting in a meager monthly per capita income of IDR 128,556 (or $0.38person/day). In 2008 the poverty line was set at IDR 178,657/person/month ($0.53 USD/day) (Indonesian Bureau of Statistics, 2008). This means the average person in the Seruyan District was earning around IDR 50,000/month under the poverty line.

Village	Number of Households	Total Household Inhabitants	Average Household Size	Average Monthly Household Income (IDR)	Monthly per Capita Income (IDR)	Daily per Capita Income (USD/Day)
Bahaur	147	1350	9.2	500,000	54,444	$0.21

[12] https://www.bps.go.id/linkTableDinamis/view/id/1120

Paring Raya	151	651	4.3	500,000	115,975	$0.45
Parang Batang	197	1029	5.2	500,000	95,724	$0.37
Tanjung Hanau	119	478	4.0	500,000	124,477	$0.48
Banua Usang	372	990	2.7	500,000	187,879	$0.72
Paren	117	376	3.2	400,000	124,468	$0.48
Ulak Batu	54	285	5.3	400,000	75,789	$0.29
Palingkau	49	171	3.5	400,000	114,620	$0.44
Cempaka Baru	133	613	4.6	500,000	108,483	$0.42
Telaga Pulang	421	1.484	3.5	800,000	226,954	$0.87
Baung	171	690	4.0	500,000	123,913	$0.48
Jahitan	143	482	3.4	500,000	148,340	$0.57
Muara Dua	169	557	3.3	500,000	151,706	$0.58
Tanjung Rangas	643	2187	3.4	500,000	147,005	$0.57
Total:	**2886**	**11,343**	**3.9**	**500,000**	**128,556**	**$0.49**

Table 29. Demographic & Economic Data for Local Communities within the Project Management

Zone. **Compiled from the Central Bureau of Statistics of the Seruyan District.*

Additional standard indicators of poverty include access to education, health care, clean drinking water and housing. As detailed above in the community section, access to all four of these services are extremely limited and/or non-existent in the project area. Both health care and education facilities require distant travel and cost is a limiting factor. Sanitation facilities are not available (e.g. septic tanks are not used), with toilets designed to drop waste directly into rivers – the same rivers used to bathe, wash and collect water for drinking and cooking. Supporting data for these conditions are based on direct observations acquired during a recent social survey, site visits and from other national and international organizations working in the area (OFI and World Education). Limited available government data are consistent with this conclusion.

A government health program called Jaminan Kesehatan Masyarakat (Jamkesmas) assists poor families with the cost of health care announced last year that 27,143 residents out of the c. 112,000 of the Seruyan District (c. 24%) were too poor to cover their own medical costs, thus qualifying for this program (Kapuas 2008). Again, this averages across the entire Seruyan District, not specifically for the communities or sub-districts in the project zone, which by anecdotal data are amongst the most impoverished people in the Seruyan district. When widely recognized severe disparities of income between urban and rural populations are considered, the extreme rural conditions of the Project area would suggest that far more than 24% of the population cannot afford access to basic medical care.

Although Indonesia is the largest economy in Southeast Asia and has made considerable advances in recent years in reducing poverty among its inhabitants, it is still a middle-income[13] country where many inhabitants, especially those in rural areas are directly affected by poverty. The location of the project, in the rural Seruyan District of the province of Central Kalimantan, has been identified as one of the poorest [14]districts in Indonesia. This data demonstrates that the project fulfills the community gold level requirement that the project must exist in an administrative area in a medium or high human development country in which at least 50% of the population of the area is below the national poverty line.

4.4.1 Barriers to Benefits (GL2.3)

The two greatest barriers, or risks, that may prevent project benefits reaching the poorer households include: 1) Communication on program opportunities being restricted, intentionally or unintentionally, from reaching the poorer households. For example, the village head (who is usually relatively affluent in a community and frequently used as the sole conduit for distributing information) may try to guide or restrict program participation based on their personal interests and family or other personal relationships. 2) The communities being provoked by a project opponent and misguided to categorically reject the project. In this scenario, communities in the area are erroneously seen as accepting of every development project or program offered to them, when in fact, they may wish to filter out questionable initiatives. If the Project does not provide a mechanism for communities to provide such feedback, this renders communities vulnerable to provocation by individuals with alternative agendas threatened by the Project.

[13] See 2017 Audit\CCB Monitoring\Indonesia Overview - World Bank Group.pdf
[14] See Jokowi Tetapkan 122 Kabupaten ini Daerah Tertinggal 2015-2019.pdf

The project explicitly addresses these barriers as an objective of the project (see Section 2.1.1): to engage with 25% of the poorest people in each community to identify the presence of these barriers and to overcome these risks. A special supplemental survey was conducted in 2017 at the end of the previous monitoring period to assess the presence of these barriers and risks in a differentiated approach.

These barriers and risks are mitigated through direct communication with the target households, and by taking advantage of, but not relying exclusively on, traditional forms of communication. Communication with communities has therefore followed two paths: the traditional system via local government (sub-District, township and village heads) and a direct grassroots system, delivering project information directly through physical site visits. This approach aims to appease local government and traditional leaders, not overstepping or offending them, but has also ensured that communication with the poorest households has been fluid and has maximized their participation in project activities.

4.4.2 Protections for Poorer and More Vulnerable Households and Individuals (GL2.4)

This section describes how the project has identified households in the lowest category of well-being and how these households have specifically benefited from the Project.

The project explicitly addresses protection for poorer and move vulnerable households and individuals as an objective of the project (see Section 2.1.1): to avoid or mitigate negative impacts in ache community including the poor, vulnerable, marginal and women. Multiple surveys were conducted and a detailed Theory of Change model (see Section 4.1.1) was developed to study the impacts of the Project on the poor, vulnerable, and marginal groups as well as women.

Households in the lowest category of well-being were identified through a comprehensive household livelihood security assessment (HLSA) or similar tool. This assessment incorporated all elements that contribute to a household's well-being, and analyzed whether households had adequate and sustainable access to income and resources to meet basic needs, such as access to food, drinking water, health facilities, educational opportunities, housing, and time for community participation and social integration (CARE 2002). A special supplemental survey was conducted to assess the presence of these barriers and risks in a differentiated approach. A special supplemental survey was also conducted to specifically assess the presence of positive and negative impacts on poor and vulnerable groups including women.

The population of the Project area is approximately 15,826 individuals from 2,886 households. Fifty percent of the poorest quartile amounts to 1,978 individuals, or c. 361 households, that have benefited substantially from the Project in order to meet community gold level criterion.

The Project has been designed such that it offers a multitude of programs and activities to communities across the Project area. During this monitoring period, this has included the continued implementation of a micro-credit program, reforestation in spread across the Project zone, continued planting at pineapple and djengkol agroforestry sites, maintaining an orangutan release site (employment) as well as distribution of water filters and clean water systems to villages. These programs and activities are designed and implemented to target and

prioritize involvement of individuals in the poorest quartile of households; however they have reached far more than 50% of the poorest quartile.

The poorest quartile has benefited from this project substantially by gaining access to resources previously unavailable to them; clean water, health care, education, training, credit and employment opportunities. Their involvement in any of the programs and use of any of the services has been optional, but participation has been high and is expected to grow based on community consultation and feedback from local and international NGOs working in the area. Individuals in this quartile are offered services and opportunities that improve quality of life for their families, empowering them and lifting them from chronic poverty.

Economic Impact of Project Activities on Local Communities

Quantifiable economic impacts to the communities are difficult to support. However, the project's projected budget has closely approximated the entire aggregate household income of the communities prior to project commencement and now after the project has been in effect for several years. Additionally, project activities such as reforestation / agro-forestry programs have replaced income from unsustainable practices. These new income sources have provided income growth and have mitigated environmental pressures.

Project activities have been heavily focused on maintaining and enhancing forests and natural ecosystems, and thus the environmental, socio-economic, and cultural benefits derived from them. These collateral benefits, such as access to health services, clean water, early childhood development, and micro-credit, have substantially increased the standard of living and quality of life indexes for these communities. Proponents believe therefore, that it is fair to conclude that the project has had an overwhelmingly positive and quantitative impact on all communities bordering the project zone.

Table 30 below summarizes project activities specifically designed to target exceptional community benefits and the progress that has been made during this monitoring period. None of the planned project activities have had a negative impact on HCVs in the Project zone.

Activities	Status	Implementation details	Start date	Finish date
Work group assistancy: Indah Berseri (chicken farm - in Baung)	initiative	continue	2/17/2017	ongoing
Work group assistancy: Putri Baung Bakena (egg chicken farm -in Baung)	initiative	Discontinued - not economically feasible as the egg production decreased significantly	4/1/2017	discontinued
Work group assistancy: Manuk Taheta (chicken farm in Jahitan)	initiative	continue	3/24/2017	ongoing
Work group assistancy: Karya Bersama (dried salty fish - hamlet Tampudau)	initiative	Discontinued – not economically feasible, and the fishermen prefer to sell fresh fish without additional value since they can get money to cover the transport cost too.	3/24/2017	discontinued
Work group assistancy: Harapan Berkembang (fishery in Tanjung Rangas)	initiative	continue - still looking for the good juveniles	8/4/2016	Ongoing discontinued
Work group assistancy: Zuper (shrimpaste in Sungai Perlu - located in Kuala Pembuang 1)	initiative	In 2021, RR temporally discontinued the support for ZUPER and it is creating the enabling conditions to form a new Working Group in another village in 2022.	2015	discontinued
Zero Iliteracy Program (non formal school-Kejar Paket)	educative	Still under development	8/1/2017	Discontinued – Assessment was completed; however, the formal trainer from Kuala Pembuang was not willing to visit the field
SFS Telaga Pulang assistancy	educative	discontinue since 2018 - change of curricullum and change the teacher- (farming)	6/1/2018	Jul-18 Discontinued; however, it was replaced by

				development of Farming Working Groups
Village library assistancy Muara Dua "Harati Bersama"	educative	Continue	5/1/2017	ongoing
Village library assistancy Ulak Batu "Rekreasi Ulba"	educative	Continue	1/1/2017	ongoing
NZ aid fund for Solar power electrification	pilot project	discontinue - funded by HEF NZ Embassy- handed over to villagers	7/20/2018	Nov-18
Reading Glasses program Ulba, Palingkau and Cempaka Baru	health	Between Ulak Batu and Palingkau, 468 pairs of reading glasses were provided in this monitoring period. 1. 2019 Cempaka Baru 23 Okt 2019 2. 2020 Muara Dua 14 Aug 2020, Baung 15 Aug 2020, and Belanti 16 Aug 2020 3. 2021 , Tampudau 16 July 2021 Belanti 17 July 2021, Cempaka Baru 21 July 2021, Palingkau 22 Jui 2021, Ulak Batu 23 July 2021 Sungai Perlu, in Q1 2022	Ulak Batu: 2018/03: Palingkau: 2019/03/08	Ulak Batu: Complete, Palingkau: Complete
Rimba Raya Staff computer training - capacity building	educative	• Frequency: every one – two months. For introductory stage. • Participants: All Rimba Raya Staff • Trainer: HR Department Rimba Raya will hire computer	• Starting in Q1 - 2021	Q1 2021

		trainer to provide training more frequently starting 2022		
Ecotourism prospect	initiation	idle - need to have further review (already in the plan)		
Comparative study by 2 malaysian researchers	initiation	discontinue - the researchers only did comparative study in Rimba Raya	9/10/2017	9/21/2017
Solar Lantern monitoring report (survey)	health, educative, economy	continue - it is part of monitoring activity	2016	discontinued
Water Filter monitoring report (survey)	health	continue - it is part of monitoring activity	9/1/2013	discontinued
Participatory mapping	non-routine (educative)	RR has been conducting PM in 7 villages - final and sign 4 villages (3 more to follow up) and 3 more villages are under plan to execute the process. 7 villages have signed the Participatory mapping: Ulak Batu, Telaga Pulang, Baung, Muara Dua, Jahitan, Tanjung Rangas, and Pematang Limau	2013	ongoing
Road Illumination in Muara Dua	initiation	discontinue - RR develop a better method for Solar Power Electrification (2 initial pilots in Tampudau and Belanti Hamlets), next stage Muara Dua will receive it too.	10/2/2017	discontinued
Establish village bulletin board to update Rimba Raya program status	initiation - should be upated per 6 months	continue	2021	ongoing
Floating Clinic	routine - every 3 month but we just have 1 trial period - will do again on	Continue Health service is provided in form	2016	ongoing

	December 2019	of Floating clinic who serve 8 villages and 2 hamlets. Targeting 35 patients each village or 350 patients in average per service. In 2021, it is planned to have at least 5 health services.		
Seruyan River cleaning	non-routine (educative)	Between July 2020 and December 2020, 13.8 tons of garbage were collected from the Seruyan River and its shores 2021 RR developed Village clean program in 9 villages: Palingkau, Cempaka Baru, Telaga Pulang, Baung, Jahitan, Muara Dua, Tanjung Rangas, Persil Raya and Pematang Limau and a cleaning task force with 9 members from 7 villages: Ulak Batu, Palingkau, Cempaka Baru, Baung, Jahitan, Tanjung Rangas, and Pematang Limau.	Period 2018-2019	Ongoing
Scholarship to Senior High School	non-routine (educative)	RR Scholarship for Senior High School 3. Period 2018 – 2021: 24 students received RR Scholarship (finished) 4. Period 2021 – 10 students received RR Scholarship RR Scholarship for University: Period 2021 – 3 students received	1/1/2018	ongoing

		RR Scholarship		
Village water purifying system (WPS)	1 WPS per village	By the period 2019-2020, 3 WPS were constructed in three villages. The 3 WPS facilities are producing 211.724 liter per year for 900 HH in 3 villages. Besides opening access to clean water, RR had initiated the profit-oriented village business from the facilities, providing an extra income. The facilities are envisioned to run independently by the administration committee. In year 2021, 5 additional WPS facility are being constructed in 5 villages: Ulak Batu, Cempaka Baru, Tanjung Rangas, Pematang Limau. and Palingkau	10/1/2019	2022
Solar Power Electrification (SPE) - NEW PROGRAM	health, educative, economy	2 units of SPE are being installed for Tampudau and Belanti hamlets Belanti will be built in Q4 2021	11/1/2019	ongoing

Table 30. Summary of Project Activities and their Resulting Exceptional Community Benefits

Identification and mitigation of negative impacts from project to poorer households

Measures to identify the most vulnerable households and individuals were undertaken as part of the survey described above. A part of this assessment has been to identify ways in which all households, including the poorest households, has been or may have been negatively affected by the project.

In the past, livelihoods in the Project area are largely dependent on fishing and a limited amount of farming (with productivity in apparent steep decline). Project activities have been designed to enhance these activities, in order to improve techniques and subsequent returns. Socially and politically, the project is thought to provide negligible risk to poor or vulnerable households. Although currently deemed unlikely, the risk of previously unidentified negative impacts arising is always present and continues to be monitored. The table below explores potential negative impacts made by the projects and methods that have been used to avert or mitigate these impacts. As is shown through the Theory of Change diagrams and models, the project has had net positive impacts on poorer and more vulnerable households within the project zone.

Potential negative impact	Households or individuals affected	Impact aversion and mitigation
Livelihood and social opportunities are lost	Vulnerable or marginalized groups who do not contribute to communal forest mapping/protection	Ensure vulnerable and marginalized groups provide input to participatory mapping activities and forest mapping/protection
Micro-credit support and funding is not available therefore livelihood and social opportunities are lost	Vulnerable or marginalized groups who do not access the micro-credit program or whose work would be in direct conflict/competition with work brought about by the micro-credit program	Ensure vulnerable or marginalized group have direct (and/or individualized) access to the micro-credit program. Ensure there are no conflicts between work of vulnerable or marginalized groups that is outside of micro-credit program

Table 31. Potential negative impacts and how they were averted or mitigated.

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B1.1)

The net biodiversity benefits and impacts for the project zone during this monitoring period have been, and are expected to continue to be, positive. The goals for biodiversity impacts for the project include change in the number of hectares significantly better managed by the project for biodiversity conservation (as compared with the without-project scenario) and an increase in protection (via habitat preservation) for the globally Critically Endangered or Endangered species that benefit from reduced threats as a result of project activities (as measured against the without-project scenario).

The 'without project' scenario equates to conversion of most or all remaining forests in the project area to oil palm plantations, which is currently the greatest threat to biodiversity in the project zone. A sharp decline in the biodiversity of the project zone through direct negative impacts of land clearing and associated indirect impacts (e.g., providing access to more remote forests for hunting, illegal logging, increased fire risk, and the draining of peat swamp forest) would be the result. Such indirect impacts would also allow greater access to Tanjung Putting National Park which would result in a significant impact on the park's biodiversity and threaten the OFI Orangutan release program.

Since the project started, it has directly and indirectly contributed to net positive biodiversity impacts described above. Directly the project has provided financial support to OFI to continue with its work to rehabilitate and release orangutan back into the forest. The project has also built a release center in the project area and will continue to monitor and protect the boundaries of the project from the agents of deforestation and the impacts of fire. The project has avoided the conversion to oil palm of 47,237 hectares compared with the baseline scenario through implementation of a variety of project activities and monitoring efforts. This forest represents a significant habit that will be extremely important to the ongoing protection of the orangutans and other endangered species in the future.

Through the establishment of the Rimba Raya project, any negative biodiversity impacts have been avoided and the project activities implemented during this monitoring period have created positive biodiversity impacts.

5.1.2 High Conservation Value Protection (B1.2)

During this monitoring period, none of the planned project activities have shown a negative impact on HCVs in the project zone. Project activities have been heavily focused on maintaining and enhancing forests and natural ecosystems, as well as the connectivity among them. Such activities have shown a strong positive impact on HCVs 1-3.

Rimba Raya is an important part of the greater Tanjung Puting forest mosaic comprised of terrestrial and aquatic ecosystems that house hundreds of species of flora and fauna and provide habitat for many rare and endangered species. A previous study of the project zone documented high

biodiversity including 361 species of birds, 122 species of mammals, and 180 species of trees and woody plants likely to be present in the project zone.

Rimba Raya biodiversity notably includes the endangered Bornean orangutan (Pongo pygmaeus), the only great ape outside of Africa, whose populations have declined 95% in the last century. Tanjung Puting National Park houses one of the largest protected orangutan populations, and the Rimba Raya project area augments adjacent Tanjung Puting orangutan habitat by ca. 14%.

Project area forests likely house eight other primate species including the endangered proboscis monkey (Nasalis larvatus) and agile gibbon (Hylobates agilis). More than half of all mammals occurring in Borneo are likely present on the project area including the more common sun bear (Helarctos malayanaus), barking deer (Muntiacus muntjak), bearded pig (Sus barbatus), endangered Borneo Bay cat (Catopuma badia), and hairy-nosed otter (Lutra sumatrana). An estimated 45 species of bats are likely to be present in the project area. A third of these are IUCN Red Listed, 13 of which have restricted ranges or are endemic to Borneo.

Some 361 bird species are likely present in the project area. Of these, 156 species are of national and/or international conservation significance. Eighty species are listed by the IUCN as Threatened or Near-Threatened with Global Extinction, including the Endangered Storm's Stork (Ciconia stormi), which is considered one of the twenty most endangered bird species in the world.

Table 32 below summarizes the most severe threats for HCVs 1-3 in the Project zone and provides associated management recommendations and activities to alleviate these threats. This highlights the project focus on maintaining and enhancing forests and natural ecosystems to protect HCVs 1-3. Threats and project activities to mitigate key threats are discussed further below.A total of 54 species listed as *Critically Endangered* or *Endangered* by IUCN are likely present in the Rimba Raya Project area, 8 of which have been confirmed present in TPNP during the 2017-2019 monitoring period.. An additional 40 species listed as *Vulnerable* by IUCN are likely present in the Project area, 14 of which were confirmed in TNTP within the monitoring period. Conservation of the project area has protected these species.

Maintaining and enhancing forests and other natural ecosystems is essential to protecting HCVs 1-3 in the project zone. Some of these HCV sub-values have required protection of specific areas within the project zone (e.g. ecotones and areas that provide connectivity between the project area and neighboring Tanjung Puting National Park). Additionally, maintenance of some HCVs has required education programs for local communities.

HCV	Threats to HCV	Management Recommendation & Activities
1.1	Disconnecting HCV 1.1 forests from the Project area; degrading or removing forest or other natural habitat from the supporting area (Project zone)	Maintain and enhance forests in the Project zone and connectivity to the Project area because of its supporting function to neighboring TPNP
1.2	**Plants:** Illegal logging, fire, small scale agriculture, conversion to oil palm	**Plants:** Cessation of logging (except limited selective timber harvesting for local consumption); protection all remaining forests
	Herps (possibly one terrapin): hunting, egg harvesting, degradation of riparian habitats and sand beaches along river used for nesting	**Herps:** Protection of the Seruyan and its tributaries through stabilizing land use and replanting some areas to restore riparian zone and flood plain buffers. Education program for local communities.
1.3	Habitat loss, habitat degradation, hunting	Protecting all remaining forests (esp. natural forests) and wetlands; prevent further conversion to industrial scale agriculture; reducing hunting through education and awareness campaigns
1.4	**Lakes & water bodies:** water pollution, human inhabitation, conversion of shores, hunting.	**Lakes & water bodies:** Education and protection of important bird areas
	Grassy banks & slow moving rivers: habitat conversion	**Grassy banks & slow moving rivers:** Education and protection of areas important to birds for nesting or foraging.
	Ecotones: Habitat disturbance, especially through land clearance	Ecotones: Protection of forest and wetland ecotones from any form of disturbance
2.1	HCV deemed not present because large tracts of forest already fragmented by anthropogenic causes (fire and logging)	Potential to enhance landscape level forest connectivity (in turn restoring this HCV) by preventing further isolation of remaining fragments and reconnecting large remnant patches of forest
2.2	Habitat degradation and conversion	Protecting wetlands and forests where ecotones exist
2.3	Habitat degradation and conversion; hunting	Protecting wetlands and forests; reduce hunting
3	Logging and forest conversion	Not to clear forest in HCV 3 areas

Table 32. Threats and management recommendations for HCVs 1-3 in the Project zone

HCV 1.1 Support Function to Protected Areas

HCV 1.1 draws attention to areas that contain or provide biodiversity support function to protection or conservation areas in or near the project zone to ensure that management actions are taken to maintain or enhance the function of such areas.

During this monitoring period, HCV 1.1 has been considered present in the project zone, given its condition (at least partially forested) and direct contiguity with the eastern boundary of TPNP, a protected area of very high biodiversity conservation importance. The project zone provides vital biodiversity support function as a buffer zone of TPNP, by expanding the effective area of lowland forest cover in the greater Tanjung Puting landscape by 14% (OFI 2008). This buffer zone function has expanded available habitat for orangutans and a wide variety of other threatened or protected plant and animal species in the national park.

The project zone also contains legally mandated protection zones along riparian-zone floodplains of the Seruyan River and its numerous tributaries, as well as lake shore buffer zones associated with undiscovered wetland areas potentially present within the freshwater/peat swamp mosaic of habitats in the project zone, and the western shores of the Sembuluh Lake system overlapping the eastern boundary of the project zone.

Key threats to this HCV include forest loss due to fire and oil palm conversion, degradation of the biodiversity value of the buffer through logging and degradation of riparian and lake side buffer zones through small-scale conversion for agriculture and development of human settlements in lakeside environments. All of the conservation efforts described in more detail below to maintain HCVs 1.3, 1.4, 2.2, and 2.3 ensure positive net impacts on HCV 1.1 by the project

HCV 1.2 Critically Endangered Species

Conservation activities of the project have had net positive impacts on HCV 1.2 species as follows:

Birds and Mammals

There are 8 Critically Endangered (CR) and Endangered (EN) species confirmed present in the project area during this monitoring period. Most notable among these is the Bornean Orangutan (EN).

Plants.

Twenty-five HCV 1.2 plants were identified as likely present in the Rimba Raya project zone, with two species confirmed in the project zone within this monitoring period. These species occur in various forms (freshwater swamp forest, peat swamp forest and lowland dipterocarp forest) and all are considered CR due primarily to habitat loss. Proposed HCV 1.2 management has precisely addressed this threat, pursued in parallel with HCV 1.3 and 3 (see below), where the goal has been

to maintain and manage sufficient habitat to ensure long-term population viability of all threatened, protected and restricted range species.

At present, insufficient data are available to estimate existing population sizes for HCV 1.2 plants in the project zone, or to determine minimum necessary population sizes to ensure long-term viability. However, as the project aims to retain all remnant natural forest, successful conservation measures taken by the project to protect natural forests have increased long-term population viability of these HCV 1.2 species.

It should also be noted that the HCV Toolkit for Indonesia makes provision for limited harvesting of CR plants of demonstrable economic importance – e.g., locally common dipterocarp species that contribute substantially to commercial timber volumes in a logging concession – provided that a management plan is in place to ensure long term population viability through sustainable harvesting. In this situation, management of commercial HCV 1.2 plants becomes identical to that of HCV 1.3, namely to retain sufficient habitat for maintaining viable populations. In the case of the Rimba Raya project, this management provision of HCV 1.2 would permit limited selective timber harvesting of CR dipterocarps for local use by communities within the project zone as part of a broader livelihoods development program.

Herptofauna.

Only one HCV 1.2 species of herptofauna was identified as potentially present in the project zone, the CR Painted river terrapin (*Callagur borneoensis*). This species is known to inhabit the tidal portions of rivers and estuarine mangrove areas and to feed on fruit, leaves, and clams, although its presence within the project zone has not been confirmed. As the project aims to prevent further degradation of the Seruyan River and its tributaries through stabilizing land use and replanting some areas to restore riparian zone and flood plain buffers, these successful conservation actions have had a positive net impact on this HCV 1.2 species, if present.

Conclusion.

Overall, conservation efforts made by the project to protect remaining natural forests and prevent further degradation of river quality have resulted in net positive impacts on HCV 1.2 species likely present in the Project zone.

Endangered & Critically EndangeredSpecies Found in Project area		
Mammals		
Nasalis larvatus larvatus	Bekantan	EN
Pongo pygmaeus wurmbii	Orangutan	EN
Hylobates albibarbis	Owa	EN
Manis javanica	Trenggiling	CR
Plants		

Shorea smithiana Symington -Neolamarchia cadamba	Lanan	CR
Shorea sp	Meranti	CR
Shorea pauciflora King	Ubar	EN
Prionailurus planiceps	Kucing hutan	EN
Reptiles		
Heosemys spinosa	Kura-kura gambut	EN

Table 33: Endangered and Critically Endangered Species Confirmed Present (2017-2019)

HCV 1.3 Areas that Contain Habitat for Viable Populations of Endangered, Restricted-Range, or Protected Species

The aim of HCV 1.3 is to identify areas where viable populations of endangered, restricted-range, or protected species are known or likely to occur, and to ensure that management action is taken to conserve sufficient habitat for long-term viability of the population. In the assessment of this HCV, populations of species confirmed or likely present are assumed to be viable until credibly proven otherwise through population modeling, analysis of habitat extent and condition, or exhaustive field surveys. HCV 1.3 species also include viable populations of CR species listed above under HCV 1.2.

Conservation activities of the project have had net positive impacts on HCV 1.3 bird, mammal, or plant species as follows:

Birds.

A total of 110 HCV 1.3 bird species are considered likely present in the project zone. Of these, 38 (35%) are thought to depend solely on natural forest, while another 34 (31%) use natural forest as well as disturbed forests. Nineteen species are known to use converted non-forest lands, but only 3 of these exist solely in non-forested areas. Thirty-nine species are wetland and/or coastal species.

Major threats to HCV 1.3 birds include habitat loss and degradation, especially of riparian and wetland habitat for aquatic birds. As with other parts of Kalimantan, bird capture for local consumption and the commercial pet trade may represent a further threat to HCV 1.3 birds, but there were no indications of such activity during field visits to villages in the project zone.

Based on habitat needs for HCV 1.3 birds, long-term population viability has required protecting forests and non-forested wetlands. Project conservation measures to protect all remaining forests and to restore targeted riparian and floodplain buffer zones in the Project area have addressed the most important threat to HCV 1.3 species by securing remaining habitat and preventing further losses. Protection of non-forest wetland areas has also been required, but since the project aims to protect all remaining natural habitat, especially by preventing conversion to oil palm, wetland protection has also been achieved by the project.

Additional environmental outreach and education activities, planned as part of a broader livelihoods and community engagement program, have also served to reduce hunting and trapping pressures on bird populations, which as noted has already appeared to be low. Because these project activities have been successfully implemented, net project impacts on HCV 1.3 bird populations have been positive.

Mammals.

Fifty-five HCV 1.3 mammal species are potentially present in the Project zone. Of these, eight are listed by IUCN as Endangered and 21 as Vulnerable, a total of 24 species are protected by the Government of Indonesia, and 15 species are endemic to Borneo.

As with birds, many HCV 1.3 mammals are dependent on natural forest habitats. Thirty-four HCV 1.3 mammals in the Project zone are dependent on forest, and seven of these rely exclusively on primary forest. While the remaining 21 species use forest, they are also known to use non-forested areas (e.g. *ladang* agriculture, scrub, short secondary forest regrowth), usually when such areas are in close proximity to forests. Only the orangutan and pangolin have been known to enter and use gardens and plantations on a regular basis when food is available.

The major threat to HCV 1.3 mammals has been habitat loss and degradation, especially intact lowland dipterocarp and peat swamp habitats. As with other parts of Kalimantan, mammal capture for local consumption may be a further threat to HCV 1.3 mammals, but preliminary data collected during field visits to villages in the project zone have indicted a very low frequency of hunting, due in part to the fact that most communities are Muslim and therefore may consume a small number of mammal species. Project conservation measures to protect all remaining natural habitat and to restore targeted riparian and floodplain buffer zones in the project area have addressed the most important threat to HCV 1.3 mammals by securing remaining habitat and preventing further losses. Additional environmental outreach and education activities, planned as part of a broader livelihoods and community empowerment program, will serve to reduce potential hunting pressure further, which as noted already appears to be low. Together, these project activities will serve to maintain or enhance HCV 1.3 mammals.

Project benefits for orangutans deserve special mention. Much of the land in the project area remains undeveloped, providing an estimated 47,000 ha of additional land contiguous with TPNP to the west of the Project area (OFI 2008). This represents 14% of forest in the region of TPNP and adjacent areas, providing significant habitat for orangutans and other wildlife. A past study on orangutans in TPNP and its buffer, including portions of the Project area, found resident orangutan populations averaging 1.9 orangutans per square kilometer (Galdikas et al. unpublished report, cited in OFI 2008). More recent field surveys by OFI confirmed similar orangutan densities in the project area as a whole and showed that individual orangutan home ranges cross the park boundary into the Project area (Basic Information - Audit 2017 (poin5-BS)-Nandez_edited-ENG.doc). This demonstrates occurrence of one or more inter-connected orangutan population(s) in TPNP and the Project area.

The current orangutan population of TPNP is estimated to be between 4,180 (PHVA, 2016) and 6,839 individuals (TNTP, 2012). Adjacent forests in the Project area provide an additional 15,000 hectares of suitable orangutan habitat, supporting an estimated 760 individuals. This figure represents an augmentation of the TPNP orangutan population by an additional 14%. During this monitoring period, two female baby orangutans were born in the release area, demonstrating that the release individuals and populations are able to successfully reproduce and inhabit the restored and protected forest.

The project has greatly reduced deforestation rates over the lifespan of the project, primarily by preventing oil palm plantation development in the park buffer and limiting access to the national park from the eastern border. These preventive measures will have marked impacts on the long-term population status of the orangutan. A 2008 analysis of past and future projected deforestation in the project area found that forest in the Project area would be completely deforested in a 'without project' scenario and that TPNP would lose an estimated 147,237 hectares (60%) of its forest cover during this same period. By extrapolation, this simplified 'without project' scenario suggests that the orangutan population in the project area would be reduced by more than one-half and that of the greater TPNP orangutan population would be reduced by a third.

Plants. Twenty-four HCV 1.3 plant species were identified as confirmed or likely present in the project zone. Most common among these are members of the Dipterocarpaceae (18 of 24 species), including six species listed as Vulnerable by IUCN, 14 as Endangered IUCN, and six protected under Indonesian law. These species are concentrated mainly in peat and mixed freshwater swamp ecosystems of the project zone, but at least 14 species have also been likely to occur in the area of lowland dipterocarp forest in the north. All of these species, especially dipterocarps, are largely or totally dependent on natural forest for pollination by out breeding, seed predator avoidance, seedling recruitment, and growth.

The two most significant threats to HCV 1.3 plants in the project zone have been illegal logging (most HCV 1.3 plants are timber species) and habitat loss by fire, small scale agriculture, and conversion to oil palm. As mentioned under HCV 1.2, the cessation of logging, apart from limited selective timber harvesting for local consumption in the project zone, is the main conservation intervention measure of the project. In addition, the project has aimed to protect all remaining forest by eliminating any further conversion to oil palm and controlling fire. In doing so, project activities have served to maintain or enhance HCV 1.3 plants by eliminating the two main threats to long-term viability of plant populations.

There is the possibility that livelihood activities supported by the project could take place in a location where HCVs 1-3 are present (e.g., limited wood production for local subsistence consumption through selective logging). Considerations for how to minimize such impacts were discussed in Section 4.1.3, and have been adopted by the project. The key element of a management strategy to minimize this potential negative impact has been ensuring subsistence harvesting levels do not exceed those required to maintain or enhance viable populations of HCV 1.3 tree species whose

harvest may be permitted as part of a broader livelihoods development program (e.g., *Shorea uliginosa* in mixed peat swamp forest or *Shorea balangeran* in freshwater swamp and riparian forest).

Herptofauna. Seventeen HCV 1.3 reptiles have been identified as likely or potentially present in the project zone, seven of which have been confirmed in neighboring TPTN. Of these, five are listed as Endangered by IUCN: False Ghavial (*Tomistoma schlegelii*), Malayan giant turtle (*Orlitia borneensis*), Asian brown tortoise (*Manouria emys*), Black-breast leaf turtle (*Geoemyda spengleri*), and Spiny turtle (*Heosemys spinosa)*.

Of particular concern are the False Ghavial (*Tomistoma schlegelii*), which has been hunted to extinction in most of Borneo, and the Estuarine crocodile (*Crocodylus porosus*), both of which are present in TPNP and may be present in the Seruyan River based on reports from villagers in the Project zone.

Management of these HCV 1.3 species, as well as other herptofauna, has focused on protecting wetland areas and undisturbed forests (preferred habitats for Bornean herptofauna), reducing hunting, and maintaining water quality in rivers and wetlands. Sedimentation, river pollution by oil palm effluent and nutrient loading, and destructive fishing practices (e.g. cyanide) all have negative impacts on the distribution and viability of water/river-dependent species. As the project has aimed to (i) protect habitat for these species by protecting forest and associated wetland areas, (ii) prevent further industrial agricultural encroachment (with attendant negative impacts on water quality), and (iii) conduct livelihood activities focused on the promotion of sustainable fishing practices and avoidance of hunting of HCV species, net project impacts on HCV 1.3 herptofauna have served to maintain or enhance this HCV.

Conclusion. Overall, conservation efforts made by the project during this monitoring period to protect remaining natural forests and prevent further degradation of river quality have resulted in net positive impacts on HCV 1.3 species that have been shown to exist in the project zone or likely exist in the project zone.

HCV 1.4 Areas that Contain Critical Habitat of Temporary Use by Species or Congregations of Species

Three habitat types under HCV 1.4 were highlighted as potentially present in the project zone: (i) lakes and open water bodies; (ii) grassy banks and slow-moving, shallow rivers; and (iii) possible ecotonal transitions among major ecosystem types that may be important as travel routes for locally nomadic frugivores, such as the orangutan. Major current and future threats to wildlife dependent on lakes and open water bodies include pollution caused by oil palm plantation run-off (and possible improper treatment of mill effluent), conversion of shoreline ecosystems due to expanding human habitations, and possible over-hunting and fishing. Major threats to grassy banks and slow moving rivers, as well as ecotonal transitions, are habitat destruction and degradation through logging, fires, and conversion to oil palm.

Project activities to mitigate these threats, and enhance HCV 1.4 management, include identification and protection of potentially important wetland bird areas (including efforts to protect shoreline areas of Lake Sembuluh), education outreach to raise awareness about the importance of maintaining water quality to local livelihoods and wildlife and the impact of different local practices on water quality, identification and protection of ecotonal transitions from, e.g., wetland to non-wetland and from kerangas to non-kerangas.

Conclusion. Combined impacts of the project to eliminate the risk of widespread forest loss and ecosystem conversion to oil palm, together with efforts to map and protect potentially important wetland areas and ecotonal transitions, shoreline vegetation along Lake Sembuluh, and possibly other wetlands, as well as education outreach to raise awareness and change behaviors related to human impacts on water quality and wetland protection, have shown net positive impacts on HCV 1.4.

HCV 2.1 Large Landscapes with Capacity to Maintain Natural Ecological Processes and Dynamics

HCV 2.1 was deemed not present in the project zone. Therefore no specific management to maintain this value is recommended. It is noted, however, that if the project succeeds in protecting and potentially enlarging forest cover and connectivity in the project zone, then it is possible in the long term that this project will restore the large intact landscape function (HCV 2.1) once present in the area.

HCV 2.2 Areas that Contain Two or More Contiguous Ecosystems

HCV 2.2 aims to identify and maintain ecotones and ecoclines that connect different ecotypes (ecosystem classes), especially where they occur in large forest landscapes. Such transitional environments are important not only for the maintenance of key ecosystem functions, by ensuring movement of species and flux of materials and energy across boundaries, but also as centers of biodiversity in their own right.

For the project zone and nearby TPNP, maintenance of ecotones has been important for long-term population viability of mobile, locally nomadic frugivorous vertebrates that forage among multiple habitat types tracking seasonal availability of fruit. Broadly different ecosystem types often show asynchronous phenological patterns of fruiting, and therefore enable specialist frugivores, such as hornbills and gibbons, to maintain a positive energy balance by tracking fruit availability among different habitat types. Such taxa present in the project zone and nearby TPNP include orangutans, gibbons, bearded pigs, pigeons, and fruit bats among others.

Ecosystem transitions listed under HCV 2.2 in the Toolkit present in the project zone include the following:

Adjacent wetland and non-wetland area. The most notable wetland to non-wetland transition in the project zone occurs along the western edge of Lake Sembuluh.

Adjacent swamps and non-swamp areas. The swamp to non-swamp transitions are centered on three kinds of swamp: (i) shallow periodically inundated grasslands or marshes; (ii) freshwater or riparian swamps; and (iii) peat swamps.

Adjacent kerangas and non-kerangas areas. Kerangas to non-kerangas are most common in northern parts of the project zone.

The main threats to this HCV are uncontrollable spread of wildfires into peat forest areas adjacent to periodically inundated grasslands in the south, and continued expansion of oil palm, in particular southward from the estate in the north.

Conclusion. Conservation efforts carried out by the project to protect remaining natural forests by (i) reducing fire risk through prevention of logging, (ii) fighting fires directly through construction of observation towers and development and deployment of firefighting teams and equipment, and (iii) prevention of continued expansion of oil palm, have resulted in net positive impacts on HCV 2.2 in the project zone.

HCV 2.3 Areas that Contain Populations of Most Naturally Occurring Species

HCV 2.3 aims to identify landscapes supporting representative populations of most naturally occurring species in the study region and with a capacity to maintain such populations in the long term.

The project zone is an important part of a large landscape mosaic of diverse natural and anthropogenic ecosystem types, covering c. 500,000 ha of terrestrial and aquatic ecosystems. This area includes c. 266,000 ha of natural forest, representing at least five major terrestrial ecosystem types; numerous ecotonal transitions among contrasting terrestrial ecosystem; a complex network of rivers and associated riparian environments draining nutrient-poor sandy soils and/or peat swamps, which produce so-called 'black water rivers' with distinctive aquatic fauna; and (iv) a large black water lake system (Lake Sembuluh).

The area is considered likely to support some of the largest populations of threatened and protected species known from south central Kalimantan, including a total of 361 species of birds, 167 species of mammals (including 45 species of bats), and at least 180 species of free-standing large woody plants (excluding orchids, pitcher plants, lianas, epiphytes, and understory herbs).

HCV 2.3 is therefore considered present in the project zone and nearby TPNP, to which it makes vital contributions of lowland habitat to support landscape-level populations of most naturally occurring species.

The two largest threats to HCV 2.3 are habitat degradation and conversion resulting from oil palm expansion and wild fire. Possible future threats include intensified logging and hunting. Presence of HCV 2.3 in an area is effectively a combination of dimensions of HCVs 1.2 and 1.3, relating to species, and HCVs 1.1, 1.4, 2.1, and 3, relating to habitats. For this reason, the analysis provided relating to net positive project impacts on these component values applies to HCV 2.3 as well.

Conclusion. Overall, conservation efforts made by the project to protect remaining natural forests by preventing oil palm expansion, logging, and fires, combined with efforts to prevent further degradation of river quality and open wetlands have resulted in net positive impacts on HCV 2.3 in the project zone.

HCV 3 Rare or Endangered Ecosystems

All remaining natural vegetation types in the project zone are provisionally considered rare or endangered ecosystems under HCV 3. Immediate threats to HCV 3 include all factors described above as drivers of habitat loss and forest conversion within the project zone. All conservation activities described above in relation to prevention of continued forest loss and ecosystem conversion apply to management of HCV 3.

Conclusion. Conservation efforts planned by the project to protect all remaining natural forests and other natural ecosystem by (i) reducing fire risk through prevention of widespread illegal logging, (ii) fighting fires through immediate detection using observation towers and rapid response through deployment of firefighting teams and equipment, and (iii) prevention of continued expansion of oil palm have resulted in net positive impacts on HCV 3 in the project zone.

5.1.3 Invasive Species (B1.3)

The Rimba Raya project plan includes both an enrichment component for forested areas (divided into 40 blocks, I - XL) that may have been slightly degraded due to illegal logging, and a rehabilitation component for deforested and highly degraded areas (divided into 60 blocks, A – BH) that required significant restoration work. The species that are used for enrichment and rehabilitation are listed in Table 34 below. None of these species are invasive.

No.	Species		Block Plantation
	Local Name	Scientific Name	
1	Meranti	*Shorea sp.*	I - XL
2	Jelutung	*Dyera costulata*	I - XL
3	Ramin	*Gonystylus bancanus*	I - XL
4	Keruing	*Dipterocarpus sp*	I - XL
5	Ulin	*Eusideroxylon zwageri*	I - XL
6	Tengkawang	*Shorea stenoptera*	I - XL
7	Merawan	*Hopea sp*	I - XL
8	Dahu	*Dracontomelon sp.*	I - XL

9	Melur	*Dacrydium sp*	I - XL
10	Gelam	*Melaleuca sp*	I - XL
11	Nyatoh	*Palaquium sp)*	I - XL
12	Terentang	*Campnosperma sp*	I - XL
13	Pulai	*Alstonia scholaris*	I - XL
14	Durian Hutan	*Durio Sp.*	I - XL
15	Bintangur	*Callophyllum sp.*	I - XL
16	Jambu-jambu	*Eugenia sp.*	I - XL
17	Kayu Arang	*Diospyros sp.*	I - XL
18	Resak	*Vatica sp.*	I - XL
19	Puspa	*Schima sp*	I - XL
20	Saninten	*Castanopsis sp.*	I - XL
21	Gembor,	Alseodaphne spp.	I - XL
22	Karet hutan (Hevea brasiliensis Mull.Arg)	Hevea brasiliensis Mull.Arg	I - XL
II	**REHABILITATION PLANTING**		
1	Jabon	*Antocephalus cadamba*	A-BH
2	Binuang	*Octomeles sumatrana Miq*	A-BH
3	Makaranga	*Macaranga sp*	A-BH

Table 34. Species to be used for Rimba Raya project rehabilitation and enrichment activities

5.1.4 Impacts of Non-native Species (B1.4)

The project proponent guarantees that there has been no use of non-native species by the project.

5.1.5 GMO Exclusion (B1.5)

The project proponent guarantees that no GMOs have been used or will be used to generate GHG emission reductions or removals.

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impact Mitigation (B2.2)

To gauge off-site impacts to biodiversity that may be caused by the project, the project proponent has been monitoring the movements and business activities of oil palm companies that are planning to retire their licenses in the project area as a result of project activities.

The project has also documented the political economic dimensions of illegal logging activities in the project zone (e.g., where loggers originate, who is funding the illegal logging) and report the activity to appropriate authorities. Alternative job opportunities have been sought for local residents involved in the illegal logging through community development initiatives such as the forest and fire patrol system. The project has also attempted to track where illegal logging operations relocate, in an effort to monitor off-site impacts to biodiversity.

It should be noted, finally, that any potential off-site negative impacts to biodiversity have been more than offset by the project's role as a physical buffer to TPNP and the protection that the project has already offered to the park's biodiversity.

5.2.2 Net Offsite Biodiversity Benefits (B2.3)

The project has not had any negative impacts on biodiversity outside the project zone resulting directly from project activities. There is the possibility for activities currently active in, or slated for, the project area to be displaced into neighboring areas or other parts of Kalimantan. For example, oil palm companies that are unable to operate in the project area (as a result of the project) may purchase licenses to operate in neighboring areas, having a clear negative impact on biodiversity in that area. Similarly, illegal logging currently taking place in the project area may be displaced into other neighboring areas, intensifying damage to these areas.

At a landscape spatial scale, oil palm development and illegal logging has continued to spread into other areas regardless of project activities in the project area. This can be argued based on the current distribution of both activities in and near the project zone, existing oil palm licenses in the region, local development plans for a major crude palm oil export facility on the southern coast of the project area and ongoing expansion of both activities across Kalimantan. For oil palm, current land use planning in Kalimantan, current and predicted expansion rates for oil palm in Kalimantan, and continued market demand for this relatively inexpensive oil indicate that oil palm will continue its rapid expansion. For illegal logging, a lack of enforcement of Indonesian laws limiting unpermitted logging and timber export, and continuing global markets for cheap, illegal wood, indicate that this threat to biodiversity will likely also continue.

The project's presence may shift the spatio-temporal dynamics and/or intensity of when these activities reach other areas in the immediate vicinity, but given the full range of factors driving oil palm expansion mentioned above, the incremental impact within the project zone and adjacent areas is likely to be small. One possible exception is the short-term response of the four oil palm companies whose licenses are retired if the project is implemented as planned. If these licenses are simply retired through a commercial transaction, then off-site biodiversity impacts will be zero. If a license swap is pursued, whereby the current licenses are retired and/or traded for licenses in new areas, then biodiversity impacts in these new areas will be negative. In this scenario, net biodiversity impacts will depend on exactly where such licenses are established, and subsequent comparisons of biodiversity gains in the project area compared to biodiversity losses where the new licenses are issued. The project has a clear plan for tracking the future business activities of the companies whose licenses will be retired in the 'with project' scenario.

From a biodiversity perspective, both oil palm and illegal logging are environmentally unsustainable options, to be minimized or avoided wherever possible. By creating and protecting a large area of natural habitat contiguous with TPNP, the project has helped to maintain and enhance biodiversity in a region that would otherwise be degraded or lost to these two activities. Maintaining biodiversity in rain forests is highly dependent on maintaining ecosystem dynamics between species, and retaining

large enough tracts of habitat for species with the largest ranges. Oil palm plantations completely uncouple ecosystem dynamics and illegal logging can heavily disturb the dynamic and make forests susceptible to fire, which results in vast losses of biodiversity.

The presence of the project and its biodiversity related project activities have created benefits within the project zone that are unparalleled in comparison with the expected impacts of oil palm expansion into the area (as well as offsite areas) had the project not been present. The benefits which exist within the project zone greatly outweigh the potential impacts of unmitigated negative offsite action. Because of the project and its implemented project activities, the net effect of the project on biodiversity in and around the project zone is positive.

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan Development (B3.3)

As per the CCB Standard v2.0, inclusion of the biodiversity monitoring plan in this report is not necessary if the monitoring plan has been previously included and successfully validated as part of the project description document. Included in the table below (Table 35) is a summary of the biodiversity monitoring components that were monitored during this report period. Please see the CCB project description document to view the entire biodiversity monitoring plan (CCBA_PDD_Verification_2011.09.20_Final.pdf).

Monitoring Component		Activity and Years	Times and Periods	Detection frequency	Remote sensing data, resolution, coverage and years	Reporting frequency
Preliminary Biodiversity Monitoring Components	Forest Cover and Condition	Identification of change in forest cover classes with ecosystem-specific methods.	Annually	Annually	Medium resolution imagery (e.g. Landsat 7)	Annually
		Identification of change in forest cover classes with ecosystem-specific methods	Once per monitoring period	Once per monitoring period	High-resolution imagery (Ikonos, QuickBird, or aerial photography)	Once per monitoring period
		Ground patrol to check permanent 10-20 km transects for tree loss	Not conducted during this monitoring period	Not conducted during this monitoring period	n/a	Annually
	Plant and Wildlife Populations	Survey of indicator species for plants, birds, mammals, and herpetofauna	Survey conducted for indicator species, but survey for wildlife	n/a	n/a	Bi-annually

Monitoring Component		Activity and Years	Times and Periods	Detection frequency	Remote sensing data, resolution, coverage and years	Reporting frequency
			populations has not yet been conducted			
		Orangutan Survey	This survey has not been conducted during this monitoring period	n/a	n/a	Annually
	Quality and Condition of Aquatic and Wetland Ecosystems	Monitoring of water quality in the Seruyan River and Lake Sembuluh.	Ongoing	As required	n/a	Bi-annually
	Fire	See Section 5.3.2				
Comprehensive Biodiversity Monitoring Component - HCVs	Ecosystem mapping	Field survey to describe vegetation types based on taxonomy	Annually	Bi-annually	n/a	Bi-annually
		Develop draft vegetation map integrating these data with other secondary sources such as improved soil maps, geology, and land systems	Not done during this monitoring period	Bi-annually	High resolution imagery used in climate component	Bi-annually
	Confirmation of Species Likely or Potentially Present	Undertake Botanical Survey, document possible population estimation of HCV 1.2 (Critically Endangered Species) and 1.3 (Areas that Contain Habitat for Viable Populations of Endangered, Restricted Range or Protected Species) species. One area of special consideration should be the survey of orchids	Not done during this moitoring period	Bi-annually	n/a	Bi-annually

Monitoring Component		Activity and Years	Times and Periods	Detection frequency	Remote sensing data, resolution, coverage and years	Reporting frequency
		and other rare epiphytic plants.				
		Undertake Avifaunal surveys to confirm the presence of bird species considered likely or potentially present under HCV 1.2 and 1.3 and to begin developing a sense for areas rich in rare, threatened, or protected bird species. Bird surveys should be carried out in coordination with surveys for other taxa, in particular plants, and the selection of survey sites should be informed by refined vegetation maps.		Bi-annually	n/a	Bi-annually
		Undertake Mammal surveys, Orangutan survey could/should be separate project.		Bi-annually	n/a	Bi-annually
		Undertake Herptofauna surveys. Focus on Painted river terrapin, the False Ghavial (Tomistoma schlegelii) and the Estuarine Crocodile (Crocodylus porosus).		Bi-annually	n/a	Bi-annually
	Bird Survey of Lake Sebuluh	Undertake Bird survey and confirm previously recorded species.	Not undertaken during this monitoring	Bi -annually	n/a	Bi-annually

Monitoring Component		Activity and Years	Times and Periods	Detection frequency	Remote sensing data, resolution, coverage and years	Reporting frequency
			period			
	HCV Full Assessment	Identify HCV 3 (Rare or Endangered Ecosystems) in the Project zone using the Analytical Method described in the revised HCV Toolkit.	Annually	Bi - annually	n/a	Bi-annually
		Conduct follow-up assessment of HCVs 5 & 6, should be done as part of community assessment	Has not been conducted during this monitoring period	Bi - annually	n/a	Bi-annually

Table 35: Summary of Biodiversity Monitoring

5.3.2 Biodiversity Monitoring Results (B3.1, B3.2)

Activities implemented or planned are summarized in the table below. Biodiversity Monitoring Activities are conducted periodically every year with a target of 8 transect lines. Biodiversity monitoring activities have been incorporated into Rapid Assessment activities (Basic Information - Audit 2017 (poin5-BS)-Nandez_edited-ENG (REV2).pfd).

Rapid Assessment, or "Brief/Short Assessment", is a joint activity of Climate and Biodiversity activities, which is done to fulfill the preconditions to complete the Periodic Forest Inventory (Inventarisasi Hutan Menyeluruh Berkala - IHMB).

During this monitoring period, the project has furthered progress in the building of three (3) new orangutan release centers in the project area. Monitoring of the twenty-five (25) released orangutans has continued and two female babies were born in the release area during this monitoring period. The project has also continued field monitoring for detection of vulnerable and endangered species as well as the development of maps detailing areas at risk within the project. Further, the project has continued to monitor and protect the boundaries of the Project from the agents of deforestation and the impacts of fire.

Since project commencement, the project has directly and indirectly contributed to the net positive biodiversity impact in the areas. Directly the project has provided financial support to OFI to continue with its work to rehabilitate and release orangutans back into the forest.

To better measure biodiversity and species distribution in the project area, 25 camera traps have been installed in strategic locations within each management unit in 2019 and 2020. Camera traps will require routine patrols to maintain camera security and yearly refresher trainings will be required to minimize human error when installing the camera traps. A preliminary evaluation of camera trap usage to measure biodiversity and species distribution suggests that the camera itself functions well and is capable of producing sufficient photos of fauna.

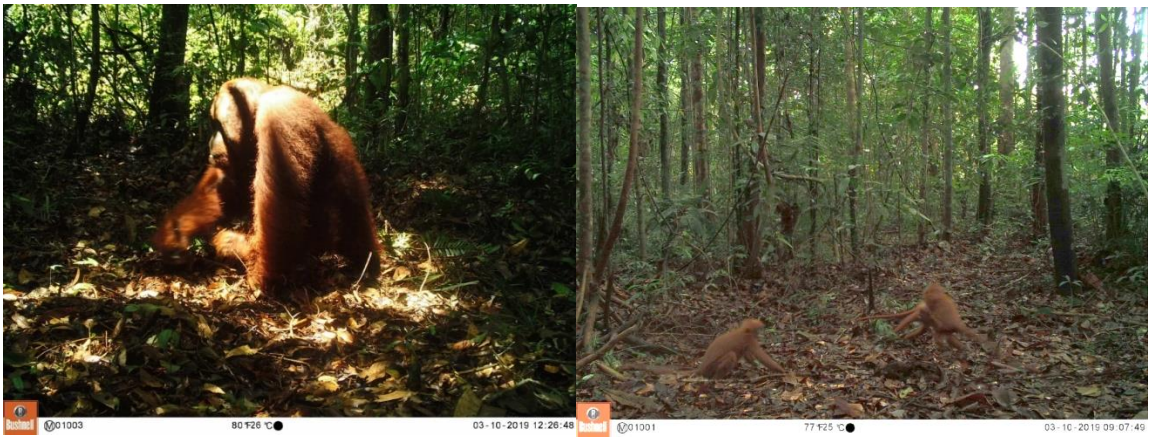

Figure 14: (Left) Image of the Bornean orangutan (*Pongo pygmaeus* [EN]) captured by camera trap. (Right) Image of two Maroon leaf monkeys (*Presbytis rubicunda* [LC]) captured by camera trap.

Mitigate loss of forest area and expand habitat for endangered species

A fire management refresher course was offered to 13 staff in July, 2019, and a Fire Strategy plan training was offered to all staff in February 2021. During the monitoring period, 2 new fire towers were built in Ulak Batu and Muara Dua villages, and the previously built fire tower in Batu Hirang was continueously manned. 8 guard posts throughout the project area were also constrcted during this monitoring period.

Indirectly the project has avoided the conversion of more than 15,187 ha of forest compared with the baseline scenario. This forest represents a significant habitat that will be extremely important to the ongoing protection of the orangutans in the future, as well as countless other species, many of which are vulnerable or endangered. Furthermore, efforts continued to rehabilitate mangrove ecosystems in the coastal area of Sungai Bakau in collaboration with local government, communities, and the Seruyan Environmental Agency (See “Mangrove Replanting Report No.3-Implementation stage”). Local nurseries in Sungai Bakau village and Sugai UU village provided 74,850 seedlings for planting and replanting activities.

Figure 15: Mangrove planting activities

Reduce local downstream pollution

Water quality was tested from six different sources to identify viability for human consumption, as well as to enable analysis of changes in water condition over time. The table below (Table 36) displays the test results from this monitoring period. None of the sample sites contain water that is suitable for human consumption because in some measurement parameters they have values that are not in accordance with established quality standards. As this was a preliminary test, routine water quality data collection will be needed to identify trends for use in informing future development of drinking water sites ((see laporan uji kualitas air Oktober 2019.docx).).

No	Parameter	Sample						Units	Quality standard	
		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6		2001 (class 1)	2010 (drinking water)
1	Temp.	29,7	34,2	28,6	28,1	29,1	29,5	^{0}C		Air ±3
2	pH	6,5	4,5	7,8	3,9	7,5	6,8		6 – 9	6,5 - 8,5
3	Sulfite (Na_2SO_3)	12	300	2	420	5	3000	mg/L		
4	Hardness ($CaCO_3$)	9	360	16,2	630	24	3300	mg/L		500
5	Chloride (Cl)	1	11	14	3	80	12000	mg/L	600	250
6	Total alkaline	18	4	19	3	30	120	mg/L	500	
7	Iron (Fe)	1	0	1	0	3	3	mg/L	0,3	0,3

Table 36: Water quality test results for six sites

No	Parameter	Sample conformity with quality standards					
		1	2	3	4	5	6

1	Suhu	√	√	√	√	√	√
2	pH	√	X	√	X	√	√
3	Sulfit	√	√	√	√	√	√
4	Kesadahan	√	√	√	X	√	X
5	Klorida	√	√	√	√	√	X
6	Total Alkalinitas	√	√	√	√	√	√
7	Besi	X	√	X	√	X	X

Table 37. Conclusion of water quality results and conformity to quality standards. Check marks indicate conformity to standards and an X indicates non-conformity.

Details about project activities and progress made in the latest monitoring period can be viewed in the table below (Table 38)

	Activities	Status	Implementation details	Start date	Finish date	Steps necessary to start/finish activity	Responsibility
1	Maintain and enhance forests in the project zone to avoid disconnection of HCV1.1 forests from the Project area	on progress	Routine data collection for land cover in Rapid assessment activity - performed 2x/month. Monitoring fire danger rating (FDR) based on mini weather station (MWS) data.	Jul-15	ongoing	Perform routine patroli and FDR monitoring. Patrol intensity level depends on FDR monitoring result.	Concession Manager and Unit Manager
2	Allow selective logging for local consumption, but protect all remaining forests	on progress	Routine patrol is conducted 2x/month. Socialization in regards the necessary logging and illegal logging is performed based on necessity and village agreement.	Jan-15	ongoing	Perform routine patrol and socialization to community members - socialization based on necessity and inquiry.	Concession Manager
3	Protection of the Seruyan and its tributaries through stabilizing land use and potentially replanting some areas to restore riparian zone and flood plain buffers. Education program for local communities.	on progress	Replanting in North unit on burnt area in the buffer zone. Replanting in Central unit on burnt area in Tatah Ji. The activities are performed to prevent fire and to rehabilitate the riparian area, as well the community livelihood - in fishing	Jul-15	ongoing	Continue working with 2 nurseries in Ulak Batu and Muara Dua and obtain pulled-out seedling from forest.	Biodiversity Technical Staff and Unit Manager
4	Protecting all remaining forests (esp. natural forests) and wetlands; prevent further conversion to industrial scale agriculture; reducing hunting through education and awareness campaigns	on progress	The project has protected 41,523.2 hectares of forest and wetlands that would have instead been converted to oil palm plantation. Agricultural education has started in the Forest Field School at the junior high and high school levels	Jul-15	ongoing	Develop curriculum material for Forest Field School.	Concession Manager Biodiversity Technical Staff
5	Lakes & water bodies: Education and protection of important bird areas	on progress	The project has protected 41,523.2 hectares of forest and wetlands which has resulted in allowing the lakes and water	Mar-15	ongoing	Perform routine survey for data collection and flora and fauna monitoring. Collaborate with community program for	Concession Manager Biodiversity Technical Staff

			bodies to remain intact.			forest field school.	
6	Grassy banks & slow moving rivers: Education and protection of areas important to birds for nesting or foraging	on progress	The project has protected 41,523.2 hectares of forest and wetlands which has resulted in allowing the lakes and water bodies to remain in tact	Mar-15	ongoing	Perform routine survey for data collection and flora and fauna monitoring. Collaborate with community program for forest field school.	Concession Manager Biodiversity Technical Staff
7	Ecotones: Protection of forest and wetland ecotones from any form of disturbance	on progress	The project has protected 41,523.2 hectares of forest and wetlands	Jul-15	ongoing	Perform data collection process from Rapid Assessment activity, flora and fauna monitoring, and routine patrol	Concession Manager Biodiversity Technical Staff
8	Potential to enhance landscape level forest connectivity (in turn restoring this HCV) by preventing further isolation of remaining fragments and reconnecting large remnant patches of forest	on progress	Develop and extend the green corridor by replanting programs and protect the area by routine patrol	Jul-15	ongoing	Perform replanting on burnt area and routine patrol	Concession Manager Biodiversity Technical Staff
9	Protecting wetlands and forests where ecotones exist	on progress	The project has protected 41,523.2 hectares of forest and wetlands which has resulted in protecting wetlands and forests where ecotones exist.	Jul-15	ongoing	Perform routine patrol, data collection and land cover mapping	Concession Manager and Climate & GIS Technical Staff
10	Protecting wetlands and forests; reduce hunting	on progress	The project has protected 41,523.2 hectares of forest and wetlands which has resulted in protecting wetlands and forests.	Jul-15	ongoing	Perform routine patrol routine and socialization to community in regards legal hunting method where it doesn't bring dangerous impact to forest	Biodiversity Technical Staff and Unit Manager
11	Not to clear forest in HCV 3 areas	on progress	The project has protected 41,523.2 hectares of forest and wetlands	Jul-15	ongoing	Perform routine patrol, data collection and land cover mapping	Concession Manager and Climate & GIS Technical Staff

12	Monitoring of business activities of oil palm companies that have retired their licenses in the PA	on progress	The project has monitored and reported activities of the agent of deforestation in the leakage buffer zone	Jul-15	ongoing	Annual remote sensing as described in the monitoring plan	Climate and Gis Technical Staff
13	Document economic dimensions of illegal logging activities and report to appropriate authorities	on progress	The project has monitored and reported activities of any illegal logging identified in the CAA and buffer zone	Jul-15	ongoing	Annual remote sensing and ground based measurements as described in the monitoring plan	Climate and Gis Technical Staff
14	Provide alternative job opportunities	on progress	Develop economic work group for local community	Jul-15	ongoing	Develop fisherman work group in Muara Dua, Tanjung Rangas, and Sungai perlu. Develop agriculture work group in Muara Dua	RRC Project manager
15	Track location of illegal logging operations	on progress	Develop map of vulnerable area	Jul-15	ongoing	Perform routine patrol and capture land/area pictures by drone	Climate and Gis Technical Staff
16	Camera Trap training	Complete	Hold trainings on camera trap usage and installation for monitoring wildlife in the project area	Feb- 19	Feb-19	Completed	Biodiversity Technical Staff
17	Water Quality Check	On progress	Identify viability for human consumption, as well as enable analysis for changes in water condition over time	2018	Ongoing	Routine water quality data collection will be needed to identify trends in water quality	Biodiversity Technical Staff
18	Mangrove Replanting Activity	On progress	Mangrove replanting and restoration project	2013	2021	Additional planting activities and monitoring	Biodiversity Technical Staff
19	Protect and manage large patches of contiguous forest	Complete	The project has protected 41,523.2 hectares of forest and wetlands. Additionally the Project has completed the demarcation of the ecosystem restoration concession (ERC) boundary which has now been submitted to the Government and the boundary measurement has been approved	2009	2018	Annual remote sensing and ground based measurements as described in the monitoring plan. Continual patrols along the ERC boundary demarcation.	RRC Project manager

			via Definitive Decre Sk.23 year 2018. This will be the first of its kind in Indonesia.				
20	Camera Trap Monitoring	On progress	25 camera traps were installed this monitoring period to aid in biodiversity monitoring and species distribution analysis in the project zone	Feb-19	Ongoing	Annual refresher trainings will be required on camera trap usage and installation as well as patrols of the installed cameras.	Biodiversity Technical Staff

Table 38: Biodiversity monitoring results.

5.3.3 Monitoring Plan and Results Dissemination (B3.3)

Field monitoring occurs within each field unit on a minimum of a weekly basis, and in some locations where there is concern for, or a history of encroachment, it can be as frequently as daily. Monitoring trip reports are kept at the field unit level for each trip and compiled by field unit manager as a summary to be provided to the Sampit office on a monthly basis. The reports are available by anyone upon request and actively disseminated to all stakeholders on an annual basis prior to any upcoming audit. Summaries of monitoring results are disseminated within communities using the community information boards.

5.4 Optional Criterion: Exceptional Biodiversity Benefits

The Rimba Raya project is applying for Gold Level status under the CCB standard on the basis of meeting the Vulnerability Criterion during this monitoring period. Additionally, the Project qualifies under the Irreplaceability Criterion due to the large population of Bornean orangutans within the project area and nearby TPNP. Both criteria are demonstrated as being met below.

Based on data from neighboring Tanjung Puting National Park, the Rimba Raya project area is very likely to have a large number of globally threatened species. Forest between TPNP and the project area is contiguous, with similar vegetation types, forest structure and ecosystem mosaics. Species previously identified in TPNP are therefore a solid proxy for species likely to occur in the project area. As displayed in the table below, a total of 54 species listed as Critically Endangered or Endangered by IUCN are likely present in the Rimba Raya project area, 8 of which were confirmed present within the project area in the current monitoring period. An additional 40 species listed as Vulnerable by IUCN are likely present in the project area, 14 of which were confirmed within the project area.

There are 8 Critically Endangered (CR) and Endangered (EN) species confirmed present in the project area during this monitoring period. Most notable among these is the Bornean orangutan (EN). The full list of species is found in the supporting document Compiled Biodiversity Report_2019.

Estimated Total and Confirmed Number of Endangered, Threatened & Vulnerable Species Found in Project area		
	CR & EN Species	**VU Species**
	Total (confirmed)	**Total (confirmed)**
Mammal	5	6
Bird	0	2
Plant	3	6
Reptile	1	2
Total	**9**	**16**

Table 39: Endangered, Threatened, and Vulnerable Species List

Endangered & Critically Endangered Species Found in Project area		
Mammals		
Nasalis larvatus larvatus	Bekantan	EN
Pongo pygmaeus wurmbii	Orangutan	EN
Hylobates albibarbis	Owa	EN
Manis javanica	Trenggiling	CR
Prionailurus planiceps	Kucing hutan	EN
Plants		
Shorea smithiana Symington -Neolamarchia cadamba	Lanan	CR
Shorea sp	Meranti	CR
Shorea pauciflora King	Ubar	EN
Reptiles		
Heosemys spinosa	Kura-kura gambut	EN

Table 40: Critically Endangered and Endangered Species Lists

Vulnerable Species Found in Project area	
Mammals	
Sus barbatus	Babi Hutan
Helarctos malayanus	Beruang Madu
Pteropus sp	Kelelawar
Cervus unicolor	Rusa Sambar
Presbytis rubicunda	Klasi
Neofelis diardi	Macan dahan
Birds	
Leptoptilos javanicus	Bangau Tongtong
Pycnonotus zeylanicus	Pampulu

Plants	
Baccaurea spp	Asam-Asam
Dyera polyphylla (Miq.) Steenis	Jelutung
Garcinia sp	Manggis Hutan
Gonystylus bancarus	Ramin
Combretocarpus rotundatus	Tumih
Eusideroxylon swageri	Ulin
Reptiles	
Tomistoma schlegelii	buaya sapit
Cuora amboinensis	Kura - Kura Tangkup

Table 41: Vulnerable Species

6 ADDITIONAL PROJECT IMPLEMENTATION INFORMATION

6.1 Records and Information

In accordance with project requirements all documents and records are kept in a secure and retrievable manner. The project proponent is committed to the storage of data for at least two years after the end of the project crediting period.

The electronic and hard copy data sources are stored in the locations described in Table 42.

Data / Information	Location 1	Location 2	Location 3
Project design documents/plans/ procedures	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun Kalimantan Tengah 74111, Indonesia	**N/A**	**N/A**
Satellite images	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun	**ecoPartners LLC** 2930 Shattuck Ave Suite 305 Berkeley, CA 94705	**N/A**

Data / Information	Location 1	Location 2	Location 3
	Kalimantan Tengah 74111, Indonesia		
Land Use Land cover change files	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun Kalimantan Tengah 74111, Indonesia	**EP Carbon** 2930 Shattuck Ave Suite 305 Berkeley, CA 94705	**N/A**
Hard copies of field patrols	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun Kalimantan Tengah 74111, Indonesia	**Rimba Raya Field Office** Jl .Nangka II No.62 RT/RW : 08/02 Kel. Ketapang, Kec. Mentawa Baru Hulu Sampit – Kalimantan Tengah	**N/A**
Carbon and biodiversity related Field Patrol Reports	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun Kalimantan Tengah 74111, Indonesia	**Rimba Raya Field Office** Jl .Nangka II No.62 RT/RW : 08/02 Kel. Ketapang, Kec. Mentawa Baru Hulu Sampit – Kalimantan Tengah	**N/A**
Community engagement field data	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun Kalimantan Tengah 74111, Indonesia	**World Education** World Education Jalan Tebet Dalam IV-D Number 5A Jakarta 12810 Indonesia	**Rimba Raya Field Office** Jl .Nangka II No.62 RT/RW : 08/02 Kel. Ketapang, Kec. Mentawa Baru Hulu Sampit – Kalimantan Tengah
Community Engagement Summary Reports	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun Kalimantan Tengah 74111, Indonesia	**World Education** World Education Jalan Tebet Dalam IV-D Number 5A Jakarta 12810 Indonesia	**Rimba Raya Field Office** Jl .Nangka II No.62 RT/RW : 08/02 Kel. Ketapang, Kec. Mentawa Baru Hulu Sampit – Kalimantan Tengah
Monitoring reports and calculations	**Orangutan Foundation International (OFI)** Jalan Hasanuddin No. 10 Blk DKD Pangkalan Bun Kalimantan Tengah 74111, Indonesia	**EP Carbon** 2930 Shattuck Ave Suite 305 Berkeley, CA 94705	**N/A**

Table 42: Data and Information Storage Locations

6.2 Quality Assurance and Quality Control

An internal Quality Control (QC) and Quality Assurance (QA) process has been developed and followed. The detailed procedures are outlined in the 'QA_QC Plan V1.3'. A brief summary of the QA/QC procedures are described below.

6.2.1 Remote Sensing

Remotely sensed data was collected and processed in accordance with the QA/QC procedures described in the GOFC-GOLD Sourcebook (GOFC-GOLD, 2010). Accuracy assessments of land cover change detected in the monitoring period are carried out consistent with the GOFC-GOLD Sourcebook. A confusion matrix identifying the errors of omission and commission was produced in order to calculate the uncertainty of the landcover analysis and ensure this analysis exceeded the minimum requirements of the methodology. This procedure will continue to be followed for each image captured and classified as part of the monitoring program. The Project is working with an independent consultant (ecoPartners LLC) who has extensive experience in remote sensing techniques.

EcoPartners has documented and established new remote sensing procedures for the LULC classification. The documentation of the current land use / land cover analysis and change detection will assist in consistent reporting of project activities between monitoring periods.

6.2.2 Data Entry and Analysis

Reliable estimation of carbon stock in pools requires proper entry of data into the data analyses spreadsheets. To minimize the possible errors in this process, the entry of both field data and laboratory data shall be reviewed using expert judgment and, where necessary, comparison with independent data to ensure that the data are realistic. Communication between all personnel involved in measuring and analyzing data should be used to resolve any apparent anomalies before the final analysis of the monitoring data is completed. If there are any problems with the monitoring plot data that cannot be resolved, the plot should not be used in the analysis.

6.2.3 Data Storage

Due to the long-term nature of the Rimba Raya project activity, data shall be archived and maintained safely. Data archiving shall take both electronic and paper forms, and copies of all data shall be provided to each project participant. All electronic data and reports shall also be copied on durable media such as CDs and copies of the CDs are stored in multiple locations.

The archives shall include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheet;
- Estimates of the carbon stock changes in all pools and non-CO2 GHG and corresponding calculation spreadsheets;
- GIS products (including all aerial imagery if applicable);
- Copies of the measuring and monitoring reports.

7 ADDITIONAL PROJECT IMPACT INFORMATION

No additional project impact information is available. All project impacts are identified and discussed in sections 3,4, and 5.

8 REFERENCES

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