



Enhancing the Implementation of Landscape Management of Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BR) in Riau Province of Sumatra Island, Indonesia

FIFTH BI-ANNUAL PROGRESS REPORT

Enhancing the Implementation of Landscape Management of Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BR) in Riau Province of Sumatra Island, Indonesia --- ITTO PD-712/13 Rev 3 (F) ---

Period

April 2023 – June 2025

Host Government

Indonesia

Executing Agency

Center for Socio Economic of Forest Community Development,
The Ministry of Forestry of Indonesia

Starting Date

26 April 2023

Duration

30 Months

Project costs

Managed By Executing Agency	USD 202,000
Retained By ITTO	USD 48,000
Total Budget	USD 250,000

Bogor, July 2025

Executing & Collaborating Agencies:

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1. Description of the Work Implemented in the Period

The project submitted the inception report in February 2023, followed by an amendment report in March 2023. On May 2nd, 2023, the project organized the First Project Steering Committee (PSC) Meeting, which was attended by all PSC members. The minutes of the meeting were endorsed and circulated to all PSC members for their reference.

Subsequently, from May 3rd to May 5th, 2023, the project conducted a site visit along with the ITTO Secretariat Team and the Korean Forest Service (KFS) representatives, covering Pekanbaru and the location of GSK-BB Biosphere Reserve in Riau province. During this visit, meetings were held with key stakeholders from various sectors, including representatives from the central government, local governments, and NGOs.

The project involves a range of activities managed by both a National Consultant and a subcontractor, as well as several activities directly overseen by the Project Management Unit (PMU).

The project engaged a National Consultant to conduct focus group discussion on the planning framework of GSK-BR involving concerned authorities (Activity 1.1.), To affirm sustainable forest functions on GSK-BR involving forestry authorities and main stakeholders (Activity 1.2). To review and update bio-physical and socio-economic data on biosphere reserve (Activity 1.3), and to train sufficient numbers of professionals on biosphere management related skills (Activity 2.2). While to conduct activity 1.4 To install and operate a data-base system for the biosphere reserve, the project engaged a National Expert. Additionally, the project engaged a subcontractor to conduct a series of dialogue with stakeholders at sub-district and village levels on potential benefits of biosphere (Activity 3.1) and to identify sustainable income generating activities in close consultation with local communities at selected sites (3.2).

There are also several activities that are managed by PMU including formulating an Integrated Strategic Management Plan (ISMP) with the assistance of competent professionals (Activity 1.5), Developing an operational plan to ensure the existing management coordinating board functioning well (Activity 2.1), formulating and adopting protocols on biosphere management operations (Activity 2.3), developing SOP for the conduct of management operations by different stakeholders (Activity 2.4), and launching campaign on GSK-BR development through dialogue, production and dissemination of attractive and easy-to-read materials (Activity 3.7).

The Second Meeting of the Project Steering Committee (PSC) was conducted on January 19th, 2024, with full attendance from all PSC members. The minutes of this meeting were officially endorsed and circulated to facilitate comprehensive communication among the PSC members. Preceding the Second Meeting of the PSC, a field visit was organized on January 17-18th, 2024. During this visit, ITTO representatives actively participated in a dialogue at the village level in Buantan Besar, Siak Regency.

The PMU has also undertaken several non-activity-based initiatives, such as attending training on capacity building for legal drafting related to biosphere reserves in April 2024. This training focused on mitigating potential moral hazards and ensuring legal certainty. A notable example

is the legal drafting case within Project ITTO PD 712/13, which involved revising the 2017 Riau Governor's Decree on the Biosphere Reserve Management Coordination Board.

The project was also presented at the 15th Southeast Asia Biosphere Reserve Network Meeting held on Wakatobi Island from April 28th to May 2nd, 2024. This meeting aimed to build a biosphere reserve conservation network among UNESCO member countries, including Malaysia, Vietnam, the Philippines, Lao PDR, Thailand, Japan, Cambodia, Timor Leste, and Australia, as well as Southeast Sulawesi. The PMU emphasized the importance of biodiversity conservation and the standardization of management activities at the landscape level of the GSK-BR. Key issues raised during the event included efforts to enhance the welfare of local communities and strengthen collaboration among stakeholders.

On September 9th, 2024 a PTC Meeting was held which was attended by representatives of ITTO, ASEFI, National Consultants and PMU. The results of this PTC Meeting recommended:

- The implementation of each ITTO project will be presented at the ITTC session, highlighting its achievements and positive impact on the community. Donors may hesitate to invest in future projects within the biosphere reserve if they do not see strong coordination among stakeholders. To validate the progress made, it is essential that ITTO conduct comprehensive monitoring of the landscape management of the Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BR).
- The project must reconsider how to enhance the effectiveness of the management coordinating board. APP Sinarmas, as the initiator of the GSK-BB area as a biosphere reserve and the holder of permits for companies operating forest plantations within the reserve, should be committed to contributing to and expediting the revitalization process of the board in collaboration with local government.
- The development of the GSK-BB database system, if feasible, should be connected to other national forest cover monitoring information systems, such as SIMONTANA. This integration will enhance the effective collection and updating of GSK-BB data within those systems.
- Updating spatial data on the GSK-BB landscape is crucial, as it helps us monitor changes in forest cover, including land rehabilitation efforts from various institutions. It is also essential to track illegal logging, forest fires, encroachment, and land occupation.
- Additionally, the project must address the lack of dissemination of the management concepts related to the GSK-BB biosphere reserve at the site level.

The project participated in the Environmental and Forestry Standards Week (PeSTA) event held by the Environmental and Forestry Instrument Standardization Agency at the Manggala Wanabakti Building, Jakarta. The activity period which took place from 10-12th September 2024, visitors who attended and visited the ITTO PD 712/13 booth were invited to learn about the concept of management, a general explanation of the background to the determination of status, potential and unique values, and standardization of management activities for each Biosphere Reserve in Indonesia, especially the Giam Siak Kecil Bukit Batu Biosphere Reserve. This exhibition disseminates the concept and standardization of forest management activities and supports the Sustainable Development Goals (SDGs). The ITTO PD 712/13 booth also presented project activity report products in order to provide support for the implementation of the management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve and non-timber forest products (NTFPs) produced by the community around the Biosphere Reserve landscape.

The project continues amidst the organizational changes of the Ministry of Environment and Forestry to become the Ministry of Environment/Environmental Management Agency and the Ministry of Forestry. Following the recent changes in Indonesia's government structure, the Secretary General of the Ministry of Forestry, through Decree No. E.2/SEKJEN/HKUN/KLN.01/3/2024, has appointed the Center for Socio-Economic of Forest Community Development (CSEFCD) as the new executing Agency for this project. The Center's role is to enhance the socio-economic status of forest communities, aligning with the project's objectives particularly in developing demonstration plots for local community livelihoods. As a new EA, CSEFCD has held an audience for CB GSKBB stakeholders in Riau province in April 2025. The meeting discussed the follow-up of project management implementation after restructuring.

The project has received approval from ITTO to extend the project duration by an additional 6 months, extending the timeline until September 2025 with no additional budget. This extension will ensure the achievement of optimal results including additional activity that is Activity 1.8: 'Developing an Integrated Funding Proposal to Support an achievement of the Biosphere Reserve to the FOLU NET Sink 2030'. To date, the ITTO PD 712/13 Rev. 3 (F) PMU has prepared the initial funding proposal, drawing on the Draft Integrated Strategic Management Plan (ISMP) for the Giam Siak Kecil–Bukit Batu Biosphere Reserve (CB-GSKBB) and the Riau Province FOLU Net Sink Work Plan. The proposal is being submitted through the BPDH Fund Windows scheme, with the Governor of Riau Province serving as the official proponent. Draft proposal discussions with stakeholders were held on February 25th 2025, April 30th 2025, and May 28th 2025. During these meetings, the following inputs were gathered: Activity locations candidate, Stakeholders involved and responsible for each activity, and Series of activities already undertaken or currently underway by each stakeholder. Based on the inputs received, the Project has revised and refined the draft proposal. The updated proposal is now ready for submission to Bappeda of Riau Province, for onward reporting to the Governor as the formal proponent.

In the first phase of the project, 9 of the 15 planned activities have been completed (Activity 1.1, Activity 1.2, Activity 1.3, Activity 1.5, Activity 2.2, Activity 2.3, Activity 2.4, Activity 3.1 and Activity 3.2), and 6 activities are currently underway (Activity 1.4 To install and operate a data-base system for the biosphere reserve, Activity 1.8 Developing an Integrated Funding Proposal to Support an achievement of the Biosphere Reserve to the FOLU NET Sink 2030, Activity 2.1 To make existing management coordinating board functioning well through development of an operational plan and provision of needed resources, Activity 3.3 To establish demonstration plots for selected income generating activities at selected suitable sites, Activity 3.4 To train villagers on practical skills for implementing selected income generating activities and for developing CSE of NTFPs, and Activity 3.7 To launch campaign on GSK-BR development through dialogue, production and dissemination of attractive and easy-to-read materials).

2. Execution of the Workplan

2.1. Workplan Review

The review of the project implementation compared to the project workplan presented in Table 1. Workplan review

Output/Activities		PHASE I										
		Year 1				Year 2				EXT		
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
Output 1 : Planning framework GSKBR supporting standardization for FOLU Net Sink 2030												
PD	Activity 1.1 To organize focus group discussion on Planning framework GSKBR involving concern authorities											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 1.2 To affirm sustainable forest functions on GSK-BR involving forestry authorities and main stakeholders											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 1.3 To review and update biophysical and socio-economic data on biosphere reserve											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 1.4 To install and operate a data-base system for the biosphere reserve											Activity in execution
YPO 1												
YPO 2												
YPO 3												
PD	Activity 1.5 To formulate ISMP with the assistance of competent professionals											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 1.8: Developing an Integrated Funding Proposal to Support an Achievement of the Biosphere Reserve to the FOLU NET Sink 2030											Activity in execution
YPO 1												
YPO 2												
YPO 3												

Output/Activities		PHASE I										
		Year 1				Year 2				EXT		
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
Output 2 Institutional capacity to manage GSK BR based on standardization strengthened												
PD	Activity 2.1 To make existing management coordinating board functioning well through development of an operational plan and provision of needed resources											Activity in execution
YPO 1												
YPO 2												
YPO 3												
PD	Activity 2.2 To train sufficient number of professional on biosphere management related skills											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 2.3 To formulate and adopt protocols on biosphere management operations											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 2.4 To develop standard operating procedures (SOP) for conduct of management operations by different stakeholders											Activity completed
YPO 1												
YPO 2												
YPO 3												
Output 3: Support of stakeholders on operational management of GSK BR promoted												
PD	Activity 3.1 To conduct a series of dialogue with stakeholders at sub-district and village levels on potential benefits of biosphere reserve development											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 3.2 To identify sustainable income generating activities in close consultation with local communities at selected sites											Activity completed
YPO 1												
YPO 2												
YPO 3												
PD	Activity 3.3 To establish demonstration plots for selected income generating activities at selected suitable sites											Activity in execution
YPO 1												
YPO 2												
YPO 3												

Output/Activities		PHASE I										
		Year 1				Year 2				EXT		
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
PD	Activity 3.4 To train villagers on practical skills for implementing selected income generating activities and for developing CSE of NTFPs											Activity in execution
YPO 1												
YPO 2												
YPO 3												
PD	Activity 3.7 To launch campaign on GSK-BR development through dialogue, production and dissemination of attractive and easy-to-read materials											Activity in execution
YPO 1												
YPO 2												
YPO 3												

Note: Initial planning
 Implementation, completion target adjustment

2.2. Progress in Implementation of the Activities

Table 2. Progress in implementation of the Activities

Output/Activities	Percentage executed	Originally planned completion date	Estimated completion date
Output 1: Planning framework GSKBR supporting standardization for FOLU Net Sink 2030			
Activity 1.1 To organization focus group discussion on Planning framework GSKBR involving concern authorities	100%	April-July 2023	July 2023
Activity 1.2 To affirm sustainable forest functions on GSK-BR involving forestry authorities and main stakeholders	100%	July 2024-September 2025	December 2024
Activity 1.3 To review and update bio-physical and socio-economic data on biosphere reserve	100%	November 2023-February 2024	June 2024
Activity 1.4 To install and operate a data-base system for the biosphere reserve	75 %	January-March 2025	September 2025
Activity 1.5 To formulate ISMP with the assistance of competent professionals	100 %	March-September 2024	June 2024
Activity 1.8: Developing an Integrated Funding Proposal to Support an achievement of the Biosphere Reserve to the FOLU NET Sink 2030	75%	April – September 2025	September 2025
Output 2: Institutional capacity to manage GSK BR based on standardization strengthened			
Activity 2.1 To make existing management coordinating board functioning well through development of an operational plan and provision of needed resources	75 %	July 2024-September 2025	September 2025
Activity 2.2 To train sufficient number of professionals on biosphere management related skills	100%	Oct 2023 – March 2025	June 2024
Activity 2.3 To formulate and adopt protocols on biosphere management operations	100%	Oct 2023 – Dec 2024	December 2024
Activity 2.4 To develop standard operating procedures (SOP) for conduct of management operations by different stakeholders	100%	April 2024-March 2025	December 2024

Output/Activities	Percentage executed	Originally planned completion date	Estimated completion date
Output 3: Support of stakeholders on operational management of GSK BR promoted			
Activity 3.1 To conduct a series of dialogue with stakeholders at sub-district and village levels on potential benefits of biosphere reserve development	100%	April – Dec 2023	June 2024
Activity 3.2 To identify sustainable income generating activities in close consultation with local communities at selected sites	100%	April – Dec 2023	June 2024
Activity 3.3 To establish demonstration plots for selected income generating activities at selected suitable sites	40%	July 2023 – September 2025	September 2025
Activity 3.4 To train villagers on practical skills for implementing selected income generating activities and for developing CSE of NTFPs	40%	July 2023 – September 2025	September 2025
Activity 3.7 To launch campaign on GSK-BR development through dialogue, production and dissemination of attractive and easy-to-read materials	40%	July 2024-September 2025	September 2025

2.3. Inputs Applied

a. Financial Statement

The project budget managed by the executing agency is US\$202,000, of which US\$128,858.87 has been expenses for project implementation, so unspent funds is US\$73,142. More details can be seen in the following Financial Statement table.

PROJECT FINANCIAL STATEMENT (IN US Dollars)								
Project No. PD 712/13 Rev.3 (F)				Period ending on: June 2025				
Project Title: "Enhancing The Implementation Of Landscape Management Of Giam Siak Kecil-Bukit Batu Biosphere Reserve (Gsk-Br) in Riau Province of Sumatera Island, Indonesia"								
Component			Original Amount	Modified Budget	Expenditures To-date			Available Fund
					Accrued	Expended	Total	
			(A)	(B)	(C)	(D) {B + C}	(E) {A - D}	
B	Expenditures by executing agency:							
	10	Project Personnel						
		11 Project Coordinator	24,000	11,670		11,480	190	
		12 Project Secretary	12,000	16,500		14,250	2,250	
		13 Technicians	12,000	16,500		14,250	2,250	
		14 National Expert	4,806	4,806		2,000	2,806	
		15 National Consultant	25,400	20,460		10,390	10,070	
		15.1 Resources person	6,900	7,620		4,251	3,369	
		16 Campaigning specialist	1,340	1,340		-	1,340	
		17 operator/promotinal contributor	1,206	1,206		-	1,206	
		19 Component Total	87,652	80,102	-	56,621	23,481	
	20	Sub-Contract						
		24 Sub Contract No. 4 NGO	18,000	18,000		18,000	-	
		25 Sub Contract No. 5 NGO	5,000	5,000		-	5,000	
		26 Sub Contract No. 6 NGO	3,000	4,000		-	4,000	
		29 Component Total	26,000	27,000	-	18,000	9,000	
	30	Duty Travel						
		31 Daily Subsistence Allowance	20,560	22,207		11,327	10,880	
		32 Air Ticket	14,790	16,496		7,441	9,055	
		33 Local transport	4,410	7,280		5,083	2,197	
		39 Component Total	39,760	45,983	-	23,851	22,132	
	40	Capital Items						
		41 PC/Notebook	3,538	3,498		3,498		
		49 Component Total	3,538	3,498	-	3,498	-	
	50	Consumable Items						
		51 Consumable	3,650	1,775		683	1,093	
		52 Stationary	9,600	3,196		933	2,262	
		53 Utilities	6,000	5,878		4,071	1,807	
		54 Provider Rental	400	-		-		
		59 Component Total	19,650	10,848	-	5,687	5,162	
	60	Miscellaneous						
		61 Meeting	19,900	29,103		17,524	11,579	
		62 Printing	1,500	964		177	787	
		66 PSC Meeting	4,000	4,502		3,502	1,000	
		69 Component Total	25,400	34,569	-	21,202	13,367	
	70	Total Expenditures To-date:	202,000	202,000		128,859	73,142	
	80	National Management Cost						
		89 Component Total						
	90	ITTO Monitoring, Evaluation and Administration						
		81 ITTO Monitoring and Review	13,214					
		82 ITTO Programme Support	26,786					
		83 Financial Audit	8,000					
	100	Total Project Monitoring and Administration	48,000					
		Remaining balance of funds (A-B)	250,000					

b. Cash Flow

Funds transferred to the project amount to US\$170,000, distributed in three installments: the first installment on April 26, 2023, for US\$70,000, the second installment on March 25, 2024, for US\$50,000, and the third installment on December 12, 2024, for US\$50,000. Total expenditure for project implementation amounts to Rp1,997,670,503 or equivalent to US\$128,859. So the remaining balance is US\$41,141. More details can be seen in the following Chas Flow table.

PROJECT FINANCIAL STATEMENT (IN US Dollars)								
Project No. PD 712/13 Rev.3 (F)				Period ending on: June 2025				
Project Title: "Enhancing The Implementation Of Landscape Management Of Giam Siak Kecil-Bukit Batu Biosphere Reserve (Gsk-Br) in Riau Province of Sumatera Island, Indonesia"								
Component			Original Amount	Modified Budget	Expenditures To-date			Available Fund
					Accrued	Expended	Total	
					(A)	(B)	(C)	(D) {B + C}
B	Expenditures by executing agency:							
	10 Project Personnel							
	11	Project Coordinator	24,000	11,670		11,480	11,480	190
	12	Project Secretary	12,000	16,500		14,250	14,250	2,250
	13	Technicians	12,000	16,500		14,250	14,250	2,250
	14	National Expert	4,806	4,806		2,000	2,000	2,806
	15	National Consultant	25,400	20,460		10,390	10,390	10,070
	15.1	Resources person	6,900	7,620		4,251	4,251	3,369
	16	Campaigning specialist	1,340	1,340		-	-	1,340
	17	operator/promotinal contributor	1,206	1,206		-	-	1,206
	19	Component Total	87,652	80,102	-	56,621	56,621	23,481
	20 Sub-Contract							
	24	Sub Contract No. 4 NGO	18,000	18,000		18,000	18,000	-
	25	Sub Contract No. 5 NGO	5,000	5,000		-	-	5,000
	26	Sub Contract No. 6 NGO	3,000	4,000		-	-	4,000
	29	Component Total	26,000	27,000	-	18,000	18,000	9,000
	30 Duty Travel							
	31	Daily Subsistence Allowance	20,560	22,207		11,327	11,327	10,880
	32	Air Ticket	14,790	16,496		7,441	7,441	9,055
	33	Local transport	4,410	7,280		5,083	5,083	2,197
	39	Component Total	39,760	45,983	-	23,851	23,851	22,132
	40 Capital Items							
	41	PC/Notebook	3,538	3,498		3,498	3,498	
	49	Component Total	3,538	3,498	-	3,498	3,498	-
	50 Consumable Items							
	51	Consumable	3,650	1,775		683	683	1,093
	52	Stationary	9,600	3,196		933	933	2,262
	53	Utilities	6,000	5,878		4,071	4,071	1,807
	54	Provider Rental	400	-		-	-	
	59	Component Total	19,650	10,848	-	5,687	5,687	5,162
	60 Miscellaneous							
	61	Meeting	19,900	29,103		17,524	17,524	11,579
	62	Printing	1,500	964		177	177	787
	66	PSC Meeting	4,000	4,502		3,502	3,502	1,000
	69	Component Total	25,400	34,569	-	21,202	21,202	13,367
70	Total Expenditures To-date:		202,000	202,000		128,859	128,859	73,142
	80 National Management Cost							
	89	Component Total						
	90 ITTO Monitoring, Evaluation and Administration							
	81	ITTO Monitoring and Review	13,214					
	82	ITTO Programme Support	26,786					
	83	Financial Audit	8,000					
100		Total Project Monitoring and Administration	48,000					
	Remaining balance of funds (A-B)		250,000					

2.4. Output Achievement

Output 1: Planning framework GSKBR supporting standardization for FOLU Net Sink 2030

Activity 1.1 To organize one focus group discussion on planning framework of GSK-BR involving concerned authorities

COMPLETED. The Activity was conducted on 12th June 2023 (Pre FGD Planning Framework for GSK BB Biosphere Reserve) and 13th July 2023 (FGD Planning Framework for GSK BB Biosphere Reserve). This activity was implemented with the assistance of a competent national consultant, Dr. Dolly Priatna from Belantara Foundation.

We identified 37 stakeholders including plantation enterprises, farmers, fishers, traders, brokers, loggers, forest product users, miners, NGOs, foreign researchers, universities, central government agencies, local government representatives, etc.

Key conclusions from the FGD (Focus Group Discussion) Planning Framework for the Giam Siak Kecil Bukit Batu Biosphere Reserve are as follows:

- Overall, the results of this FGD emphasize the importance of collaboration, accurate mapping, and good data management in formulating a better and more sustainable GSK-BR Planning Framework.
- Planning for the management of biosphere reserves for the following year (2023-2028) will focus on increasing institutional/institutional capacity, as well as support for stakeholders, which are the main focus in this Planning Framework.
- Efforts to increase institutional capacity for the coordinating board for the management of biosphere reserves that have been formed, and the support of other stakeholders in the management of these biosphere reserves need to be continued and strengthened.
- Periodic monitoring and evaluation of the implementation of this Planning Framework is very important to ensure the achievement of goals and continuous improvement.

Activity 1.2 To affirm sustainable forest functions on GSK-BR involving forestry authorities and main stakeholders

COMPLETED. Activity 1.2 was conducted with the assistance of Mr. Wahid Tesyar Arfan, S.Hut., a national consultant from the Ministry of Environment and Forestry. The updated spatial data analysis for the Giam Siak Kecil-Bukit Batu Biosphere Reserve indicates that the total area of the reserve is approximately 703,932.85 hectares. The GSK- BB Biosphere Reserve consists of a core area of ± 181,326.16 hectares, a buffer area of ± 220,944.31 hectares, and a transition area of ± 301,662.38 hectares. The Giam Siak Kecil Bukit Batu Biosphere Reserve (GSK-BB BR) is located in Siak District, Bengkalis District, and Dumai City, Riau Province.

The spatial data for the Giam Siak Kecil Bukit Batu Biosphere Reserve delineation is analyzed through overlay forestry thematic data, which includes as the following maps:

1. Forest Area map of Riau Province (Annex to the Decree of the Minister of Environment and Forestry No. SK. 903/MENLHK/SETJEN/PLA.2/12/2016 dated December 7th, 2016);

2. Map of Forest Area Establishment Progress of Riau Province up to 2020 (Annex to the Decree of the Minister of Environment and Forestry No. SK.6612/MENLHKPKTL/KUH/PLA.2/10/2021 dated October 27th 2021);
3. Indicative Map of for Land Tenure Settlement in the Framework of Forest Area Arrangement (PPTPKH) and Agrarian Reform Object Land Sources (TORA), and the Realization Map of PPTPKH and TORA Revision III (Annex to the Decree of the Minister of Environment and Forestry No. 6132 of 2024, dated March 20th, 2024);
4. Indicative Map for Social Forestry Areas (Revision IX) (Annex to the Decree of the Minister of Environment and Forestry No. 6642 of 2024);
5. Indicative Map of the Suspension of Business Licensing, Forest Area Utilization Approval, or New Forest Area Reclassification on Primary Natural Forest and Peatland for 2023, Period II (Annex to the Decree of the Minister of Environment and Forestry No. SK.12764/MENLHK-PKTL/IPSDH/PLA.1/11/2023, dated November 22nd, 2023);
6. Map of Forest Utilization Business Licensing (PBPH) Development;
7. Map of Forest Area Utilization Approvals (PPKH);
8. Map of Land Cover for 2023;
9. Map of Forest Area Release;
10. Folu Net Sink Work Plan 2023;
11. Map of Deforestation for 2022-2023.

All thematic forestry layers map data were sourced from the Geospatial Information System of the Ministry of Environment and Forestry (KLHK). These include thematic spatial layers (SHP files) such as zoning and conservation-area blocks; Forest Area Utilization Approval Permits (PPKH); the Third Revision of PPTPKH; Forest Management Units (KPH); designated forest areas; the eighth revision of PIAPS; land-cover datasets; and Forest Utilization Business Licenses.

In accordance with Minister of Environment and Forestry Regulation No.24 of 2021 on Thematic Geospatial Information, the Directorate of Forest Resource Inventory and Monitoring (under the Directorate General of Forestry Planning and Environmental Management) serves as the primary data custodian for forest-area data. At the provincial and regional levels, the Forest Area Designation Bureau (Regional Office of Forestry Planning) serves as the sub-data custodian.

Provincial and regional data producers update their thematic forestry map layers, which are subsequently verified and validated in the field by each local sub-data custodian producer.

The analysis of overlaying the Giam Siak Kecil Bukit Batu Biosphere Reserve zoning with forestry thematic data provides essential inputs as a source of data and information to support the evaluation management, change development of Biosphere Reserve land-use for the ITTO project, stakeholders, and other users for effective action plan and also precise policy-making for management.

Activity 1.3 To review and update bio-physical and socio-economic data on biosphere reserve

COMPLETED. Activity 1.3 was carried out with the assistance of a national consultant from Man and Biosphere (MAB), Prof Maman Turjaman.

The objective of this activity was to update biophysical and socio-economic data and provide detailed input for the GSK-BB BR management plan, including at the site level. The study has incorporated recent research findings from the past 2-3 years on the complex socio-economic and biophysical aspects of peatland ecosystems. It emphasizes the need for significant efforts to ensure the survival and sustainability of key species, such as the Sumatran elephant and tiger, highlighting the importance of continuous collaboration among stakeholders to improve community well-being in transition areas and establish wildlife corridors. Effective protection of these species is indicative of successful and sustainable management of the biosphere reserve.

The final result is a Technical Report that provides an update on the biophysical and socio-economic data for the Giam Siak Kecil – Bukit Batu (GSK-BB) Biosphere Reserve in Riau Province, Indonesia. The report encompasses the Bio-Physical Assessment, Environmental Changes, Socio-Economic Assessment, Stakeholder Analysis, Integrated Strategic Management Plan (ISMP), Organization and Execution of the Biosphere Reserve Concept, Integrated Management Plans for the GSK-BR, Community Engagement, Sustainable Tourism, and Monitoring and Enforcement.

Since its establishment in 2009 as a UNESCO biosphere reserve, GSK-BB BR has faced complex challenges that necessitate sustained attention and commitment from provincial stakeholders. A comprehensive database of biophysical and socio-economic data is essential for effective management. Current research from the University of Riau, the National Research and Innovation Agency (BRIN), international collaborations, and site-level NGO activities funded by international sponsors indicates that existing knowledge remains fragmented with notable gaps. Addressing these gaps requires robust, long-term research logistics and a specialized management strategy, particularly given the reserve's peatland ecosystems.

Industrial forest plantation companies play a crucial role in driving management and research logistics within the biosphere reserve, working in partnership with national and international research institutions. The provincial government must uphold its commitment to the sustainability of GSK-BB BR, following its nomination and post-designation management by UNESCO. The Regional Development Planning Agency (BAPPEDA) of Riau Province is integral to managing baseline data and information, in collaboration with the Natural Resources Conservation Agency under the Ministry of Environment and Forestry.

Activity 1.4 To install and operate a data-base system for the biosphere reserve

ON GOING. The project has engaged national expert Mr. Muhammad Farid Fahmi, M.T., to develop a comprehensive website and database for the GSK-BR management. A comprehensive website and database has been developed and public outreach efforts have been enhanced to support the effective management of biosphere reserve. This initiative ensures transparency, accessibility, and active community involvement in managing the

Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BR). The website and database provides detailed information and resources about the biosphere reserve and are accessible at: <https://bsilhk.menlhk.go.id/itto-gsk/>. Output to date includes a website information system and database, also an operational manual guide book for users/admin usage.

The website information system as a public information portal includes:

- 1) Profile and general overview of the Giam Siak Kecil–Bukit Batu Biosphere Reserve;
- 2) Biodiversity data, including flora and fauna;
- 3) Restoration programs and fire management initiatives implemented by stakeholders;
- 4) Additional stakeholder activities;
- 5) Carbon storage potential and the characteristics of peatland ecosystems;
- 6) A gallery of community activities in the transition area;
- 7) Spatial data and zoning information of the biosphere reserve;
- 8) Statistical data on involved stakeholders and participating villages;
- 9) Documentation of activities and publication materials;
- 10) Posters outlining standard management protocols and impact mitigation monitoring for the Giam Siak Kecil–Bukit Batu Biosphere Reserve as a SOP for conduct of management operations by different stakeholders.

The database serves as an information portal that includes:

- 1) Management Plan and Its Implementation.
- 2) Environmental Management and Monitoring Standards.
- 3) Periodic Review.
- 4) ITTO PD 712/13 Rev.3 (F) project documents.

Activity 1.5 To formulate ISMP with the assistance of competent professionals

COMPLETED. The project has formulated an Integrated Strategic Management Plan with the assistance of competent professionals (MAB). GSK-BR planning framework for 2024-2028, including an integrated strategic management plan with 11 programs and 97 activities involving 41 parties to synergize core, buffer, and transition management areas, alongside identified policies such as strengthening BBKSDA Riau's capacity, fundraising for biodiversity conservation, reshaping the GSK-BR Management Coordinating Board, intensifying site-level management by the Forest Management Unit, integrating GSK-BR into regional planning, promoting environmental education and research, granting sustainable resource utilization rights to local communities, and restoring ecosystems affected by encroachment and fires.

Activity 1.8 Developing an integrated funding proposal to support an achievement of the biosphere reserve to the FOLU net sink 2030

ON GOING. The project is also preparing a proposal entitled "*Optimizing the Management of Biosphere Reserve of Giam Siak Kecil – Bukit Batu in Supporting Indonesia's FOLU Net Sink 2030*". Meetings have been held with relevant parties to gather input on the development of this proposal. The expected outputs from this proposal are:

1. A multi-stakeholder action plan document for GSK-BB management that is participatory, integrated, and adaptive to socio-ecological dynamics.
2. An integrated spatial-based database of ecological, social, economic, and carbon stock conditions of GSK-BB.
3. Peat ecosystems are restored over a minimum of 150 hectares, and the area's protection system from forest and land fires is enhanced.
4. An active monitoring and law enforcement system in the core and buffer zones, based on technology and community involvement.
5. Non-timber forest products and environmental services are developed sustainably, based on local potential, and gender-inclusive.
6. Community green economy units are established and supported by training, mentoring, and access to markets and financing.
7. The GSK-BB Research Center is strengthened through infrastructure development and collaboration with national and international partners.
8. All local stakeholders are trained and actively involved in collaborative landscape management.
9. Institutional coordination for the management of the GSK-BB Biosphere Reserve is effective and zoning-based.
10. The carbon Monitoring, Reporting, and Verification (MRV) system is operational and integrated with the 2030 SRN and FOLU Net Sink reporting.

To date, the ITTO PD 712/13 Rev. 3 (F) PMU has prepared the initial funding proposal, drawing on the Draft Integrated Strategic Management Plan (ISMP) for the Giam Siak Kecil–Bukit Batu Biosphere Reserve (CB-GSKBB) and the Riau Province FOLU Net Sink Work Plan. The proposal is being submitted through the BPD LH Fund Windows scheme, with the Governor of Riau Province serving as the official proponent

Draft proposal discussions with stakeholders were held on February 25th 2025, April 30th 2025, and May 28th 2025. During these meetings, the following inputs were gathered:

- 1) Activity locations candidate.
- 2) Stakeholders involved and responsible for each activity.
- 3) Series of activities already undertaken or currently underway by each stakeholder.

Based on the inputs received, the Project has revised and refined the draft proposal. The updated proposal is now ready for submission to Bappeda of Riau Province, for onward reporting to the Governor as the formal proponent.

Output 2: Institutional capacity to manage GSK BR based on standardization strengthened

Activity 2.1 To make existing management coordinating board functioning well through development of an operational plan and provision of needed resources

ON GOING. To achieve one of the objectives of Biosphere Reserve management as outlined in the Seville Strategy—namely, to ensure harmony and interaction among the different zones of the biosphere reserve—the appropriate management model is a collaborative management institution that serves as a multi stakeholder coordination platform (communication forum). One of the project's activities is to promote the operationalization of the Coordinating Board for the Management of the Giam Siak Kecil–Bukit Batu Biosphere Reserve and to identify the institutional entity that will lead the integration of stakeholder programs across the Giam Siak Kecil–Bukit Batu (GSKBB) Biosphere Reserve landscape.

The Management Coordinating Board, established by Riau Governor Decree Number Kpts.7/1/2017, has not been operational. Therefore, the Project proposed to either revitalize the structure of the Coordinating Board or establish an Operational Task Force for the Coordination of the Giam Siak Kecil–Bukit Batu Biosphere Reserve Management. This proposal was submitted via a letter from the Executing Agency (No. S.74/SETBSI/PEHKT/KLN.2.3/B/06/2024, dated June 24th 2024), addressed to:

- 1) Head of the Regional Development Planning, Research, and Development Agency (Bappeda) of Riau Province.
- 2) Head of Partnership and Engagement, Sinar Mas Forestry.
- 3) Head of Landscape Conservation and Environment, Sinar Mas Forestry.

On May 2nd 2024, the Executing Agency and the Project Team held a coordination meeting with Bappeda Riau to follow up on the proposal to revitalize the Coordinating Board's structure. Subsequently, at the end of June 2025, the Bappeda Team consulted with the Governor of Riau regarding environmental matters and the GSKBB Biosphere Reserve. The Governor agreed to reactivate the Coordinating Board for the Management of the Giam Siak Kecil–Bukit Batu Biosphere Reserve. As a next step, the Bappeda Team will hold internal discussions to finalize the draft of the Riau Governor Decree concerning the Coordinating Board for the Management of the Giam Siak Kecil–Bukit Batu Biosphere Reserve.

Activity 2.2 To train sufficient number of professionals on biosphere management related Skills

COMPLETED. This training involved Prof. Dr. Ir. Sambas Basuni, MS, and Dr. Haryanto R. Putro from IPB University as the National Consultants. This training was to enhanced professional capacity in biosphere management skills for stakeholders across various sectors, aiming to strengthen their commitment to sustainable management of GSK-BR. This capacity-building activity, the first of its kind for the GSK-BR, saw active participation from stakeholders who voiced their hopes in four key areas: enhancing understanding of the biosphere's ecological, social, and cultural values, implementing a more integrated and participatory management approach involving all stakeholders, and strengthening

institutions for effective and transparent coordination. Additionally, participants emphasized the importance of collaboration among all parties to create synergy, resolve conflicts, and achieve the shared goal of conserving and sustainably utilizing the reserve. These hopes reflect a strong desire for active involvement and improvements in understanding, management, and institutional support to promote the area's sustainability.

The training was conducted from May 27th to May 29th 2024 in Pekanbaru. The event was attended by 28 stakeholders (53 participants) from various sectors, including Government (BBKSDA Riau, Bappedalitbang Riau, BPSILHK Kuok, Dinas LHK Riau, Dinas Perkebunan Riau, Dinas LH Bengkalis, Dinas LH Dumai, Bappeda Siak, P3E Sumatera, BPKH, Direktorat PKK-KSDAE), Man of Biosphere (MAB) Indonesia Committee, University (Riau University), Companies (APP Sinar Mas Forestry, PT. Arara Abadi, PT. Balai Kayang Mandiri, PT. Bukit Batu Hutan Alam, PT. Riau Abadi Lestari, PT. Sekato Pratama Makmur, PT. Satria Perkasa Agung, PT. Surya Intisari Raya - HGU Sawit, PT. Riau Makmur Sentosa - HGU Sawit, and PT. Adei CRF-HGU Sawit), and NGOs (FKKM, Yayasan Belantara Foundation, SENDS, and LPESM).

The training covered the following topics: 1) Management of GSK-BB Biosphere Reserve, 2) Policies and Implementation of Biosphere Reserve Management (Policies and Institutional Management of Biosphere Reserves in Indonesia, Conservation Area Management in the Perspective of Biosphere Reserve Landscape, Adaptive Management of Biosphere Reserves, and Organizing Biosphere Reserve Management), 3) Issues and Solutions in GSK-BB Biosphere Reserve Management (Wildlife Management in GSK-BB Biosphere Reserve, Forest Resource Management in GSK-BB Biosphere Reserve (Tenurial Issues and Community Access to Forest Resources), Community-based Economic Development (Commodities and Environmental Services) in GSK-BB Biosphere Reserve), Collaborative Management of GSK-BB Biosphere Reserve (Governance and Collaborative Management Organization of GSK-BB Biosphere Reserve, and Stakeholder Roles in GSK-BB Biosphere Reserve Management).

Activity 2.3 To formulate and adopt protocols on biosphere management operations

COMPLETED. The project has formulated a standard for landscape management activities in the GSK-BB Biosphere Reserve. This contains activity standards serving as regulations to mitigate the negative impacts of management activities. The standards are divided into three Biosphere Reserve management areas, namely: core area, buffer area and transition area. The purpose is to mitigate the impact of landscape management activities of each area of biosphere landscape through standardization instruments.

This standard regulates 10 business/activity components and 15 impacts managed and monitored in three management zone areas: core, buffer, and transition. It includes management and monitoring methods to mitigate such impacts by stakeholders across the Biosphere Reserve landscape. Types of activities include research, non-timber forest product harvesting, introduction of plant species/taxonomy/dendrology, ecotourism operations, forest utilization business licensing operations, housing and settlement development, plantation operations, subsistence farming, freshwater aquaculture, and commercial enterprises.

This standard has been developed as an operational protocol for Biosphere Reserve management activities, guided by best practices and experiences in area management based on the zoning designation of Biosphere Reserves as defined by UNESCO. This special standard document is accompanied by a supporting document—namely a Conformity Assessment—which serves as a Standard Operating Procedure (SOP) for evaluating the appropriateness of standard implementation.

This standard was developed by the Secretariat of the Agency for Standardization of Environment and Forestry Instruments (ASEFI) of the Ministry of Environment and Forestry (MoEF), in collaboration with relevant stakeholders, through a factual drafting process conducted on 20 September 2023. It subsequently underwent a factual public consultation process on 23 February 2024, attended by representatives from the Indonesian National Committee for Man and the Biosphere—as the implementing body for the development and management of Biosphere Reserves in Indonesia—alongside the Directorate of Conservation Area Management under the Directorate General of Natural Resources and Ecosystem Conservation as the manager of conservation areas in Indonesia, the non-governmental organization Belantara Foundation, forest utilization business license holder APP Sinarmas Forestry Group, the Riau Provincial Natural Resources Conservation Agency, the Riau Provincial Development Planning Agency, and experts in sustainable forest management.

The Biosphere Reserve Standard (operational protocol) has obtained a certificate of feasibility for pilot implementation number: 167/SALTRA/PHB/10/2024, endorsed by the Head of the Agency for Standardization of Environment and Forestry Instruments. Based on this certificate, the standard has been implemented across eight pilot entities representing various ecosystem typologies, including lower and upper montane forests, peatlands and freshwater swamps, savannas, coastal forests, and mangroves. These eight entities are distributed across three Biosphere Reserve landscapes: the Merapi-Merbabu-Menoreh Biosphere Reserve in Central Java Province and the Cibodas Biosphere Reserve in West Java Province (representing lower and upper montane ecosystem typologies), as well as the Blambangan Biosphere Reserve in East Java Province (representing 15 sub-ecosystem typologies).

Activity 2.4 To develop standard operating procedures (SOP) for conduct of management operations by different stakeholders

COMPLETED. Assessment of compliance is an activity carried out to evaluate the compliance of standard implementation by activity implementers based on reference requirements. This assessment serves as a tool for the Ministry responsible for the environmental and forestry sector or for the designated Conformity Assessment Body in monitoring standard implementation. The results of this conformity assessment also provide feedback for activity implementers to improve their application of standards, and serve as input for standard developers to revise, refine, or review existing standards."

Assessment of Compliance in Monitoring the Implementation of Management Standards and Environmental Monitoring as an Effort to Mitigate the Impact of Management Activities on the Biosphere Reserve Landscape is an integral document that cannot be separated

from the protocol/standard document titled “Environmental Management and Monitoring as a Mitigation Effort to the Impact of Management Activities on Biosphere Reserve Landscapes.”

This Assessment of Compliance serves as a Standard Operating Procedure (SOP) to evaluate the compliance of standard implementation, as follow:

1. Monitoring and inspection of the implementation of environmental management and monitoring standards as a mitigation effort to address environmental impacts caused by business and/or activities conducted by business actors within the Biosphere Reserve landscape.
2. Identifying the success of standard implementation based on specific criteria or indicators under the authority of the Ministry responsible for the environment and forestry sector or the designated Conformity Assessment Body.
3. The Assessment of Compliance is carried out to evaluate the performance of established environmental and forestry standards. Important records regarding environmental management and monitoring activities conducted by standard-applying entities—beyond those explicitly listed in the standards—may demonstrate the performance of the implementing entity and serve as valuable input for revising or reviewing the standards.

The project has formulated a standard for landscape management activities in the biosphere reserve. This standard regulates 10 business/activity components and 15 impacts managed and monitored in three management zone areas: core, buffer, and transition. This standard has obtained a certification of standard test worthiness number: 167/SALTRA/PHB/10/2024.

The standard is designed to be tested based on ecosystem typology, namely lower and upper mountains, peat and freshwater swamps, savannas, coastal forests and mangroves. The Biosphere Reserve Standard has been tested in the Merapi-Merbabu-Menoreh Biosphere Reserve (representing the lower and upper mountain ecosystem typology) located in Central Java Province and the Blambangan Biosphere Reserve (representing the typology of 15 sub-ecosystems) in East Java, and Cibodas Biosphere Reserve (representing the lower and upper mountain ecosystem typology). Eight entities apply the standard, and test recommendations note that there is a need for environmental impact regulation related to road construction activities passing through the core zone area of the biosphere reserve, the introduction of alien species (IAS), and the use of water and water energy activities in nature reserves and conservation areas.

Fundamental land-related issues from the test results include:

- i. The delineated Biosphere Reserve consists of forest and non-forest areas that are given biosphere reserve status in the form of landscape management designated by international institutions, where there are various land use regulations both inside and outside the forest area. The biosphere reserve is not an area designation.
- ii. According to UNESCO regulations - no activities are allowed in the core zone except for research, education, and ecotourism activities. However, in fact, within the core zone of the Biosphere Reserve, there are special blocks, such as in national parks, where road construction activities take place. There are also utilization blocks, which

include tourism activities such as the construction of natural tourism infrastructure facilities like lodging, canteens, communication towers, and others.

- iii. The biosphere reserve consists of areas with various stakeholders, from conservation entities, forestry business entities, trading business entities, agricultural entities, plantation entities, housing & settlement entities, aquaculture entities, and others. However, meetings implementing the biosphere reserve management framework only involve conservation entities like national parks, grand forest parks, nature tourism parks, wildlife reserves, and nature reserves. Other entities are not active because there is no driving force in mobilizing multi-stakeholders in the area with biosphere reserve status.

Output 3: Support of stakeholders on operational management of GSK BR promoted

Activity 3.1 To conduct a series of dialogue with stakeholders at sub-district and village levels on potential benefits of biosphere reserve development

COMPLETED. The project has been executed with the assistance of a subcontractor, with Forum Komunikasi Kehutanan Masyarakat Wilayah Riau (FKKM Riau) taking the lead in conducting a series of dialogues. This initiative involved collaboration with two NGOs, namely Lembaga Pemberdayaan Ekonomi dan Sosial Masyarakat (LPESM) and Perkumpulan Sustainable Environmental Development Studies (SENDS), both operating under the FKKM Riau consortium. The engagement of these organizations underscores a comprehensive approach to community communication and development within the project framework.

Before initiating the dialogue series, meetings were held with relevant stakeholders, including Bappedalitbang Riau, Dinas LHK Riau, Bappeda Siak, Bappeda Bengkalis, Dinas PMD Bengkalis, and key community figures. All stakeholders expressed appreciation and anticipation for the activity to evolve into a genuine economic initiative.

The dialogue series unfolded across 15 villages, spanning 8 sub-districts in two regencies from December 2023 to January 2024. FKKM Riau orchestrated a comprehensive set of dialogues, reaching villages such as Desa Beringin, Desa Koto Pait Beringin, Desa Tasik Serai, Desa Tasik Serai Timur, and Desa Melibur in Talang Muandau Sub-district, Bengkalis Regency, Riau. Simultaneously, SENDS facilitated dialogues in various villages across Siak Regency, including Kampung Tuah Indrapura in Bunga Raya Sub-district, Kampung Buntan Besar and Kampung Merempan Hulu in Siak Sub-district, Kampung Muara Bungkal in Sungai Mandau Sub-district, and Kampung Selat Guntung in Sabah Auk Sub-district. Additionally, LPESM organized dialogues in Bengkalis Regency across three sub-districts, including the Siak Kecil sub-district, encompassing Desa Bandar Jaya, Desa Sungai Linau, and Desa Lubuk Gaung. In the Bandar Laksamana sub-district, dialogues occurred in Desa Temiang, and in the Bukit Batu sub-district, LPESM conducted dialogues in Desa Sukajadi.

Viable economic activities such as oil palm plantations and agroforestry development, along with proposed commodities such as horticulture, non-timber forest products, and ecotourism. Dialogue activities involved a total of 375 people (262 men and 113 women) who are farmers residing and highly concerned about environmental sustainability in villages within Siak Regency and Bengkalis Regency, Riau Province. Meanwhile, market

access for horticulture commodities and non-timber forest products is available, but it is constrained by the dominance of middlemen, and demonstration plots in several villages are awaiting external funding support.

Various methods, such as brainstorming, questionnaire completion, in-depth interviews, and discussions, were employed during the dialogue process. Community representatives, encompassing village officials, community leaders, women's leaders, youth leaders, and farmer groups, actively participated. This initiative reflects a comprehensive approach to engaging stakeholders and communities, demonstrating a commitment to understanding and involving diverse perspectives in the project.

The majority of participants in the dialogue have been living in the vicinity of GSK BR for over a decade. Villagers generally view biosphere reserves as viable sources of income generation. The prevailing economic activities in the area revolve around agriculture and fishery. Notably, there was identified potential for tourism activities in some villages (Beringin, Koto Pait Beringin, and Sungai Linau Village). The community expresses a preference for demonstration plots (demplots) situated near agricultural land. Participants are eager to actively contribute to the development of biosphere reserves. Their expectations include financial support and access to farming tools. Additionally, there is a recognized need to initiate the access or opening of markets for products originating from the community. This collective perspective highlights the community's aspirations and priorities in fostering sustainable development within the biosphere reserves.

Activity 3.2 To identify sustainable income generating activities in close consultation with local communities at selected sites

COMPLETED. The primary source of income for farmers stems from their engagement in agricultural activities, producing various commodities. However, a significant challenge arises due to the absence of a sustainable market for their products. To address this issue, there is a pressing need for an off-taker system that can establish a reliable and enduring market. This system envisions a marketplace connecting farmers directly with commercial produce buyers, facilitating the purchase of all grades of produce directly from the farm. Transactions within this marketplace can occur through spot sales, program-based arrangements, or contractual terms, providing flexibility for both farmers and buyers.

It's notable that farmers exhibit a preference for cultivating palm oil over other agricultural commodities. While this choice aligns with economic interests, it raises concerns about the environmental impact, particularly in terms of biodiversity degradation associated with palm plantation. Additionally, the use of fertilizers, while potentially enhancing yields, is acknowledged as a factor that could contribute to environmental degradation. Striking a balance between economic considerations and environmental sustainability is imperative in addressing these challenges within the agricultural landscape.

Each village in the biosphere reserve demonstrates its unique strengths and aspirations for income-generating activities. In Bandar Jaya, the community is keen on cattle farming, while Sungai Linau prioritizes coffee and cattle. Temiang is committed to rice cultivation, Lubuk Gaung engages in a combination of rice cultivation and innovative practices like palm oil trunk crafts. Sukajadi offers a diverse range of activities, including rice, palm oil, coconut,

rubber plants, smoked fish, *kemojo* sponge cake, and historical tours. This economic diversity showcases the distinctiveness of each village within the biosphere reserve.

Tasik Serai expresses a desire for cattle fattening and fish cages. Beringin Village seeks to engage in a variety of activities, including honey bee cultivation, chili farming, and cattle fattening. Koto Pait Beringin emphasizes honey bee cultivation and tourism. East Tasik Serai specializes in cattle fattening. Selat Guntung adopts a multifaceted approach, incorporating the use of oil palm trunks, fisheries cultivation, processing coconut shells into charcoal, and *kelulut* cultivation. Finally, Tuah Inderapura concentrates on cultivating vegetables and fruit in home gardens. These diverse economic pursuits contribute to the overall richness of the biosphere reserve, highlighting a harmonious blend of traditional and innovative practices across villages.

Activity 3.3 To establish demonstration plots for selected income generating activities at selected suitable sites

ON GOING. Initial coordination has been carried out with several parties. Expected Result are Developing minimum 4 (four) demonstration plot to increase the capacity of farmer groups in developing non-timber forest products (NTFP) and agricultural products that have the potential to enhance community income and welfare, which in the long term is expected to increase economic resilience and reduce pressure on forest areas. Developing demonstration plots covering preparation, construction, cultivation, licensing, and marketing. Assisting in developing demonstration plots through technical assistance, licensing assistance, and market access. The planned location for the demonstration plot is in Beringin Village and Temiang Village.

ITTO Project PD 712/13 Rev.3 (F) contributes by developing demonstration plots for NTFPs and agricultural products and enhancing the capacity of forest farmers in the core and buffer area of the GSK-BB Biosphere Reserve. The long-term benefits include business capital support, institutional strengthening, and the establishment of clear supply chains for forest and agricultural products, ultimately improving economic resilience and reducing pressure to convert forest land to oil palm plantations.

The development of the demonstration plot is based on the results of the activities 3.1 To conduct a series of dialogue with stakeholders at sub-district and village levels on potential benefits of biosphere reserve development, dan Activity 3.2 To identify sustainable income-generating activities in close consultation with local communities at selected sites in 15 villages in the GSKBB area.

The implementation planning process has been finalized and conveyed to the prospective subcontractors (NGO: FKKM and LPESM) who will be responsible for executing the activities in the field.

Based on the results of the identification and consideration of the chances of success in increasing the income of community groups, the demonstration plot will be developed in 2 (two) villages, namely Beringin Village, Tualang Muandau District, Bengkalis Regency, and Temiang Village, Bandar Laksamana District, Bengkalis Regency, in Riau Province.

Expected output achieved through the implementation of this activity are:

1. Establishment and development of demonstration plots in Beringin Village, Tualang Muandau District, Bengkalis Regency, in Riau Province:
 - a. *Apis mellifera* honey bee cultivation
 - 1) Increasing the production of *Apis mellifera* honey bees by adding 50 honey bee hives and the colonies.
 - 2) Improving the quality of *Apis mellifera* honey product packaging.
 - 3) Facilitating the formation of *Apis mellifera* honey bee farming farmer groups.
 - 4) Control pests that interfere with honey bee cultivation.
 - 5) Encouraging and facilitating honey bee farmer groups to obtain distribution permits in the form of Household Industry Food Production Certificates/SPP-IRT (PIRT numbers), in coordination with relevant government agencies.
 - 6) Facilitating the marketing of honey bee products through Village-Owned Enterprises (BUMN Desa) and the Merah Putih Village Cooperative.
 - 7) Installation of signage and other support materials.
 - b. *Apis mellifera* honey bee cultivation
 - 1) Building and developing a floating rice cultivation demonstration plot intercropped with fish in the yard (3x15 meters).
 - 2) Assisting with floating rice cultivation activities in the demonstration plot.
 - 3) Installation of signage and other support materials.
2. Establishment and Development of demonstration plots in Temiang Village, Bandar Laksamana District, Bengkalis Regency, in Riau Province:
 - a. Construction of a semi-permanent production house (7x5 meters) to support various production activities by the Makmur Jaya Women Farmers Group (KTWMJ), such as red ginger, liberica coffee, ecoprint, sewing batik, etc. The production house will be divided into two rooms, with a bathroom, and include a water tank, and also installation of signage and other support materials.
 - b. Dryland rice cultivation
 - 1) Building and developing a dryland rice cultivation demonstration plot (2 hectares).
 - 2) Assisting with dryland rice cultivation activities in the demonstration plot.
 - 3) Reactivating the previously formed dryland rice farmer group to develop and manage this demonstration plot.
 - 4) Installation of signage and other support materials.

Activity 3.4 To train villagers on practical skills for implementing selected income generating activities and for developing CSE of NTFPs

ON GOING. Initial coordination has been conducted with potential subcontractors. The expected outcomes of this training are as follows:

1. At least 60 farmers from 6 villages in 2 districts train on livelihood activities.
2. Training participants involve at least 40% women from the total participants.
3. Conducting 3 sessions of training with the following topics; Development of the *Mellifera* Honey Bee Cultivation, Development of Dryland Rice Cultivation, and Batik stamp training with synthetic and natural dyes.

Activity 3.7 To launch campaign on GSK-BR development through dialogue, production and dissemination of attractive and easy-to-read materials

ON GOING. Preliminary result: 17 news launched in social media/media mainstreaming, 2 standing banners produced, 2 books, 1 video, 4 posters, 1 document preliminary standard.

ITTO PD 712/13 Rev.3 (F) took part in Environmental and Forestry Standards Week (PeSTA), organized by the Environmental and Forestry Instrument Standardization Agency (BSILHK), at the *Manggala Wanabakti* Building in Jakarta from 10 to 12th September 2024.

Each day, members of the public, students, academics, government officials, and private-sector representatives were invited to join interactive activities introducing the concept of biosphere-reserve management. Throughout the three-day event, visitors could enter a prize-draw quiz by answering questions based on presentations given earlier by the ITTO exhibition team.

At the ITTO PD 712/13 booth, project reports and non-timber forest products (NTFPs) that support implementation of the Giam Siak Kecil–Bukit Batu Biosphere Reserve were displayed. Featured items included woven pandan- and rattan-fiber bags, bed frames, and pure *Apis mellifera* honey sourced directly from Bengkalis Regency, Riau Province. The team also offered complimentary chocolate snacks to individual and group visitors.

To deepen understanding of the biosphere-reserve concept in Indonesia, the ITTO Project Management Unit (PMU) showcased posters outlining the Standards for Management and Impact Monitoring of Biosphere Reserve Landscapes in Indonesia. These displays explained the core, buffer, and transition-zone framework and the corresponding management and monitoring measures.

During PeSTA 2024, the ITTO team informed the booth's 175 attendees that the project is actively accelerating management strategies for the Giam Siak Kecil–Bukit Batu Biosphere Reserve. To overcome key implementation challenges, the project is taking strategic steps to establish a dedicated governance board — including restructuring the Biosphere Reserve Management Coordination Board—to lead conservation efforts among stakeholders across the landscape.

Review of Logical Framework Matrix

Project Element		Measurable indicators		Means of verification	Key assumptions
Original	Adjusted	Original	Adjusted		
<u>Development objective</u> To contribute to realizing the management objectives and basic functions of GSK-BR	To contribute to realizing the management objectives and basic functions of GSK BR including contributing to achieving FoLU Net Sink 2030 and promoting it	3-4 years after project completion: - Adopted ISMP fully used to guide management operations - Deforestation and forest degradation reduced from 2,800 ha in 2013 to 0 ha in 2023 - At least 20 villages in 2 main districts supported management operations	3-4 years after project completion: - Adopted ISMP fully used to guide management operations - Data on the achievements of the FoLU Net Sink for the GSK-BR Region are available - At least 10 villages in 2 main districts supported management operations	- Consultation with authorities - Provincial and district governments provide strong support implementation of adopted ISMP - Forestry Agency annual reports - Forestry Agency annual reports	Provincial and district governments provide strong support implementation of adopted ISMP
<u>Specific objective</u> To promote an effective implementation of sustainable management and conservation of GSK-BR	To promote an effective implementation of sustainable management and conservation of GSK-BR	By end of the project By end of year 3: - A legitimate ISMP disseminated, adopted and ready for implementation - Coordinating board equipped with operational infrastructure and functioned well - Protocols and SOP of management operations developed and adopted - 120 farmers of 12 villages in 2 main districts engaged in implementation of livelihood activities	By end of the project By end of year 3: - A legitimate ISMP disseminated, adopted and ready for implementation - Coordinating board equipped with operational infrastructure and functioned well - Protocols and SOP of management operations developed and adopted - 60 farmers engaged in implementation of livelihood activities	- Consultation, ISMP document - Provincial and District governments support adoption of formulated ISMP - Field check - Protocols and SOP document - Livelihood development report	Provincial and District governments support adoption of formulated ISMP

Project Element		Measurable indicators		Means of verification	Key assumptions
Original	Adjusted	Original	Adjusted		
<u>Output 1:</u> Planning framework of GSK-BR enhanced	Output 1: Planning framework GSKBR supporting standardization for FOLU Net Sink 2030	- 1 FGD held in year 1 - Sustainable forest functions on core area well defined year 1 - Data on reserve reviewed and updated in year 1 - Database system installed and operational since year 1 - ISMP formulated in year 2 - Consultation on ISMP with stakeholders at provincial and district levels conducted in year 2 - 1 national workshop organized and ISMP adopted in year 3	- Sustainable forest functions on core area well defined year 2 - Data on reserve reviewed and updated in year 2 - Database system installed and operational since year 2	- Discussion report - Map, field check - NC's report - NC's report, field check - ISMP document - Consultation report - Workshop report	Local authorities supportive Interest of stakeholders preserved
<u>Output 2:</u> Institutional capacity to manage GSK BR strengthened	<u>Output 2:</u> Institutional capacity to manage GSK BR based on standardization strengthened	- MCB equipped with workplan and work facilities since year 1	MCB equipped with workplan since year 2	NC's report	
		- 6 staff of EA and CA trained on skills for biosphere reserve management in years 1 and 2	- At least 30 persons from 28 stakeholders enhanced their capacity on biosphere reserve management in year 2	Training report/Technical Report	
		- Protocols of managements operations adopted in year 2		Protocols document	

Project Element		Measurable indicators		Means of verification	Key assumptions
Original	Adjusted	Original	Adjusted		
		- SOP for management operations adopted in year 2		SOP document	
		- Suitable funding mechanism established in year 3		NC's report	
<u>Output 3:</u> Support of stakeholders on operational management of GSK BR promoted	<u>Output 3:</u> Support of stakeholders on operational management of GSK BR promoted	- A series of dialogues on livelihood activities with local stakeholders conducted in year 1		NGO's technical report	
		- 3 income generating activities identified and demonstrated at 4 sites in years 1 - 3			
		- 120 farmers of 12 villages in 2 districts trained on livelihood activities in years 2-3	60 farmers trained on livelihood activities in year 2-3		
		- At least 40% of woman involved in the training			
		- 3 technical manuals on livelihood developed and disseminated in years 2-3	3 technical manuals on livelihood developed and disseminated in years 3		
		- Legal framework for utilization of environmental services developed in years 2-3	Legal framework for utilization of environmental services developed in years 3		
		- Campaign on GSK BR development launched in year 3			

2.5. Additional Output-Media coverage

BSILHK has published several news about the ITTO Project PD 712/13 Ref 3 (F) at BSILHK website and also other online medias as follows:

- The topics “BSILHK Starts New Action for Landscape-Based Protection in the Giam Siak Kecil Biosphere Reserve, Involving All Stakeholders” Published in several media such as:
 - Agro Indonesia: <https://agroindonesia.co.id/bsilhk-mulai-aksi-baru-proteksi-berbasis-lanskap-di-cagar-biosfer-giam-siak-kecil-libatkan-semua-stakeholder/>
 - Suara Karya.co.id: <http://suarakarya.co.id/klhk-gelar-aksi-baru-proteksi-cagar-biosfer-gsk-di-riau/49820>
 - Forest Insight: <https://forestinsights.id/2023/05/02/bsilhk-perkuat-pengelolaan-berbasis-lanskap-di-cagar-biosfer-giam-siak-kecil/>
 - Riau Antara News: <http://riau.antaranews.com/berita/332004/klhk-membuka-aksi-baru-proteksi-cagar-biosfer-giam-siak-kecil>
 - Sindonews.com: <https://daerah.sindonews.com/read/1087715/701/klhk-membuka-aksi-baru-proteksi-cagar-biosfer-giam-siak-kecil-1683115555>
 - Rakyat Merdeka.com: <https://rm.id/baca-berita/government-action/170321/proteksi-cagar-biosfer-giam-siak-kecil-ini-jurus-klhk>
 - Media Indonesia: <https://mediaindonesia.com/humaniora/578398/klhk-membuka-aksi-baru-proteksi-cagar-biosfer-giam-siak-kecil>
 - ASEFI Website : <https://bsilhk.menlhk.go.id/index.php/2023/05/02/klhk-membuka-aksi-baru-proteksi-cagar-biosfer-giam-siak-kecil/>
- The topics “Landscape-Based Management in Giam Siak Kecil Biosphere Reserve Formulated, Will Be Replicated to Other Locations” Published in Pikiran Rakyat.com: <https://seputarcibubur.pikiran-rakyat.com/humaniora/pr-1786617269/pengelolaan-berbasis-lanskap-di-cagar-biosfer-giam-siak-kecil-dirumuskan-bakal-direplikasi-ke-lokasi-lain>
- The topics “The last buffer gate for biodiversity and peat swamp forest ecosystem” Published in ASEFI Website: <https://bsilhk.menlhk.go.id/index.php/2023/05/08/the-last-buffer-gate-for-biodiversity-and-peat-swamp-forest-ecosystem/>
- The topics “International Day for Biodiversity: ASOEN Chair Indonesia Pays Attention to Protect the Giam Siak Kecil-Bukit Batu Biosphere Reserve Contributes to Global Biodiversity Framework” published in ASEFI Website: <https://bsilhk.menlhk.go.id/index.php/2023/05/31/international-day-for-biodiversityasoen-chair-indonesia-pays-attention-to-protect-the-giam-siak-kecil-bukit-batubiosphere-reserve-contributes-to-global-biodiversity-framework/>
- The Topics “UNESCO Meeting: Talking Standardization for Giam Siak Bukit Batu Biosphere Reserve” Published in ASEFI Website: <https://bit.ly/GSK-UNESCO>
- The Topics “28 Parties Agree on Meeting Points to Protect the Giam Siak Kecil Bukit Batu Biosphere Reserve” Published in ASEFI Website:

<https://bsilhk.menlhk.go.id/index.php/2024/05/30/28-para-pihak-menyepakati-titik-temu-menjaga-cagar-biosfer-giam-siak-kecil-bukit-batu/>

- <https://bsilhk.menlhk.go.id/berita/seru-itto-pd-71213-ajak-pengunjung-mengenal-konsep-kelola-lanskap-cagar-biosfer-di-pesta-bsilhk-2024>
- There are also several social media as a means of publication at:
<https://www.instagram.com/bsilhk/>

3. Critical analysis of project progress

- The ITTO Project PD 712, initially approved in 2013 and designed by the Research, Development, and Innovation Agency (FORDA or BLI), has undergone a transition in its executing agency. The Agency for Standardization of Environment and Forestry Instruments (ASEFI or BSILHK) is assigned as the executing agency (April 2023 - march 2025), with a mandate to ensure the quality of the environment and forestry in business activities through standardization. However, with the restructuring of the Indonesian government, the Secretary General of the Ministry of Forestry, through Decree No. SE.2/SEKJEN/HKUN/KLN.01/3/2024, has appointed the Center for Socio-Economic of Forest Community Development as the new executing Agency for this project with a mandate to implement socio-economic development for forest communities.
- The project has developed a GSK-BR planning framework for 2024-2028, including an integrated strategic management plan with 11 programs and 97 activities involving 41 parties to synergize core, buffer, and transition management areas, alongside identified policies such as strengthening BBKSDA Riau's capacity, fundraising for biodiversity conservation, reshaping the GSK-BR Management Coordinating Board, intensifying site-level management by the Forest Management Unit, integrating GSKBR into regional planning, promoting environmental education and research, granting sustainable resource utilization rights to local communities, and restoring ecosystems affected by encroachment and fires.
- Bio-physical and socio-economic data on biosphere reserves were reviewed and updated, underscoring the need to protect Sumatran elephants and tigers. Ecological assessments documented 200 forest species, 19 mammals, 3 terrestrial birds, and a monitor lizard, highlighting the sensitivity of peatland ecosystems to land use changes and the importance of stakeholder collaboration for community well-being and wildlife corridors.
- Conducted dialogues at the sub-district and village levels to explore sustainable income opportunities, identifying viable economic activities such as oil palm plantations and agroforestry development, along with proposed commodities like horticulture, non-timber forest products, and eco-tourism. We met 262 men and 113 women who live and who have a high attention in the villages. While market access for these commodities is available, middlemen traders still dominate, and demonstration plots in some villages are awaiting support from relevant parties.
- Formulated the standard for landscape management activities in the biosphere reserve, addressing potential impacts across three management areas: core, buffer,

and transition. The standard is stipulated by the Director General of Agency for Standardization of Environment and Forestry Instruments. The standard is also implemented in Merapi-Merbabu-Menoreh Biosphere Reserve located in Central Java Province.

- Enhanced professional capacity in biosphere management skills for stakeholders across various sectors, aiming to strengthen their commitment to sustainable management of GSK-BR for 53 persons.
- Enhanced the project management team's capacity in legal drafting on management standards. Focused on mitigating potential moral hazards and ensuring legal certainty. Revised the Riau Governor's Decree 2017 to establish a functional coordination body for the reserve.
- Attended the 15th Southeast Asia Biosphere Reserve Network Meeting to build conservation networks with UNESCO member countries, especially in Southeast Asia, that attended more than 150 delegates from 10 countries. The project team emphasized biodiversity conservation and management standardization. Issues raised during the event include efforts to enhance local community welfare and stakeholder collaboration.
- The project has been launched 17 news in social media/media mainstreaming, 2 standing banners produced, 2 books, 1 video, 4 posters, 1 document preliminary standard. Also, as part of the campaign of GSK-BR, ITTO PD 712/13 Rev.3 (F) participated in the Environmental and Forestry Standards Week (PeSTA) hosted by the Environmental and Forestry Instrument Standardization Agency (BSILHK) at the Manggala Wanabakti Building, Jakarta, which held from 10th to 12th September 2024. Each day, visitors—including members of the public, students, university scholars, government officials, and private-sector representatives—were invited to participate in engaging activities designed to introduce the concept of biosphere reserve management. Throughout the three-day PeSTA exhibition, attendees had the opportunity to join a prize draw quiz by answering questions based on presentations conducted earlier by the ITTO exhibition team. The ITTO exhibition team informed all 175 booth attendees that the project actively supports accelerating the implementation of management strategies for the Giam Siak Kecil–Bukit Batu Biosphere Reserve. To address one of the primary challenges in implementation, the project has taken strategic measures to establish a dedicated governance entity to lead conservation actions among stakeholders within the biosphere landscape. This includes restructuring the Biosphere Reserve Management Coordination Board.
- A comprehensive database has been developed and public outreach efforts have been enhanced to support the effective management of biosphere reserves. This initiative aims to ensure transparency, accessibility, and active community involvement in managing the Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BR). The database provides detailed information and resources about the biosphere reserve.
- The project is also preparing a proposal with the title "Optimizing the Management of Biosphere Reserve of Giam Siak Kecil – Bukit Batu in Supporting Indonesia's FOLU Net Sink 2030" that will be submitted by Regional Development Planning Agency, Riau to RBC official, Ministry of Forestry.

4. Conclusions

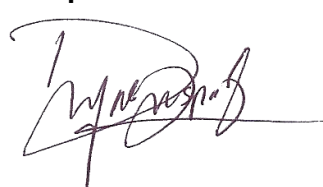
- a. The project is progressing according to the established schedule, aligning with the defined outcomes of the implemented activities. It is anticipated that the project will successfully deliver the planned outputs within the stipulated time frame.
- b. Of the 15 activities planned for first phase, 9 activities have been completed (Activity 1.1, Activity 1.2, Activity 1.3, Activity 1.5, Activity 2.2, Activity 2.3, Activity 2.4, Activity 3.1 and Activity 3.2), and 6 activities are currently underway (Activity 1.4 To install and operate a data-base system for the biosphere reserve, Activity 1.8 Developing an Integrated Funding Proposal to Support an achievement of the Biosphere Reserve to the FOLU NET Sink 2030, Activity 2.1 To make existing management coordinating board functioning well through development of an operational plan and provision of needed resources, Activity 3.3 To establish demonstration plots for selected income generating activities at selected suitable sites, Activity 3.4 To train villagers on practical skills for implementing selected income generating activities and for developing CSE of NTFPs, and Activity 3.7 To launch campaign on GSK-BR development through dialogue, production and dissemination of attractive and easy-to-read materials). The project has marked significant achievements, notably the development of the Management Plan for GSK-BR for the period 2024-2028, the Standard on Landscape Management of Biosphere Reserves, the review and update of biophysical and socio-economic data on the biosphere reserves, and the enhancement of professional capacity in biosphere management skills for stakeholders across various sectors as well as updated spatial data analysis for Giam Siak Kecil Bukit Batu Biosphere Reserve. These accomplishments lay a strong foundation for the remaining activities and the long-term sustainable management of the biosphere reserve.
- c. The progress achieved thus far underscores the project's strategic importance in advancing sustainable landscape management and biodiversity conservation within the GSK-BB Biosphere Reserve. Continued collaboration and adaptive management will be essential to achieving long-term impact and ensuring that the project contributes effectively to both regional and global sustainability goals.

Acknowledged



Dodi Sumardi, S.Hut., M.T., M.PP.
Director

Responsible for the Report



Dyah Puspasari, S. Hut., M.Si.,
Project Coordinator

ANNEXESS

- ANNEX 1. Cover Letter from the Head of Center for Socio Economic of Forest Community Development Regarding Follow-Up on the Preparation of Integrated Funding Proposal to Support an Achievement of the Biosphere Reserve to the FOLU Net Sink 2030 (Activity 1.8)
- ANNEX 2. Draft of Integrated Funding Proposal to Support an Achievement of the Biosphere Reserve to the FOLU Net Sink 2030 (Activity 1.8)
- ANNEX 3. Cover Letter from the Secretary of ASEFI Regarding Request for Input on the Draft Governor's Decree of Riau Province on the Coordinating Board for the Management of the Giam Siak Kecil–Bukit Batu Biosphere Reserve (Activity 2.1)
- ANNEX 4. Draft of the Decree of Riau Governor on the Establishment of Coordination Board on the Management of Giam Siak Kecil - Bukit Batu Biosphere Reserve (Activity 2.1)
- ANNEX 5. Document of Protocols on Biosphere Reserve Management Operations (Activity 2.3)
- ANNEX 6. Document of Standard operating procedures (SOP) for Conduct of Management Operations by Different Stakeholders (Activity 2.4)
- ANNEX 7. Minutes of Meeting (MoM) Project Progress ITTO PD 712/13 Rev.3 (F) Enhancing the Implementation of Landscape Management of Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BR) in Riau Province of Sumatra Island, Indonesia, Dated May 28th 2025



Enhancing the Implementation of Landscape Management of Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BR) in Riau Province of Sumatra Island, Indonesia

FIFTH BI-ANNUAL PROGRESS REPORT

**Enhancing the Implementation of
Landscape Management of Giam
Siak Kecil-Bukit Batu Biosphere
Reserve (GSK-BR) in Riau Province
of Sumatra Island, Indonesia
--- ITTO PD-712/13 Rev 3 (F) ---**



KEMENTERIAN KEHUTANAN

PUSAT PENGEMBANGAN SOSIAL EKONOMI MASYARAKAT HUTAN

Jl. Gunung Batu No.5, Bogor, 16118, Telepon: (0251) 8631238. Faximili: (0251) 7520005

Nomor : S.53/P2SMH/PFPSEMH/KLN.03.03/B/06/2025
Sifat : Penting
Lampiran : 1 (satu) berkas
Hal : Tindak Lanjut Penyusunan Proposal Cagar Biosfer GSK-BB

3 Juni 2025

Yth.

Bapak/Ibu Pimpinan Pemangku Kepentingan
Pengelolaan Cagar Biosfer Giam Siak Kecil Bukit Batu (GSKBB)
(daftar terlampir)

Di Tempat

Berkenaan dengan pelaksanaan pembahasan draft proposal “Optimalisasi Pengelolaan Cagar Biosfer Giam Siak Kecil – Bukit Batu (GSK0BB) dalam Mendukung Indonesia Folu Net Sink 2030” pada tanggal 28 Mei 2025, kami sampaikan apresiasi dan penghargaan kepada Bapak/Ibu/Saudara atas partisipasi aktif dalam pembahasan dimaksud. Sebagai tindak lanjut, kami sampaikan hal-hal sebagai berikut:

- Untuk penyempurnaan proposal agar lebih detail dan operasional sesuai saran dan masukan dalam rapat, maka usulan mencakup:
 - Usulan tambahan kegiatan/sub kegiatan FoLU sesuai dengan tugas dan fungsi instansi pengusul
 - Lokasi pelaksanaan usulan kegiatan/sub kegiatan
 - Anggaran pelaksanaan usulan kegiatan/sub kegiatan
 - Para pihak yang akan terlibat dalam pelaksanaan kegiatan/subkegiatan
 - Usulan perbaikan narasi serta penambahan data dan informasi pada draf proposal
 - Informasi singkat kegiatan/inisiatif yang telah atau sedang dilakukan para pihak di kawasan Cagar Biosfer GSK-BB untuk memperkaya proposal sebagai modalitas bersama dalam pengelolaan cagar Biosfer GSK-BB.
- Usulan pada butir 1 diharapkan dapat disampaikan kepada kami secara tertulis melalui email ittopd712@gmail.com selambat-lambatnya 13 Juni 2025 untuk proses perbaikan. Draft proposal dapat diunduh melalui <https://bit.ly/ProposalCB-GSKBB>.
- Kami akan berkoordinasi dan berkonsultasi dengan mitra pendanaan yakni BPD LH, RBC Norway Tahap 2, 3, dan 4 (Biro Perencanaan, Kementerian Kehutanan), serta UNDP untuk peninjauan pendanaan.
- Draft proposal perbaikan akan kami sampaikan kepada Pemerintah Provinsi Riau c.q BAPPEDA Provinsi Riau untuk proses selanjutnya pada minggu ke-3 Juni 2025.
- Untuk kelancaran perbaikan proposal, mohon Saudara dapat menunjuk narahubung untuk koordinasi lebih lanjut. Untuk komunikasi lebih lanjut dapat melalui narahubung kami Sdr. Uus Danu Kusumah (HP 819-5975-7453), email: uusdanukusumah@gmail.com.

Demikian, atas kerja sama Saudara diucapkan terima kasih.

Kepala Pusat,



Dodi Sumardi, S.Hut, M.T, M.PP
NIP. 19750522 200003 1 001

Tembusan:

Sekretaris Jenderal Kementerian Kehutanan (sebagai laporan)

Dokumen ini telah dibuat dan ditandatangani secara elektronik menggunakan sertifikat elektronik yang diterbitkan oleh Balai Besar Sertifikasi Elektronik (BSrE), Badan Siber dan Sandi Negara

Lampiran Surat Kepala Pusat Pengembangan Sosial
Ekonomi Masyarakat Hutan
Nomor :
S.53/P2SMH/PFPSEMH/KLN.03.03/B/06/2025
Tanggal : 3 Juni 2025

Yth.

1. Kepala Badan Perencanaan Pembangunan Daerah, Provinsi Riau
2. Kepala Balai Besar Konservasi Sumber Daya Alam Riau
3. Kepala Dinas Lingkungan Hidup dan Kehutanan Provinsi Riau
4. Kepala Dinas Perkebunan Provinsi Riau
5. Ketua Komite Nasional MAB Indonesia
6. Kepala Badan Perencanaan Pembangunan Daerah Kabupaten Bengkalis
7. Kepala Badan Perencanaan Pembangunan Daerah Kabupaten Siak
8. Kepala Badan Perencanaan Pembangunan Daerah Kota Dumai
9. Kepala Dinas Lingkungan Hidup Kabupaten Bengkalis
10. Kepala Dinas Lingkungan Hidup Kabupaten Siak
11. Kepala Dinas Lingkungan Hidup Kota Dumai
12. Kepala Balai Penegakan Hukum Kehutanan Wilayah Sumatera, Direktorat Jenderal Penegakan Hukum Kehutanan
13. Kepala Balai Perhutanan Sosial Kampar, Direktorat Jenderal Perhutanan Sosial
14. Kepala Balai Pengelolaan Daerah Aliran Sungai Indragiri Rokan, Direktorat Jenderal Pengelolaan Daerah Aliran Sungai dan Rehabilitasi Hutan
15. Kepala Balai Pengelolaan Hutan Lestari Wilayah III, Direktorat Jenderal Pengelolaan Hutan Lestari
16. Kepala Balai Pemantapan Kawasan Hutan Wilayah XIX, Direktorat Jenderal Planologi Kehutanan
17. Kepala Balai Penyuluhan dan Pengembangan Sumber Daya Manusia Wilayah II, Badan Penyuluhan dan Pengembangan Sumber Daya Manusia
18. Kepala Seksi Wilayah II Pekanbaru, Balai Penegakan Hukum Kehutanan Wilayah Sumatera Direktorat Jenderal Penegakan Hukum Kehutanan
19. Perwakilan Sinarmas Forestry & Partner
20. Ketua Forum Komunikasi Kehutanan Masyarakat (FKKM) Wilayah Riau
21. Ketua Perkumpulan Sustainable Environmental Development Studies (SENDS)
22. Ketua Lembaga Pemberdayaan Ekonomi dan Sosial Masyarakat (LPESM)
23. Executive Director Belantara Foundation
24. Ketua Environmental Development Measures Center (ENDEMIC)
25. Ketua Environmental Clarity for Virtuous Emerging Society (ENCLAVES)
26. Ketua KAR Indonesia
27. KPH Bengkalis Pulau
28. Jaringan Masyarakat Gambut Riau
29. Aktifis masyarakat adat Sakai bathin sobanga
30. Majelis Sakai Riau

Kepala Pusat,



Dodi Sumardi, S.Hut, M.T, M.PP
NIP. 19750522 200003 1 001



ACTIVITY PROPOSAL

**Optimization of the Management of the Giam Siak Kecil –
Bukit Batu Biosphere Reserve in Support of Indonesia's FOLU
Net Sink 2030**



**GOVERNMENT OF RIAU PROVINCE
AS CHAIR OF THE STEERING COMMITTEE OF THE COORDINATING
BOARD FOR THE GIAM SIAK KECIL BUKIT BATU BIOSPHERE RESERVE**

2025

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PROPOSAL

A. TITLE

The project proposed by the Regional Development Planning Agency of Riau Province is titled: “Optimization of the Management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve in Support of Indonesia’s FOLU Net Sink 2030.”

B. RATIONALE

Riau Province is one of the key regions in Indonesia's efforts to achieve its greenhouse gas (GHG) emission reduction commitments, particularly through the Forestry and Other Land Use (FOLU) Net Sink 2030 program. This program targets the forestry and land use sector to serve as a net carbon sink of 140 million tons of CO₂e by 2030, contributing approximately 58% of the national emission reduction target. One of the strategic landscapes in Riau Province that plays a crucial role in achieving this target is the Giam Siak Kecil – Bukit Batu (GSK-BB) Biosphere Reserve.

The GSK-BB Biosphere Reserve encompasses extensive peat swamp ecosystems rich in biodiversity. However, the area faces significant pressure. Satellite image analysis shows that the extent of peat swamp forest has drastically decreased from around 600,000 hectares in 1985 to 350,000 hectares in 2002 (Jarvie et al., 2003), due to land conversion, illegal logging, forest fires, and weak management and law enforcement. Yet, WWF (2000) has identified this region as a High Conservation Value Forest (HCVF), and LIPI (2008a) has recorded its exceptionally high level of biodiversity and ecological uniqueness.

Through the biosphere reserve approach, GSK-BB is divided into three zones: core zone (±179,000 ha) for conservation, buffer zone (±222,000 ha) for limited protection and research, and transition zone (±304,000 ha) that allows for community-based

sustainable development activities. This concept emphasizes an integrated and collaborative landscape approach among stakeholders, in line with Law No. 5 of 1990, which was later amended through Law No. 32 of 2024, and the international conservation cooperation framework.

In support of achieving the FOLU Net Sink 2030 target within the GSK-BB area, various priority activities are directed towards integrating aspects of conservation, rehabilitation, sustainable economic development, and the strengthening of Good Forestry Governance, with a focus on the following key areas:

1. Program : Enhancement of Carbon Sequestration

- Activity 1. Land and Forest Rehabilitation

Sub Activity:

- Spatial analysis and mapping of restoration sites.
- Planting on degraded lands.
- Hydrological restoration: canal blocking, monitoring wells, subsidence stakes.
- Provision of endemic seedlings and MPTS (Multi-Purpose Tree Species).
- Community outreach and engagement in rewetting and revegetation activities.

- Activity 2. Calculation and Monitoring of Carbon Stocks

Sub Activity

- Carbon stock measurement through the establishment of Permanent Sample Plots (PSPs) and the development of a carbon stock baseline
- Monitoring of growth and restoration effectiveness.

2. Program : Sustainable Forest Management

- Activity 1. Landscape-Based Sustainable Economic Development

Sub Activity

- Fertigation demonstration plot, water reservoir (*embung*), composting house, biodigester.
- Cultivation and processing of non-timber forest products (NTFPs) such as sugar palm (*aren*), honey, bamboo, and mushrooms.
- **Activity 2. Community Empowerment and Capacity Building**
 - Sub Activity :**
 - Technical Training and Community Capacity Strengthening.
 - Establishment and Strengthening of Community Organizations.
- **Activity 3. Development of Sustainable Ecotourism Industry**
 - Sub Activity :**
 - Identification of natural and cultural tourism potentials, as well as interpretation trails.
 - Training of tour guides, interpreters, and development of tourism packages.
 - Facilitation of community-based tourism enterprises.
- **Activity 4. Forest and Land Fire Prevention and Area Protection**
 - Sub Activity :**
 - Routine patrols in the core, buffer, and transition zones.
 - Implementation of the Fire Danger Rating System (FDRS) and monitoring technologies (drones, SMART Patrol).
 - Community outreach on Padiatapa (FPIC), training of Community Fire Brigades (MPA), and monitoring of wildlife conflicts.
 - Construction of watchtowers, guard posts, and warning signs.

3. Program : Law Enforcement and Institutional Strengthening

- **Activity 1. Area-Based Law Enforcement**

Sub Activity :

- Legal patrols to address illegal activities (illegal logging, encroachment).
 - Training for area monitoring and supervision.
 - Wildlife conflict management and legal case documentation.
- **Activity 2. Strengthening Area Governance**
- Sub Activity :**
- Establishment and strengthening of the GSK-BB Communication Forum.
 - Development of Standard Operating Procedures (SOPs) and coordination mechanisms for landscape management.
 - Review and integration of area management plans.
 - Initiation of a multi-stakeholder join-up governance model.
- **Activity 3. Program Monitoring and Evaluation**
- Sub Activity :**
- Development of a multi-stakeholder monitoring and evaluation system.
 - Regular implementation of activity monitoring and evaluation.
 - Assessment of contributions toward the FOLU Net Sink 2030 target.

C. Goal

1. Supporting the achievement of Indonesia's FOLU Net Sink 2030 through increased carbon stocks, emission reductions from peatlands and forests, and the protection of high conservation value areas within the GSK-BB landscape.
2. Preserving and restoring the ecological functions of the GSK-BB through conservation initiatives, rehabilitation of degraded lands, and peatland hydrological restoration based on landscape approaches.

3. Enhancing the welfare of local communities through the development of a green economy based on local potential such as non-timber forest products (NTFPs), agroforestry, sustainable fisheries, and ecotourism.
4. Strengthening institutional capacity and promoting collaborative multi-stakeholder governance for participatory, transparent, and inclusive planning, implementation, and monitoring of area management.
5. Developing and implementing a carbon stock accounting system and emission absorption/reduction estimation based on spatial data and vegetation classification, in accordance with IPCC Guidelines (Tier 2) and the National Registry System (SRN) of the Ministry of Environment and Forestry.
6. Develop and provide an integrated spatial and thematic database (ecological, social, carbon-related) as a foundation for planning, evaluation, and reporting of the GSK-BB area's contribution to Indonesia's national FOLU Net Sink 2030 target.
7. Integrate digital technologies for area monitoring, carbon data collection, and activity transparency.
8. Ensure the involvement of customary areas and protection of the rights of indigenous peoples as an integral part of landscape governance.
9. Promote gender balance through the active involvement of women's groups in all stages of activities—from planning and implementation to evaluation.

D. Objective

1. The development of a comprehensive and adaptive multi-stakeholder action plan for managing the GSK-BB area, agreed upon and utilized by all relevant stakeholders.
2. Implementation of institutional capacity strengthening for area management, including enhancement of human resources, supervision infrastructure, and digital technology-based monitoring and evaluation systems.

3. Reduction in the frequency of forest and land fires (karhutla) and illegal activities through integrated patrols, community engagement, and the use of spatial information systems.
4. Execution of participatory peatland ecosystem rehabilitation and restoration in buffer and transition zones, applying a landscape approach and incorporating endemic species/NTFPs.
5. Establishment of community-based productive economic units that utilize local potential, are gender-inclusive and environmentally friendly—covering NTFPs, peatland agriculture, fisheries, and ecotourism
6. Increased carbon stocks and reduced greenhouse gas (GHG) emissions through reforestation, peatland water management, and the protection of natural forests.
7. Availability of a transparent and accountable spatial-based data and activity reporting system, supporting the MRV and SRN frameworks of FOLU Net Sink 2030.
8. Implementation of field surveys and data collection (biomass, vegetation, peat) to support scientific carbon estimation.
9. Development of high-resolution spatial maps of carbon stocks and emission potentials as references for planning and evaluation.
10. Preparation of a report on the GSK-BB area's contribution to national emission reductions, aligned with the FOLU Net Sink 2030 reporting framework.
11. Engagement of indigenous communities, women's groups, and youth in the planning, implementation, and evaluation processes across all management zones.

E. Output

1. A multi-stakeholder action plan document for managing the GSK-BB area that is participatory, integrated, and adaptive to socio-ecological dynamics.
2. An integrated spatial database of ecological, social, economic conditions, and carbon stocks in the GSK-BB area.
3. Restoration of at least 150 hectares of peatland ecosystem, accompanied by enhanced fire prevention systems for the area.
4. An active monitoring and law enforcement system in core and buffer zones, based on technology and community involvement.
5. Development of sustainable NTFP products and environmental services, grounded in local potential and inclusive of gender perspectives.
6. Establishment of community-based green economic units supported by training, mentoring, and access to markets and financing.
7. Strengthening the GSK-BB Research Center through infrastructure development and partnerships with national and international collaborators.
8. Training and active involvement of all local stakeholders in collaborative landscape management.
9. Effective institutional coordination in managing the GSK-BB Biosphere Reserve, based on zonation principles.
10. Operational carbon Monitoring, Reporting, and Verification (MRV) system, integrated with SRN reporting and the FOLU Net Sink 2030 framework.

F. Activity Formulation

This initiative is designed as part of Indonesia's strategic efforts to achieve the FOLU Net Sink 2030 target, with a focus on strengthening sustainable peatland landscape management within the Giam Siak Kecil – Bukit Batu (GSK-BB) Biosphere Reserve. Given that this area is part of Sumatra's peatland ecoregion—which holds high

conservation value yet faces severe ecological pressures—an integrated and cross-sectoral collaborative approach is required to:

1. Enhancing protection and ecological functions of the area.
2. Restoring degraded ecosystems, particularly peatlands and secondary forests.
3. Improving community welfare sustainably, through a green economy approach.
4. Supporting the contribution of the forestry and land use sectors to national GHG emission reduction through a landscape-based approach.

Proposed Activity Formulation – Three Main Clusters:

1. **ENHANCING CARBON SEQUESTRATION** Conduct forest and land rehabilitation as well as carbon stock monitoring to increase emission absorption through participatory vegetation and hydrological restoration.
2. **SUSTAINABLE FOREST MANAGEMENT** Promote community-based green economy and conservation through the development of green enterprises, capacity building, sustainable nature tourism, and protection of areas from fire threats and degradation.
3. **LAW ENFORCEMENT AND INSTITUTIONAL STRENGTHENING** Empower community enterprises based on NTFPs, peat-friendly agriculture, fisheries, and ecotourism. Strengthen governance and area protection through law enforcement, establishment of multi-stakeholder forums, development of operational regulations, and implementation of a monitoring and evaluation system linked to the FOLU Net Sink 2030 targets.

G. Modality

Activity implementation will be carried out collaboratively by a consortium of civil society organizations, community-based groups, local governments, and other stakeholders, coordinated by the GSK-BB Biosphere Reserve Management Coordination Agency under the facilitation of the Riau Provincial Government and the Ministry of Environment and Forestry (KLHK).

The implementation modality adopts the principles of inclusive governance, based on zonation (core, buffer, and transition zones), and is designed to be participatory, transparent, and results-oriented. Each partner institution will hold roles and responsibilities aligned with its area of expertise.

Key Approaches Include:

- Integration between government programs and civil society initiatives.
- Utilization of landscape and socio-cultural approaches, particularly within customary areas.
- Engagement of research institutions, private sector, and academia in research-development schemes and innovative financing (blended finance).
- Application of digital and spatial systems in management, monitoring, and reporting (MRV).
- Strengthening and legalizing community-based local institutions, including groups representing local communities, women, youth, and indigenous peoples.

H. Activity

Table 1. Activity framework and Success Indicator

Program/Activity	Sub Activity	Indicator
Program : Increasing Carbon Sequestration		
Activity : 1. Forest and Land Rehabilitation	• Spatial analysis and mapping of restoration sites • Planting on degraded land • Hydrological restoration: canal blocking, monitoring wells, subsidence stakes	Ecosystem restoration covering an area of ≥ 200 hectares is implemented through the planting of endemic vegetation and multi-purpose tree species (MPTS), construction of hydrological restoration facilities (≥ 10 canal

Program/Activity	Sub Activity	Indicator
	● Provision of endemic and multi-purpose tree species (MPTS) seedlings ● Community outreach and engagement in rewetting and revegetation activities	blocks, ≥5 monitoring wells, ≥10 subsidence stakes), active involvement of ≥100 community members, and supported by spatial analysis and geospatially documented site mapping
Activity 2. Carbon stock measurement and monitoring	● Carbon stock measurement through the establishment of Permanent Sample Plots (PSPs) and the development of baseline carbon stock data ● Monitoring vegetation growth and restoration effectiveness	TEstablishment of the baseline carbon stock for the area through measurements conducted in ≥30 Permanent Sample Plots (PSPs), with monitoring results indicating an average annual vegetation growth increase of ≥10%, and regularly documented changes in carbon stock.
Program : Sustainable forest management		
Activity 1. Landscape-Based Sustainable Economic Development	● Fertigation demo plots, water reservoirs (<i>embung</i>), compost houses, and biodigesters ● Cultivation and processing of non-timber forest products (NTFPs) such as sugar palm, honey, bamboo, and mushrooms	One unit of demonstration plot for fertigation, water reservoir (<i>embung</i>), composting, and biodigester has been established and utilized by ≥30 farmers; and three active NTFP (Non-Timber Forest Product) business units have been formed as a result of 10 training sessions,

Program/Activity	Sub Activity	Indicator
		involving ≥60 community members. These initiatives have led to ≥30% improvement in agricultural efficiency and ≥20% increase in NTFP production, supported by at least one established distribution channel.
Activity : 2. Community Empowerment and Capacity Building	• Technical Training and Community Capacity Strengthening • Formation and Strengthening of Community Organizations	≥100 community members participated in ≥3 training sessions, resulting in ≥80% improvement in understanding; ≥5 community groups were established or strengthened, and ≥2 formed external partnerships
Activity : 3. Development of Sustainable Ecotourism Industry	• Identification of natural and cultural tourism potentials, including interpretive trail mapping • Training of tour guides and interpreters, along with the development of tourism packages • Facilitation of community-based tourism enterprises	A tourism potential document and ≥2 market-ready tourism packages have been developed; ≥20 local community members have received training; and ≥1 community-based tourism enterprise has been established, comprising ≥50% local members and supported by a participatory business plan.

Program/Activity	Sub Activity	Indicator
Activity 4: Forest and Land Fire Prevention and Area Protection	• Routine patrols across core, buffer, and transition zones • Implementation of the Fire Danger Rating System (FDRS) and monitoring technologies such as drones and SMART Patrol • Community outreach on Padiatapa, training of Community Fire Brigades (MPA), wildlife monitoring, and conflict mitigation • Construction of watchtowers, guard posts, and warning signage	Priority areas are covered by patrols with SMART reporting and show a $\geq 30\%$ reduction in fire hotspots; the FDRS system and drones are active; ≥ 30 Community Fire Brigade (MPA) members have been trained; and early detection infrastructure—including watchtowers, guard posts, and warning signs—has been constructed at vulnerable sites.
Program : Law Enforcement and Institutional Strengthening		
Activity : 1. Law Enforcement of Area	• Legal patrols to address illegal activities, including illegal logging and encroachment • Training for area surveillance and monitoring • Wildlife conflict management and legal case documentation	Legal patrols are conducted annually, covering $\geq 90\%$ of vulnerable areas; ≥ 30 individuals have been trained in surveillance; and ≥ 3 wildlife conflicts have been addressed, with response times of ≤ 72 hours by trained teams.
Activity: 2. Strengthening Area Governance	• Establishment and strengthening of the GSK-BB Communication Forum • Development of SOPs and coordination	The GSK-BB Forum is formally and inclusively established, has conducted ≥ 3 coordination meetings, agreed upon ≥ 1 priority

Program/Activity	Sub Activity	Indicator
	mechanisms for integrated landscape management ● Review and integration of area management plans ● Initiation of a multi-stakeholder join-up governance model	agenda, and produced SOPs, an integrated management plan, and a multi-stakeholder join-up governance model
Activity 3. Monitoring and Evaluation Program	● Development of a multi-stakeholder monitoring and evaluation system ● Regular implementation of activity monitoring and evaluation ● Assessment of contributions toward the FOLU Net Sink 2030 targets	A multi-stakeholder monitoring and evaluation system is developed and implemented annually, covering ≥80% of the program; with ≥70% of recommendations followed up; and a contribution report to FOLU Net Sink is produced, based on spatial, carbon, and restoration data.

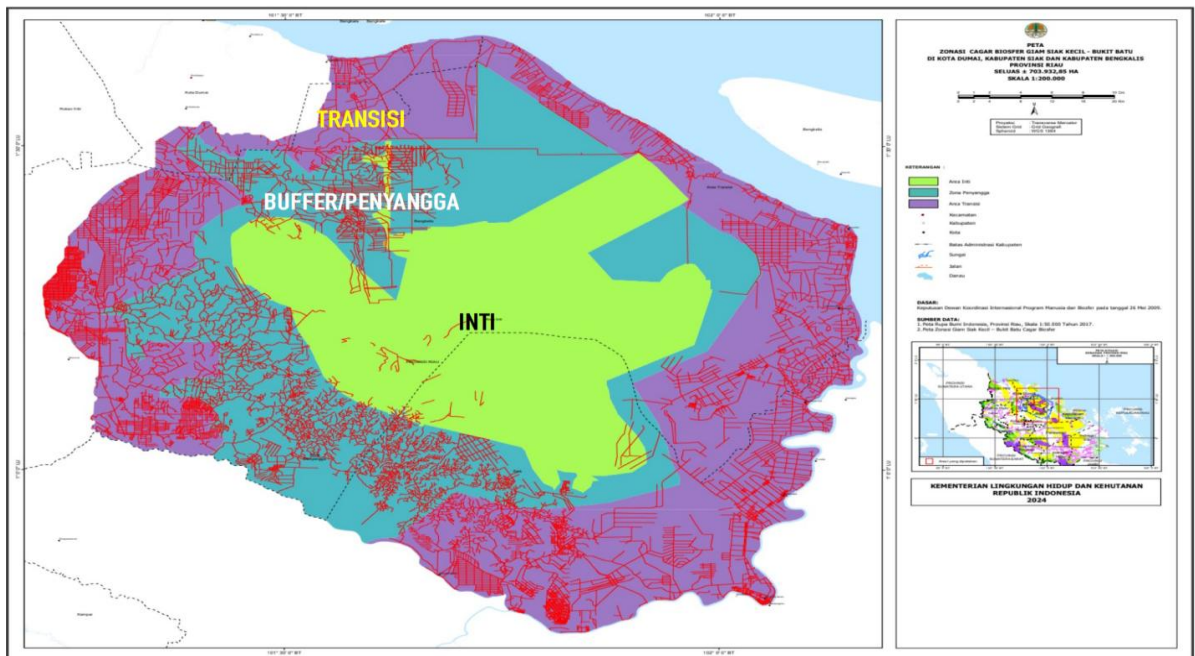
I. LOCATION

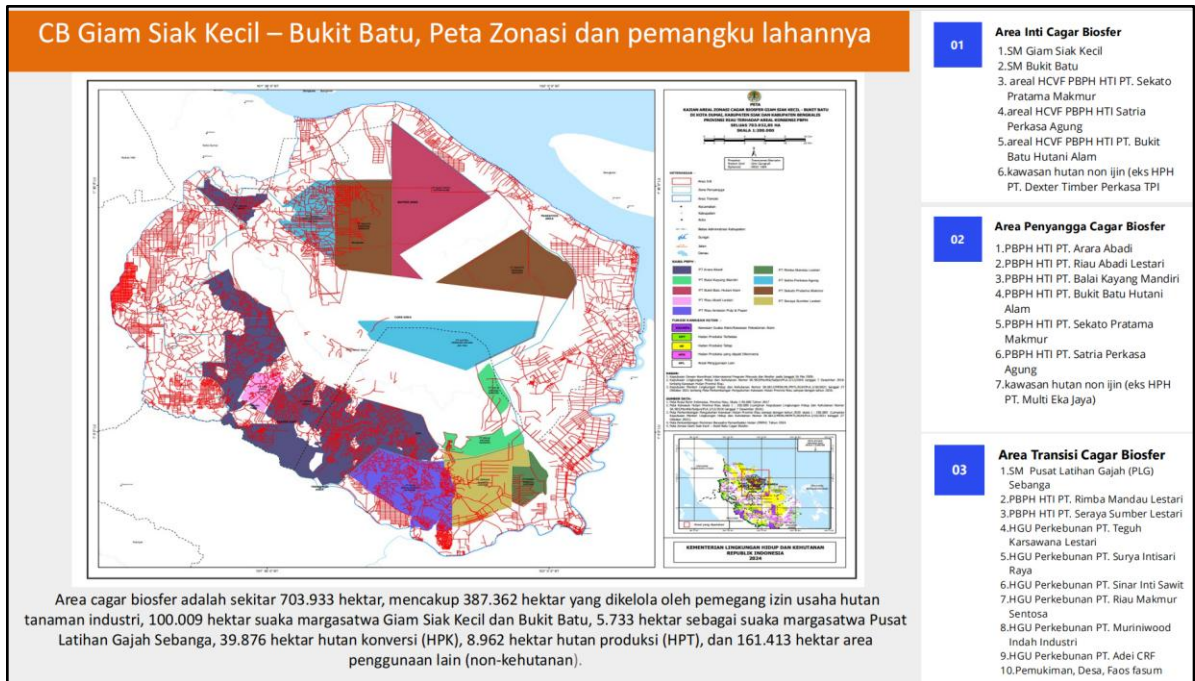
The landscape of the Giam Siak Kecil – Bukit Batu Biosphere Reserve is situated astronomically between 101° 11' – 102° 10' East Longitude and 00° 44' – 01° 11' North Latitude. The biosphere reserve is divided into three zones: the core area, the buffer area, and the transition zone.

- **Core Area** (totaling 179,000 hectares) comprises two nature reserves—Giam Siak Kecil and Bukit Batu—as well as production forest.
- **Buffer Area** (totaling 222,000 hectares) consists of industrial plantation forests and other production forests.

- **Transition Zone** (totaling 304,000 hectares) includes plantation estates, agricultural land, community settlements, and planted forest.

The activity titled "Optimization of GSK-BB Biosphere Reserve Management in Support of Indonesia's FOLU Net Sink 2030" will be focused on the utilization and transition zones, as well as the core zone for specific aspects, including carbon stock calculation within the GSK-BB Biosphere Reserve area and the impact of this project's activities on the FOLU Net Sink 2030, as illustrated in the map below.





Picture 1. Activity Location

J. Beneficiaries

- Local communities, including:
 - Farmers and cultivators in the transition and buffer zones.
 - Women's and youth groups.
 - Local communities surrounding the GSK-BB area.
- Community business groups and green cooperatives engaged in non-timber forest products (NTFPs), agroforestry, fisheries, and environmental services.
- Area management institutions, both governmental and non-governmental, including village administrations and the GSK-BB Coordinating Body.
- Local governments (Siak, Bengkalis, Dumai Regencies, and Riau Province) as holders of the coordination and integration mandate.
- Private sector entities operating in the surrounding area, within the framework of social responsibility collaboration and landscape restoration.

6. Researchers, academics, and technical partners who will utilize spatial, ecological, and social data as the basis for scientific development and policy formulation.

K. Policy Alignment

This proposal is in line with and supports various national and international policies, including:

1. National Policies

- Law No. 32 of 2009 concerning Environmental Protection and Management.
- Law No. 32 of 2024, amending Law No. 5 of 1990 on Conservation of Living Natural Resources and Their Ecosystems.
- Law No. 16 of 2016, ratifying the Paris Agreement to the United Nations Framework Convention on Climate Change.
- Government Regulation No. 71 of 2014 on Peatland Ecosystem Protection and Management, as amended by Government Regulation No. 57 of 2016.
- Government Regulation No. 26 of 2020 concerning Forest Rehabilitation and Reclamation.
- Presidential Regulation No. 98 of 2021 on Carbon Economic Value Implementation for Achieving the Nationally Determined Contribution (NDC).
- Presidential Regulation No. 60 of 2021 on the National Action Plan for Greenhouse Gas Emission Reduction.
- Presidential Regulation No. 14 of 2024 on the Implementation of Carbon Capture and Storage Activities.
- Minister of Environment and Forestry Regulation No. 24 of 2021 on Thematic Geospatial Information Administration within the Ministry of Environment and Forestry.

- Minister of Environment and Forestry Regulation No. 21 of 2022 on Indonesia's FOLU Net Sink 2030 Operational Plan.
- Minister of Environment and Forestry Regulation No. 7 of 2023 on the Carbon Trading Mechanism in the Forestry Sector.
- Ministerial Decree No. 168/Menlhk/PKTL/PLA.1/2/2022 on Indonesia's FOLU Net Sink 2030 Operational Plan.

2. Regional Policies

- Riau Governor Regulation No. 77 of 2012 on the Regional Action Plan for Greenhouse Gas Emission Reduction (RAD GRK) for Riau Province (Riau Province Gazette Year 2012 No. 28).
- Riau Governor Regulation No. 33 of 2018 on the Regional Action Plan for Sustainable Development Goals (SDGs) in Riau Province.
- Riau Governor Regulation No. 9 of 2021 on Green Riau (Riau Province Gazette Year 2021 No. 9).
- Riau Province Work Plan: Indonesia's FOLU Net Sink 2030.
- Riau Governor Decree No. KPTS.292/III/2024 on the Strengthening Team for Landscape-Based Management in the context of Emission Reduction and Carbon Sequestration Enhancement in Riau.

3. International Policies

- UNESCO Man and Biosphere (MAB) Programme: Establishes the principle of three biosphere functions—conservation, development, and logistic support.
- Paris Agreement (2015): Endorses Indonesia's commitment within its Nationally Determined Contributions (NDCs).
- Agenda 2030 – Sustainable Development Goals (SDGs): Alignment with SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 17 (Partnerships for the Goals).

L. Alignment with FOLU Net Sink 2030

The activities in this proposal contribute directly to the Operational Plan of Indonesia's FOLU Net Sink 2030, particularly under the following pillars:

Table 2. Alignment with the FOLU Net Sink 2030 through Proposal Activities

FOLU Net Sink 2030 Pillar	Proposal Activity Contribution
1. Enhancement of Forest Cover	Rehabilitation and restoration of the GSK-BB ecosystem, including reforestation of degraded lands and revegetation with local and endemic species
2. Reduction of Deforestation and Degradation	Strengthening area surveillance, integrated patrols, law enforcement, and community- and technology-based forest fire prevention
3. Sustainable Peatland Management	Hydrological restoration of peatlands through canal blocking, strengthening of peatland landscape institutions, and revegetation of degraded peatlands
4. Strengthening MRV (Measurement, Reporting, and Verification) and Data Systems	Biomass measurement, carbon mapping, integration into the National Registry System (SRN) and IPCC-based systems, along with spatial and thematic reporting
5. Empowerment and Green Economy	Development of non-timber forest products (NTFPs), agroforestry, sustainable fisheries, community-based ecotourism, as well as community training and institutional strengthening
6. Financing and Institutional Support	Multi-stakeholder collaboration, legal recognition of local institutions, partnerships with the private sector and academia, and innovative financing mechanisms

M. Strategic Feasibility

This proposal demonstrates high feasibility based on several key aspects that are mutually reinforcing and aligned with national policy directions and global conservation priorities:

1. Area Legitimacy

- Officially designated as a UNESCO Biosphere Reserve since 2009.
- Included as a priority area for restoration and conservation in documents such as the Strategic Environmental Assessment (KLHS), the National Medium-Term Development Plan (RPJMN), and the FOLU Net Sink 2030 Roadmap.
- Land cover change analysis indicates significant degradation, requiring urgent intervention.

2. Biodiversity and High Ecosystem Value

- Serves as a critical habitat for key species such as the Sumatran Tiger, Elephants, and Wetland Birds.
- Contains High Conservation Value (HCV) zones and High Carbon Stock (HCS) areas within industrial plantation landscapes and community-managed territories.

3. Carbon Potential and Climate Mitigation

- The landscape consists of deep peatlands and primary forests with exceptionally large carbon reserves.
- Restoration and rehabilitation activities have a direct impact on reducing greenhouse gas (GHG) emissions.
- There is potential for developing carbon accounting methods based on IPCC Tier 2 and for systematic reporting to the National Registry System (SRN).

4. Multi-Stakeholder and Institutional Support

- A management structure for the GSK-BB Biosphere Reserve has been established through a Governor's Decree.
- There is a collaborative commitment from local and national NGOs, universities (UNRI, UIN Suska, BRIN), and the private sector through landscape-based partnerships.

5. Availability of Data, Research, and Infrastructure Readiness

- Various ecological, social, and spatial studies have been conducted by credible institutions (WWF, LIPI, academics, etc.).
- An initial data repository is available, ready to be strengthened to support science-based decision-making and integrated carbon MRV systems.

N. Logical Framework

Table 3. Logframe Activities

Level	Objective Indicator	Verification Indicator	Main Assumption
General Objective	The contribution of GSK-BB to reducing greenhouse gas (GHG) emissions through the FOLU Net Sink 2030 approach	Area contribution report to the National Registry System (SRN) and the national FOLU Net Sink report	National commitment remains ongoing, with consistent cross-sectoral support
Specific Objective	Enhanced effectiveness of GSK-BB area management through landscape-based and collaborative approaches	Performance evaluation of area management, including zoning documents,	No conflicts occurred among stakeholders

Level	Objective Indicator	Verification Indicator	Main Assumption
		standard operating procedures (SOPs), and annual reporting	
Output	1. Multi-stakeholder Coordination Body/Forum is established and operational 2. Ecosystem restoration is underway 3. Forest fire prevention, area protection, and law enforcement are enhanced 4. Carbon and emission data are available 5. Community economy improves 6. Human resource capacity is strengthened	Forum minutes, field monitoring reports, land cover maps, and activity reports	Sufficient budgetary and technical support, with active community participation
Activity	1. Forest and Land Rehabilitation 2. Carbon Stock Calculation and Monitoring 3. Development of Landscape-Based Sustainable Economy 4. Community Empowerment and Capacity Building 5. Development of Sustainable Ecotourism Industry 6. Forest Fire Prevention and Area Protection	Attendance list, activity photos, survey result maps, training documentation, and financial reports	Weather conditions are favorable

Level	Objective Indicator	Verification Indicator	Main Assumption
	7. Law Enforcement in Protected Areas		
	8. Strengthening Area Governance Program Monitoring and Evaluation		

O. IMPLEMENTATION PLAN (TIMEFRAME) 2025–2028

Table 4. Implementation Plan (Timeframe) 2025–2028

Program / Activity	2025	2026	2027	2028
■ Program 1: Enhancement of Carbon Sequestration				
Spatial analysis and mapping of restoration sites	✓	🔄 (updating)	🔄 (location review)	🔄 (final validation)
Degraded land planting	✓	✓	✓	🔄 (maintenance)
Hidrological Restoration (canal blocking, etc)	✓	✓	✓	🔄 (reconstruction)
Provision and planting of endemic seedlings	✓	✓	✓	🔄 (monitoring)
Community engagement in rehabilitation	✓	✓	✓	✓
PSP and baseline of carbon stock	✓	🔄 (verification)	🔄 (data updating)	✓ (final compilation)
Monitoring of growth & carbon stock	🔄	✓	✓	✓
■ Program 2: Sustainable Forest Management				
Development of demonstration plots and infrastructure for non-timber forest products (NTFPs)	✓	🔄 (expansion)	🔄 (maintenance)	🔄

Program / Activity	2025	2026	2027	2028
Community technical training (Good Agricultural Practices—GAP, fertilizers, etc.)	✓	✓	🔄 (continuation)	🔄
Development of NTFP-based enterprises and institutional strengthening	✓	✓	✓	✓
Identification and development of nature and cultural tourism	✓	✓	✓	🔄
Training of tourism guide, interpreter	✓	🔄 (continuation)	🔄 (refresh)	🔄
Development of tourism package and promotioni	✓	✓	✓	✓
Forest and land fire patrol and monitoring (SMART/FDRS)	✓	✓	✓	✓
Training and strengthening of Community Fire Brigades (MPA)	✓	🔄	🔄	🔄
Protected area infrastructure (watchtowers, guard posts)	✓	🔄 (additional)	🔄 (repair)	🔄
■ Program 5: Law Enforcement and Institution				

Program / Activity	2025	2026	2027	2028
Legal patrols and enforcement (illegal logging, etc.)	✓	✓	✓	✓
Training on area surveillance and human-wildlife conflict mitigation	✓	🔄	🔄	🔄
Establishment of the GSK-BB Forum and governance standard operating procedures (SOPs)	✓	🔄 (strengthening)	🔄 (SOP review)	🔄 (finalisation)
Initiation of multi-stakeholder join-up governance	✓	✓	✓	✓
Multi-stakeholder monitoring and evaluation system, and FOLU (Forest and Other Land Uses) reporting	✓ (developing)	✓ (implementing)	✓ (evaluation)	✓ (final compilation)
Legal patrols and enforcement activities (e.g., illegal logging and related violations)	✓	✓	✓	✓

P. IMPLEMENTING INSTITUTION

Program activities are carried out by a Coalition of Civil Society Organizations and Strategic Partners with an established track record and operational base within the GSK-BB landscape. This consortium reflects diverse competencies, local representation, and technical capacity to support the achievement of the FOLU Net Sink 2030 targets.

Implementation is formally facilitated by the Riau Provincial Government through the Coordination Body for Management of the GSK-BB Biosphere Reserve, in collaboration with the Ministry of Environment and Forestry (MoEF) and other national partners. The activities are also supported by academia, the private sector, and relevant international development partners.

Q. ACTIVITY ORGANISATION

In implementing this initiative, the Regional Development Planning Agency of Riau Province will engage various stakeholders, including:

1. Local Government, consisting of:
 - Riau Provincial Environmental and Forestry Office (Dinas LHK Provinsi Riau);
 - Bengkalis District Development Planning Agency (Bappeda Kabupaten Bengkalis);
 - Siak District Development Planning Agency (Bappeda Kabupaten Siak);
 - Relevant Regional Apparatus Organizations (Dinas/OPD terkait);
2. Riau Natural Resources Conservation Agency (BBKSDA Riau)
3. Training and Human Resource Development Center Region II (Balai P2SDM Wilayah II)
4. Private sector companies
5. National Research and Innovation Agency (BRIN)

6. Communities

7. Civil Society Organizations (e.g., Kar Indonesia, FKMM, SENDS, Belantara Foundation, Siak Hijau etc.)

8. Other Strategic Partners

R. BUDGET PROPOSAL

The total budget required to implement the activity “*Optimization of Giam Siak Kecil – Bukit Batu Biosphere Reserve Management in Support of Indonesia’s FOLU Net Sink 2030*” amounts to: Rp 29,042,240,000 (Twenty-Nine Billion Forty-Two Million Two Hundred Forty Thousand Rupiah). This budget covers three main activity clusters as follows:

- | | |
|---|------------------|
| ➤ Carbon Sequestration Enhancement | Rp. 11,500,000,- |
| ➤ Sustainable Forest Management | Rp. 15,374,000,- |
| ➤ Law Enforcement and Institutional Strengthening | Rp. 2,168,240,- |

Table 5. Detailed Financing Plan of Activities

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
1	Program : Enhancement of Carbon Sequestration					
	Activity : 1. Forest and Land Rehabilitation					
	Sub Activity :					
	1. Spatial analysis and mapping of restoration sites	Availability of deforestation maps and priority restoration areas (minimum scale 1:25,000) Number of priority sites mapped (minimum of 3 priority areas)	Riau Province, Siak District, GSK BB BRI	125.000,-	Local Goverment, Universities, Private Bussines, NGO, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. BPS Kampar 4. BP2SDM Wil II 5. Yayasan Belantara
	2. Degraded land planting	Planting of degraded land covering 200 hectares, with a plant survival rate of $\geq 70\%$ after 12 months. Maintenance frequency: at least three times during the first year.	Riau Province, Siak District, GSK BB BRI	4.230.000,-	Local Goverment, Universities, Private Bussines, NGO, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. BBKSDA Riau 4. LSM (FKKM, KAR, SEND, SIAK HIJAU) 5. Yayasan Belantara 6. Perusahaan

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
	3. Hydrological restoration: canal blocking, monitoring wells, subsidence stakes	Construction of 12 canal blockings, along with priority maps for canal blocking, monitoring wells, and subsidence stakes. TMAT and subsidence data are recorded every 6 months. 12 canal blocking sites have been mapped and are available in spatial formats (shp/kml).	Riau Province, Siak District, GSK BB BRI	1.805.000,-	Local Goverment, Universities, Private Bussines, NGO, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. BBKSDA Riau 4. LSM (FKKM, KAR, SEND, SIAK HIJAU) 5. Yayasan Belantara 6. Perusahaan 7. MPA
	4. Provision of endemic and multi-purpose tree species (MPTS) seedlings	Number of seedlings meeting specifications available: 100,000 stems Initial monitoring survival rate of plants: ≥ 80% Number of initial monitoring activities within the first 3 months	Riau Province, Siak District, GSK BB BRI	3.400.000,-	Local Goverment, Universities, Private Bussines, NGO, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. BBKSDA Riau 4. LSM (FKKM, KAR, SEND, SIAK HIJAU) 5. Yayasan Belantara 6. Perusahaan

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		≥10 local plant species recommended based on identification results Species to be used in the restoration planting plan				
	5. Community outreach and engagement in rewetting and revegetation activities	200 participants (min. 40% women & vulnerable group.	Riau Province, Siak District, GSK BB BR	140.000,-	Local Goverment, Universities, Private Bussines, NGO, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbang Sosek 4. LSM (FKKM, KAR, SEND, SIAK HIJAU) 5. Yayasan Belantara 6. Perusahaan
Activity : 2. Carbon stock measurement and monitoring						
	Sub Activity : 1. measurement through the establishment of Permanent Sample Plots (PSPs) and the	- Number of available carbon maps and reports - Carbon and emission estimates calculated	Riau Province, Siak District, GSK BB BR	1.200.000,-	Local Goverment, Universities, Private Bussines, NGO, Local Communities, Ministry of Environment	1. Dinas LHK Provinsi Riau 2. BPS Kampar 3. Perguruan Tinggi

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
	development of baseline carbon stock data	- SRN (National Registry System) data integrated - Verified maps of carbon stock distribution and emission potential available (minimum scale 1:25,000)				
	2. Monitoring vegetation growth and restoration effectiveness	Restoration effectiveness is demonstrated by a plant survival rate of ≥70% and increased biomass growth	Riau Province, Siak District, GSK BB BR	600.000,-	Local Goverment, Universities, Private Bussines, NGO, Local Communities, Ministry of Environment	1. Dinas LHK Provinsi Riau 2. Pusbang Sosek 3. BBKSDA Riau 4. BPS Kampar
2	Program : Sustainable forest management					
	Activity 1. Landscape-Based Sustainable Economic Development					
	Sub Activity : 1. Fertigation demo plots, water reservoirs	Establishment of at least one functional demonstration plot featuring fertigation	Riau Province, Siak District, GSK BB BR	753.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
	(embung), compost houses, and biodigesters	systems, water reservoir (embung), compost house, and biodigester, utilized by ≥30 farmers, resulting in a ≥30% increase in agricultural input efficiency				2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. Perguruan Tinggi 5. Yayasan Belantara 6. LSM (FKKM, KAR, SEND, SIAK HIJAU) 7. Dinas Koperasi dan UMKM Kab. Siak 8. Dinas Perindustrian dan Perdagangan
	2. Cultivation and processing of non-timber forest products (NTFPs) such as sugar palm, honey, bamboo, and mushrooms	Ten training sessions and three active NTFP-based enterprises/institutions established, involving ≥60 community members, with a ≥20% increase in production, and product marketing conducted through ≥1 distribution channel	Riau Province, Siak District, GSK BB BR	4.800.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BP2SDM Wil II 5. Perguruan Tinggi 6. Yayasan Belantara

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
						7. LSM (FKKM, KAR, SEND, SIAK HIJAU) 8. Dinas Koperasi dan UMKM Kab. Siak 9. Dinas Perindustrian dan Perdagangan
	Activity : 2. Community Empowerment and Capacity Building					
	Sub Activity : 1. Technical Training and Community Capacity Strengthening	1. ≥100 community members participated in technical training and capacity strengthening 2. ≥3 types of technical and managerial trainings conducted 3. ≥80% of training participants reported improved understanding	Riau Province, Siak District, GSK BB BR	350.000,-	Local Government, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BP2SDM Wil II 5. Perguruan Tinggi 6. Yayasan Belantara 7. LSM (FKKM, KAR, SEND, SIAK HIJAU) 8. Dinas Koperasi dan UMKM Kab. Siak

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		4. ≥3 environmental campaign media produced and distributed (posters, videos, social media)				9. Dinas Perindustrian dan Perdagangan
	2. Formation and Strengthening of Community Organizations	1. ≥5 community groups (Forest Farmer Groups/KTH or equivalents) established or strengthened 2. ≥3 groups have statutes/bylaws and annual work plans 3. ≥2 groups have partnerships with external parties (government, private sector, NGOs) 4. ≥70% of group members actively	Riau Province, Siak District, GSK BB BR	450.000,-	Local Government, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BP2SDM Wil II 5. Perguruan Tinggi 6. Yayasan Belantara 7. LSM (FKKM, KAR, SEND, SIAK HIJAU) 8. Dinas Koperasi dan UMKM Kab. Siak 9. Dinas Perindustrian dan Perdagangan

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		participate in activities and decision-making				
	Activity : 3. Development of Sustainable Ecotourism Industry					
	Sub Activity : 1. Identification of natural and cultural tourism potentials, including interpretive trail mapping	• Availability of documentation from potential tourism site identification (natural, cultural, and interpretive route) in ≥2 locations • At least 3 key tourism potentials documented (e.g., lakes, wildlife, traditional customs) with descriptions, photographs, and GPS coordinates • Interpretive tourism trail map prepared and disseminated at a minimum scale of 1:25,000	Riau Province, Siak District, GSK BB BR	550.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BP2SDM Wil II 5. Perguruan Tinggi 6. Yayasan Belantara 7. LSM (FKKM, KAR, SEND, SIAK HIJAU) 8. Dinas Koperasi dan UMKM Kab. Siak 9. Dinas Perindustrian dan Perdagangan

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
	2. Training of tour guides and interpreters, along with the development of tourism packages	• Availability of documentation from potential tourism site identification (natural, cultural, and interpretive route) in ≥2 locations • At least 3 key tourism potentials documented (e.g., lakes, wildlife, traditional customs) with descriptions, photographs, and GPS coordinates • Interpretive tourism trail map prepared and disseminated at a minimum scale of 1:25,000	Riau Province, Siak District, GSK BB BR	650.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BP2SDM Wil II 5. Perguruan Tinggi 6. Yayasan Belantara 7. LSM (FKKM, KAR, SEND, SIAK HIJAU) 8. Dinas Koperasi dan UMKM Kab. Siak 9. Dinas Perindustrian dan Perdagangan
	3. Facilitation of community-based tourism enterprises	• At least 20 local community members trained as tour guides and interpreters	Riau Province, Siak District, GSK BB BR	2.450.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		• ≥1 training module developed and utilized in the training sessions • ≥2 nature/culture-based tourism packages prepared and ready for market • ≥1 simulation or trial run of the tourism route and interpretive delivery conducted				2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BP2SDM Wil II 5. Perguruan Tinggi 6. Yayasan Belantara 7. LSM (FKKM, KAR, SEND, SIAK HIJAU) 8. Dinas Koperasi dan UMKM Kab. Siak 9. Dinas Perindustrian dan Perdagangan
Activity 4: Forest and Land Fire Prevention and Area Protection						
	Sub Activity : 1. Routine patrols across core, buffer, and transition zones	• ≥90% of priority areas (core zone, buffer zone, transition zone) are covered by patrols • SMART patrol reports available and	Riau Province, Siak District, GSK BB BR	2.450.000,-	Local Government, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		archived, with at least one report per month • ≥30% reduction in hotspots and illegal activities compared to the previous year • Violations detected and followed up in accordance with procedures				4. BBKSDA Riau 5. BP2SDM Wil II 6. Perguruan Tinggi 7. Yayasan Belantara 8. LSM (FKKM, KAR, SEND, SIAK HIJAU) 9. MPA/Manggala Agni
	2. Implementation of the Fire Danger Rating System (FDRS) and monitoring technologies such as drones and SMART Patrol	• Local FDRS (Fire Danger Rating System) operates and is updated at least once per week during the dry season • A minimum of one drone and the SMART Patrol system actively utilized for patrol and mapping	Riau Province, Siak District, GSK BB BR	921.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BBKSDA Riau 5. BP2SDM Wil II 6. BPS Riau 7. Perguruan Tinggi 8. Yayasan Belantara

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		• ≥10 fire-prone points monitored digitally and reported periodically • Fire risk distribution map prepared and used for early response planning				9. LSM (FKKM, KAR, SEND, SIAK HIJAU) 10. MPA/Manggala Agni
	3. Community outreach on Padiatapa, training of Community Fire Brigades (MPA), wildlife monitoring, and conflict mitigation	• Local FDRS (Fire Danger Rating System) operates and is updated at least once per week during the dry season • A minimum of one drone and the SMART Patrol system actively utilized for patrol and mapping • ≥10 fire-prone points monitored digitally and reported periodically	Riau Province, Siak District, GSK BB BR	750.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BBKSDA Riau 5. BP2SDM Wil II 6. LSM (FKKM, KAR, SEND, SIAK HIJAU) 7. Perusahaan 8. Yayasan Belantara 9. MPA/Manggala Agni

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		Fire risk distribution map prepared and used for early response planning				
	4. Construction of watchtowers, guard posts, and warning signage	- Two observation towers constructed at strategic locations ≥2 operational guard posts constructed or rehabilitated ≥10 warning and information signs installed at critical points (e.g., entry access, boundary areas, etc.)	Riau Province, Siak District, GSK BB BR	1.250.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Pusbangsosek 4. BBKSDA Riau 5. BP2SDM Wil II 6. LSM (FKKM, KAR, SEND, SIAK HIJAU) 7. Perusahaan 8. Yayasan Belantara 9. MPA/Manggala Agni
3	Program : Law Enforcement and Institutional Strengthening					
	Activity : 1. Law Enforcement of Area					

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
	Sub Activity : 1. Legal patrols to address illegal activities, including illegal logging and encroachment	- At least 12 law enforcement patrols conducted annually in areas prone to encroachment and illegal logging ≥90% of high-risk areas for illegal logging and encroachment covered by patrols, as evidenced by maps and patrol logs 100% of patrol activities are well documented (photos, GPS points, chronology) - Law enforcement patrol reports prepared and submitted to relevant authorities periodically	Riau Province, Siak District, GSK BB BR	978.240,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. BBKSDA Riau 4. LSM (FKKM, KAR, SEND, SIAK HIJAU) 5. Perusahaan 6. Yayasan Belantara 7. Gakkum

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		(at least once per quarter)				
	2. Training for area surveillance and monitoring	• At least 30 individuals participate in area monitoring training • Participants include members of the community, forest rangers (Polhut), and local leaders • ≥80% of participants demonstrate increased knowledge, based on pre-test and post-test results • ≥70% of participants are able to independently	Riau Province, Siak District, GSK BB BR	45.000,-	Local Government, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. BBKSDA Riau 4. LSM (FKKM, KAR, SEND, SIAK HIJAU) 5. Perusahaan 6. Yayasan Belantara 7. Gakkum

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		conduct monitoring simulations				
	3. Wildlife conflict management and legal case documentation	• A minimum of 3 wildlife conflict cases (e.g., elephants, tigers, bears, etc.) are properly handled (documentation, mitigation, or evacuation) • Wildlife conflict reports responded to within a maximum of ≤72 hours from the time the report is received • ≥20 individuals trained (community members, village officials, or field personnel) in wildlife conflict mitigation	Riau Province, Siak District, GSK BB BR	250.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. BBKSDA Riau 4. LSM (FKKM, KAR, SEND, SIAK HIJAU) 5. Perusahaan 6. Yayasan Belantara 7. Gakkum
	Activity: 2. Strengthening Area Governance					

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
	Sub Activity : 1. Establishment and strengthening of the GSK-BB Communication Forum	• The forum includes representatives from at least four sectors: government, community, private sector, and academia/NGOs • ≥30% of forum members are women or youth (where relevant) • At least three coordination meetings are held annually • ≥1 priority agenda for the area is jointly agreed upon and followed up by the forum • The GSK-BB Communication Forum is established through an official decree or	Riau Province, Siak District, GSK BB BR	400.000,-	Local Government, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Dinas Terkait 4. Perguruan Tinggi 5. LSM (FKKM, KAR, SEND, SIAK HIJAU) 6. Perusahaan 7. Yayasan Belantara

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		institution endorsed by the relevant authority The forum's organizational structure is complete (chairperson, secretary, working groups)				
	2. Development of SOPs and coordination mechanisms for integrated landscape management	> 1 SOP document on landscape management prepared and endorsed, utilized in ≥1 collaborative activity, and disseminated to ≥20 stakeholders	Riau Province, Siak District, GSK BB BR	200.000,-	Local Government, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Dinas Terkait 4. Perguruan Tinggi 5. LSM (FKKM, KAR, SEND, SIAK HIJAU) 6. Perusahaan 7. Yayasan Belantara
	3. Review and integration of area management plans	1 area management plan reviewed and integrated into regional planning	Riau Province, Siak District, GSK BB BR	250.000,-	Local Government, Private Bussines, Local	1. Bappeda Provinsi Riau

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		documents, involving multiple stakeholders and resulting in an official integration document			Communities, Ministry of Environment	2. Dinas LHK Provinsi Riau 3. Dinas Terkait 4. Perguruan Tinggi 5. LSM (FKKM, KAR, SEND, SIAK HIJAU) 6. Perusahaan 7. Yayasan Belantara
	4. Initiation of a multi-stakeholder join-up governance model	A multi-stakeholder join-up governance model is developed, tested in ≥1 collaborative activity, involving multiple parties, and resulting in a follow-up action plan document and institutional support	Riau Province, Siak District, GSK BB BR	450.00,-	Local Government, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Dinas Terkait 4. Perguruan Tinggi 5. LSM (FKKM, KAR, SEND, SIAK HIJAU) 6. Perusahaan 7. Yayasan Belantara
Activity 3. Monitoring and Evaluation Program						

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
	Sub Activity : 1. Development of a multi-stakeholder monitoring and evaluation system	A multi-stakeholder M&E system is developed and endorsed, involving multiple parties, socialized to ≥20 participants, and equipped with an annual implementation plan	Riau Province, Siak District, GSK BB BR	250.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Dinas Terkait 4. Perguruan Tinggi 5. LSM (FKKM, KAR, SEND, SIAK HIJAU) 6. Perusahaan 7. Yayasan Belantara
	2. Regular implementation of activity monitoring and evaluation	Monitoring and evaluation activities are conducted annually, covering ≥80% of the program, producing comprehensive reports, with ≥70% of recommendations followed up, and	Riau Province, Siak District, GSK BB BR	650.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Dinas Terkait 4. Perguruan Tinggi 5. LSM (FKKM, KAR, SEND, SIAK HIJAU) 6. Perusahaan

No	Program/Activity/Sub Activity	Indicator	Location	Budget (x Rp. 1.000)	Beneficiaries	Stakeholder Involved
		involving multiple stakeholders				7. Yayasan Belantara
	3. Assessment of contributions toward the FOLU Net Sink 2030 targets	Evaluation is conducted based on spatial data, carbon inventory, or achievements in restoration and protection activities. An evaluation report on FOLU Net Sink contribution is prepared, covering impact analysis of activities on greenhouse gas (GHG) emission reduction	Riau Province, Siak District, GSK BB BR	450.000,-	Local Goverment, Private Bussines, Local Communities, Ministry of Environment	1. Bappeda Provinsi Riau 2. Dinas LHK Provinsi Riau 3. Dinas Terkait 4. Perguruan Tinggi 5. LSM (FKKM, KAR, SEND, SIAK HIJAU) 6. Perusahaan 7. Yayasan Belantara



KEMENTERIAN LINGKUNGAN HIDUP DAN KEHUTANAN
BADAN STANDARDISASI INSTRUMEN LINGKUNGAN HIDUP DAN KEHUTANAN
SEKRETARIAT BADAN

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Nomor : S.74/SETBSI/PEHKT/KLN.2.3/B/06/2024 24 Juni 2024
Sifat : Penting & Segera
Lampiran : 1 (satu) Berkas
Hal : Permohonan Masukan Draft SK Penetapan Satuan Tugas Operasional Koordinasi Pengelolaan Lanskap Cagar Biosfer Giam Siak Kecil – Bukit Batu

Yth.

1. Kepala Badan Perencanaan Pembangunan Daerah, Penelitian dan Pengembangan Provinsi Riau
 2. *Head of Partnership and Engangement*, Sinar Mas Forestry
 3. *Head of Landscape Conservation and Environment*, Sinar Mas Forestry
- di
Tempat

Untuk mewujudkan salah satu tujuan pengelolaan Cagar Biosfer dalam Strategi Seville, yakni menjamin adanya keselarasan dan interaksi antar area-area cagar biosfer, maka UNESCO merekomendasikan kepada setiap cagar biosfer untuk mengembangkan dan membentuk mekanisme kelembagaan untuk mengelola, mengkoordinasikan dan mengintegrasikan program dan kegiatan cagar biosfer. *Madrid Action Plan* dalam dokumennya bahwa pemenuhan salah satu aksi pengelolaan Cagar Biosfer, yaitu aksi 10.2 (setiap cagar biosfer harus membentuk komite pengelolaan yang terdiri dari *stakeholders* yang mewakili sektor kegiatan yang berbeda dari ketiga area pengelolaan). Pengelolaan cagar biosfer yang tepat menggunakan model lembaga pengelolaan kolaborasi yang merupakan wadah koordinasi (forum komunikasi) *multistakeholders*.

Badan Standardisasi Instrumen Lingkungan Hidup dan Kehutanan melalui proyek ITTO Project PD 712/13 Rev.3 (F), sedang melakukan upaya-upaya menjaga area cagar biosfer Giam Siak Kecil – Bukit Batu sebagai area proteksi biodiversitas, serta keberlanjutannya. Salah satu kegiatannya adalah mendorong operasionalisasi Badan Koordinasi (*Coordinating Board*) Pengelolaan Cagar Biosfer Giam Siak Kecil – Bukit Batu dan mengidentifikasi entitas lembaga penggerak integrasi program antar pemangku kepentingan dalam lanskap Cagar Biosfer Giam Siak Kecil – Bukit Batu.

Pemerintah Provinsi Riau telah membentuk Badan Koordinasi Pengelolaan berdasarkan Keputusan Gubernur Riau No. Kpts.7/1/2017 tentang Badan Koordinasi Pengelolaan Cagar Biosfer Giam Siak Kecil – Bukit Batu. Badan Koordinasi ini diketuai oleh Gubernur Riau, dengan Wakil Ketua: Wakil Gubernur, Bupati Bengkalis, dan Bupati Siak, dan beranggotakan dari unsur-unsur Pemerintah Provinsi Riau, Pemerintah Kabupaten Siak dan Bengkalis, Balai Besar KSDA Riau, Komite Nasional Program MAB-UNESCO Indonesia, Sinarmas Forestry, Asia Pulp and Paper Indonesia, dan LSM lokal. Dari rangkaian konsultasi dengan para pemangku kepentingan, bahwa seluruh pemangku kepentingan memiliki program dan sumberdaya yang dialokasikan untuk pengelolaan area yang tercakup dalam cagar biosfer. Namun demikian, masing-masing bekerja sendiri-sendiri. Tidak ada lembaga penggerak yang mengkoordinasikannya, meskipun telah dibentuk Badan Koordinasi sesuai SK Gubernur Riau Nomor. Kpts.7/1/2017. Selain itu juga, terkait dengan aspek pergantian personil dalam jabatan, perubahan organisasi, pemahaman kerja cagar biosfer, intensitas komunikasi, multi kewenangan, serta dinamika tantangan yang semakin meningkat.

Sehubungan dengan hal tersebut, dirasa perlu untuk merevitalisasi struktur Badan Koordinasi atau membentuk Satuan Tugas Operasional Koordinasi Pengelolaan Cagar Biosfer Giam Siak Kecil – Bukit Batu. Untuk itu, kami bermaksud mendiskusikan lebih dalam tentang revitalisasi Badan Koordinasi dengan mempertimbangkan sebagai berikut:

1. Inisiatif pembentukkan cagar biosfer adalah oleh Sinar Mas Forestry (PBPH hutan tanaman industri).

2. Kewenangan area kawasan: a) Suaka Margasatwa: BBKSDA Riau, b) PBPH: Ditjen PHL - KLHK, pemegang izin (Sinar Mas Forestry grup dan PBPH lain), c) APL: Pemda Riau, d) Lahan milik (pemegang sertifikat lahan).
3. Penanggungjawab konservasi biodiversitas: Ditjen KSDAE – KLHK.
4. Penanggungjawab administrasi Provinsi/Kabupaten: Pemerintah Daerah Riau.
5. Seluruh pemangku kepentingan telah memiliki program dan alokasi sumberdaya di area yang tercakup dalam cagar biosfer.

Terlampir, kami sampaikan pula konsep awal Satuan tugas Operasional Koordinasi Pengelolaan Cagar Biosfer Giam Siak Kecil – Bukit Batu, dengan harapan akan dapat bekerja lebih operasional; untuk mohon pandangan Saudara.

Demikian, atas kerjasamanya diucapkan terima kasih.



Sekretaris Badan,

Dr. Nur Sumedi, SPi, MP.
NIP. 19690718 199403 1 001

Tembusan:
Gubernur Provinsi Riau di Pekanbaru



GOVERNOR OF RIAU

GOVERNOR OF RIAU DECREE
Number: Kpts.

On

**THE ESTABLISHMENT OF COORDINATION BODY ON
THE MANAGEMENT OF GIAM SIAK KECIL – BUKIT BATU
BIOSPHERE RESERVE**

GOVERNOR OF RIAU,

- Considering : a. That Biosphere Reserve is an integrated area that harmonizes the interests of conserving biological natural resources and ecosystems with social, economic, and scientific-technological development, whose existence is internationally recognized;
- b. That the Giam Siak Kecil Bukit Batu (GSKBB) Biosphere Reserve, designated by UNESCO's Man and the Biosphere (MAB) Programme on May 26, 2009 and officially inaugurated by the Minister of Forestry on July 1, 2009, carries three interrelated functions—biodiversity conservation, sustainable development, and logistic support—thus requiring integrated and sustainable management;
- c. That the management activities of the Giam Siak Kecil Bukit Batu Biosphere Reserve are carried out collaboratively and synergistically by all relevant authorities and stakeholders, coordinated under a Management Coordination Body for the Giam Siak Kecil Bukit Batu Biosphere Reserve;
- d. That due to changes in the structure and nomenclature of Regional Apparatuses based on Riau Provincial Regulation Number 5 of 2024, which is the Third Amendment to Regional Regulation Number 4 of 2016 concerning the Establishment and Organization of Regional Apparatuses of Riau Province, Governor of Riau Decree Number Kpts.7/1/2017 concerning the Coordination Body for the Management of the Giam Siak Kecil Bukit Batu Biosphere Reserve requires revision;
- e. That based on the considerations as referred to in point (a) up to [d], it is necessary to establish a Governor's Decree regarding the Establishment of the Coordination Body for the Management of the Giam Siak Kecil Bukit Batu Biosphere Reserve.
- In view of : 1. Law Number 61 of 1958 concerning the Establishment of Autonomous Regions Level I of West Sumatra, Jambi, and Riau (State Gazette of the Republic of Indonesia Year 1958 Number 112, Supplement to the State Gazette of the Republic of Indonesia Number 1646);
2. Law Number ...

2. Law Number 5 of 1990 concerning the Conservation of Biological Natural Resources and Their Ecosystems (State Gazette of the Republic of Indonesia Year 1990 Number 49, Supplement to the State Gazette Number 3419), as amended by Law Number 32 of 2024 concerning the Amendment to Law Number 5 of 1990 on the Conservation of Biological Natural Resources and Their Ecosystems (State Gazette of the Republic of Indonesia Year 2024 Number 138, Supplement to the State Gazette Number 6953);
3. Law Number 41 of 1999 concerning Forestry (State Gazette of the Republic of Indonesia Year 1999 Number 146, Supplement to the State Gazette Number 3888), as amended multiple times, most recently by Law Number 6 of 2023 concerning the Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation (State Gazette of the Republic of Indonesia Number 41, Supplement to the State Gazette Number 6856);
4. Law Number 26 of 2007 concerning Spatial Planning (State Gazette of the Republic of Indonesia Year 2007 Number 68, Supplement to the State Gazette Number 4725), as amended multiple times, most recently by Law Number 6 of 2023 concerning the Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation (State Gazette of the Republic of Indonesia Number 41, Supplement to the State Gazette Number 6856);
5. Law Number 32 of 2009 concerning Environmental Protection and Management (State Gazette of the Republic of Indonesia Year 2009 Number 14, Supplement to the State Gazette Number 5059), as amended multiple times, most recently by Law Number 6 of 2023 concerning the Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation (State Gazette of the Republic of Indonesia Number 41, Supplement to the State Gazette Number 6856);
6. Law Number 23 of 2014 concerning Regional Government (State Gazette of the Republic of Indonesia Year 2014 Number 244, Supplement to the State Gazette Number 5587), partially revoked and amended several times, most recently by Law Number 6 of 2023 concerning the Enactment of Government Regulation in Lieu of Law Number 2 of 2022 on Job Creation into Law (State Gazette of the Republic of Indonesia Year 2023 Number 41, Supplement to the State Gazette Number 6856);
7. Government Regulation Number 68 of 1998 concerning Nature Conservation Areas and Nature Preservation Areas (State Gazette of the Republic of Indonesia Year 1998 Number 132, Supplement to the State Gazette Number 3776), as revoked by Government Regulation Number 28 of 2011 concerning Management of Nature Conservation Areas and Nature Preservation Areas (State Gazette of the Republic of Indonesia Number 56, Supplement to the State Gazette Number 5217), and as amended by Government Regulation Number 108 of 2015 concerning Amendment to Government Regulation Number 28 of 2011 on the Management of Nature Conservation Areas and Nature Preservation Areas (State Gazette of the Republic of Indonesia Year 2015 Number 330, Supplement to the State Gazette Number 5798);

8. Government Regulation Number...

- 8. Government Regulation Number 26 of 2008 concerning the National Spatial Planning (State Gazette of the Republic of Indonesia Year 2008 Number 48, Supplement to the State Gazette Number 4833), as amended by Government Regulation Number 13 of 2017 concerning Amendments to Government Regulation Number 26 of 2008 on the National Spatial Planning (State Gazette of the Republic of Indonesia Year 2017 Number 77, Supplement to the State Gazette Number 6042);
- 9. Riau Provincial Regulation Number 14 of 2024 concerning the Regional Medium-Term Development Plan of Riau Province for 2025–2045 (Riau Provincial Gazette Number 14 of 2024).

DECIDE

Stipulate	: DECREE OF THE GOVERNOR OF RIAU CONCERNING THE ESTABLISHMENT OF THE COORDINATION BODY FOR THE MANAGEMENT OF THE GIAM SIAK KECIL–BUKIT BATU BIOSPHERE RESERVE
FIRST	: Establishing the Coordination Body for the Management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve with the membership structure as outlined in Annex I of this Governor’s Decree.
SECOND	: The Coordination Body as referred to in Decree first dictum is tasked with realizing the synergy in the management of the Giam Siak Kecil–Bukit Batu Biosphere Reserve in accordance with the duties, functions, and authorities of all government institutions and stakeholders, through coordination and communication, as well as the distribution of roles and responsibilities in implementing the management plan for the Giam Siak Kecil–Bukit Batu Biosphere Reserve, which includes core, buffer, and transition zones, comprising natural landscape conservation and cultivated areas.
THIRD	: The details of the duties of the Coordination Body, as referred to in the second dictum, are outlined in Annex II of this Governor’s Decree.
FOURTH	: The Coordination Agency, as referred to in the first dictum, has the function of: 1. Develop an integrated management plan for the Giam Siak Kecil–Bukit Batu Biosphere Reserve; 2. Formulating coordination and communication mechanisms in the implementation of the management plan of the Giam Siak Kecil - Bukit Batu Biosphere Reserve 3. Coordinating and communicating among stakeholders in the implementation of the management plan of the Giam Siak Kecil - Bukit Batu Biosphere Reserve; 4. Initiating mediation and advocacy regarding differences in interests in the implementation of the management plan of the Giam Siak Kecil - Bukit Batu Biosphere Reserve; 5. Communicating various similar forums/institutions with the World Biosphere Reserve forums/institutions – MAB UNESCO;

6. Preparing...

6. Preparing periodic reports for the Governor of Riau, with copies submitted to the Regents of Bengkalis and Siak.
- FIFTH : In carrying out its duties, the Coordination Agency, as referred to in the first dictum, is responsible to the Governor of Riau.
- SIXTH : All costs incurred as a result of the enactment of this Governor's Decree shall be charged to the Regional Revenue and Expenditure Budget of Riau Province and other legitimate and non-binding sources.
- SEVENTH Upon the entry into force of this Governor's Decree, Governor Decree Number Kpts. 7/1/2017 concerning the Coordination Body for the Management of the Giam Siak Kecil-Bukit Batu Biosphere Reserve is revoked and declared no longer valid.
- EIGHT : This Governor's Decree shall come into effect on the date it is enacted.

Signed in : Pekanbaru
On the date :

GOVERNOR OF RIAU

ABDUL WAHID

Copies forwarded to the Honorable:

1. Minister of Forestry in Jakarta;
2. Head of National Research and Innovation Agency in Jakarta.
3. Head of National Committee of Man and Biosphere UNESCO in Jakarta

ANNEX I GOVERNOR’S DECREE
Number : Kpts.
Date :

**Membership Structure of
the Coordination Agency for the Management of the Giam Siak Kecil - Bukit Batu
Biosphere Reserve**

No.	NAME/POSITION	INSTITUTION	POSITION IN TEAM
1	2	3	4
1.	Governor of Riau	Provincial Government of Riau	Chair of Steering Committee
2.	Regent of Siak	District Government of Siak	Vice Chair of Steering Committee
3.	Regent of Bengkalis	District Government of Bengkalis	Vice Chair of Steering Committee
4.	Secretary of Riau Province	Provincial Government of Riau	Vice Chair of Steering Committee
5.	Head of BAPPEDA of Riau Province	BAPPEDA of Riau Province	Chair of Organizing Committee
6.	Head of BBKSDA of Riau	Head of the Riau Natural Resources Conservation Center	Vice Chair of Organizing Committee
7.	Head of BAPPEDA of Siak Regency	BAPPEDA of Siak Regency	Vice Chair of Organizing Committee
8.	Head of BAPPEDA of Bengkalis Regency	BAPPEDA of Bengkalis Regency	Vice Chair of Organizing Committee
9	Secretary of BAPPEDA of Riau Province	BAPPEDA of Riau Province	Secretary
10	Secretary of BAPPEDA of Siak Regency	BAPPEDA of Siak Regency	Vice Secretary I
11	Secretary of BAPPEDA of Bengkalis Regency	BAPPEDA of Bengkalis Regency	Vice Secretary II
12.	Director of PT. Arara Abadi	PT. Arara Abadi	Member
13.	Assistant for Economic Affairs and Development	Secretariat of Riau Province	Member
14.	Advisor for Economic Affairs and Development	Secretariat of Riau Province	Member
15.	Head of the Environmental and Forestry Office of Riau Province	Environmental and Forestry Office of Riau Province	Member
16.	Head of the Food Crops, Horticulture, and Plantation Office of Riau Province	Food Crops, Horticulture, and Plantation Office of Riau Province	Member
17.	Head of the Marine and Fisheries Office of Riau Province	Marine and Fisheries Office of Riau Province	Member
18.	Head of the Village Community Empowerment Office of Riau Province	Village Community Empowerment Office of Riau Province	Member
19	Head of the Tourism Office of Riau Province	Tourism Office of Riau Province	Member

No.	NAME/POSITION	INSTITUTION	POSITION IN TEAM
20	Head of the Tourism Office of Siak Regency	Tourism Office of Siak Regency	Member
21	Head of the Tourism Office of Bengkalis Regency	Tourism Office of Bengkalis Regency	Member
22.	Head of the Livestock and Animal Health Office of Riau Province	Livestock and Animal Health Office of Riau Province	Member
23	Head of the Public Works and Spatial Planning Office of Riau Province	Public Works and Spatial Planning Office of Riau Province	Member
24.	Head of the Trade, Cooperatives, and SMEs Office of Riau Province	Trade, Cooperatives, and SMEs Office of Riau Province	Member
25.	Head of the Research and Development Agency of Riau Province.	Research and Development Agency of Riau Province.	Member
26.	Chairperson of the National Committee for Man and the Biosphere (MAB) UNESCO Indonesia - BRIN	Chairperson of the National Committee for Man and the Biosphere (MAB) Indonesia - BRIN UNESCO	Member
27.	Rector of University of Riau	University of Riau	Member
28.	Director of Sustainability and Stakeholders Engagement	Asia Pulp and Paper, Sinar Mas	Member
SECRETARIAT			
29.	Head of the Division for Economic Affairs and Natural Resources	BAPPEDA of Riau Province	Coordinator
30.	Head of Technical Division	Riau Natural Resources Conservation Center	Vice Coordinator
31.	Head of the Sub-Division for Environment and Forestry, Tourism, and Energy & Mineral Resources	BAPPEDA of Riau Province	Secretary
32.	Staff of the Sub-Division for Environment and Forestry, Tourism, and Energy & Mineral Resources	BAPPEDA of Riau Province	Member
I. CORE AREA MANAGEMENT DIVISION: CONSERVATION, EDUCATION, AND RESEARCH			
33.	Head of the Riau Natural Resources Conservation Center	Riau Natural Resources Conservation Center	Coordinator
34.	Director of Sustainability and Stakeholder Engagement Asia Pulp and Paper Sinar Mas	Asia Pulp and Paper Sinar Mas	Vice Coordinator
35.	Head of Technical Division	Riau Natural Resources Conservation Center	Secretary
36.	Head of the Environmental and Forestry Office of Riau Province	Environmental and Forestry Office of Riau Province	Member
37.	Head of the Environmental Office of Siak Regency	Environmental Office of Siak Regency	Member
38.	Head of the Environmental Office of Bengkalis Regency	Environmental Office of Bengkalis Regency	Member

No.	NAME/POSITION	INSTITUTION	POSITION IN TEAM
39.	Head of the Center for Environmental Studies (PSLH), University of Riau	Center for Environmental Studies (PSLH) University of Riau	Member
40.	Head of the Center for Biological Research - BRIN	Center for Biological Research - BRIN	Member
41.	Dean of the Faculty of Mathematics and Natural Sciences, University of Riau	University of Riau	Member
42.	Executive Director of the National Committee for the UNESCO Man and the Biosphere (MAB) Program Indonesia - BRIN	National Committee for the UNESCO Man and the Biosphere (MAB) Program Indonesia - BRIN	Member
43.	Head of Landscape Conservation Department Sustainability and Stakeholder Engagement Division, Asia Pulp and Paper Sinar Mas	Asia Pulp and Paper Sinar Mas	Member
44.	Chairman of Belantara Foundation	Belantara Foundation	Member
45.	Chairman of the Riau Community Forestry Communication Forum (FKKM).	Riau Community Forestry Communication Forum (FKKM).	Member
46.	Chairperson of the Forum Masyarakat Gambut Riau (FMGR)	Forum Masyarakat Gambut Riau (FMGR)	Member
47.	Chairman of Forum HarimauKita	Forum HarimauKita	Member
II. BUFFER ZONE MANAGEMENT DIVISION: SUSTAINABLE AND ENVIRONMENTALLY FRIENDLY DEVELOPMENT			
48.	Head of the Environmental and Forestry Office of Riau Province	Environmental and Forestry Office of Riau Province	Chair
49.	Director of Sustainability and Stakeholders Engagement, APP	APP Sinar Mas	Vice Chair
50.	Secretary of Environmental and Forestry Office of Riau Province	Environmental and Forestry Office of Riau Province	Secretary
51.	General Manager Public Affair, Sinar Mas Group	Sinar Mas Group	Vice Secretary
52.	Head of the Tourism Office of Riau Province	Tourism Office of Riau Province	Member
53.	Head of the Tourism Office of Siak Regency	Tourism Office of Siak Regency	Member
54.	Head of the Tourism Office of Bengkalis Regency	Tourism Office of Bengkalis Regency	Member
55.	Head of the Environmental and Forestry Planning Division	BAPPEDA of Riau Province	Member
56.	Head of the Environmental and Forestry Planning Division	BAPPEDA of Siak Regency	Member
57.	Head of the Fisheries Office of Riau Province	Fisheries Office of Riau Province	Member

No.	NAME/POSITION	INSTITUTION	POSITION IN TEAM
58.	Head of the Food Crops, Horticulture, and Plantation Office of Riau Province	Food Crops, Horticulture, and Plantation Office of Riau Province	Member
59.	Head of Study Center	Universitas Riau	Member
60.	Dean of the Faculty of Forestry, Universitas Lancang Kuning	Universitas Lancang Kuning, Riau	Member
III. ECONOMIC DEVELOPMENT AND COMMUNITY EMPOWERMENT DIVISION			
61.	Head of the Community Empowerment and Village Development Agency of Riau Province	Community Empowerment and Village Development Agency of Riau Province	Chair
62.	Head of the Community Empowerment and Village Development Agency of Siak Regency	Community Empowerment and Village Development Agency of Siak Regency	Vice Chair
63.	Head of the Community Empowerment and Village Development Agency of Bengkalis Regency	Community Empowerment and Village Development Agency of Bengkalis Regency	Vice Chair
64.	Secretary of Community Empowerment and Village Development Agency of Riau Province	Badan Pemberdayaan Masyarakat dan Pembangunan Desa Provinsi Riau	Secretary
65.	Head of the Food Crops, Horticulture, and Plantation Office of Riau Province	Food Crops, Horticulture, and Plantation Office of Riau Province	Member
66.	Head of the Agriculture Office of Bengkalis Regency	Agriculture Office of Bengkalis Regency	Member
67.	Head of the Agriculture Office of Siak Regency	Agriculture Office of Siak Regency	Member
68.	Head of the Plantation Office of Bengkalis Regency	Plantation Office of Bengkalis Regency	Member
69.	Head of the Plantation Office of Siak Regency	Plantation Office of Siak Regency	Member
70.	Head of the Tourism Office of Riau Province	Tourism Office of Riau Province	Member
71.	Head of the Tourism Office of Siak Regency	Tourism Office of Siak Regency	Member
72.	Head of the Tourism Office of Bengkalis Regency	Tourism Office of Bengkalis Regency	Member
73.	Head of the Fisheries and Livestock Office of Siak Regency	Fisheries and Livestock Office of Siak Regency	Member
74.	Head of the Fisheries and Livestock Office of Bengkalis Regency	Fisheries and Livestock Office of Bengkalis Regency	Member
75.	Head of the Public Works and Spatial Planning Office (PUPR) of Riau Province	Public Works and Spatial Planning Office (PUPR) of Riau Province	Member
76.	Head of the Public Works and Spatial Planning Office (PUPR) of	Public Works and Spatial Planning Office (PUPR) of	Member

No.	NAME/POSITION	INSTITUTION	POSITION IN TEAM
	Bengkalis Regency	Bengkalis Regency	
77.	Head of the Public Works and Spatial Planning Office (PUPR) of Siak Regency	Public Works and Spatial Planning Office (PUPR) of Siak Regency	Member
78.	Head of the Industry and Trade Office of Riau Province	Industry and Trade Office of Riau Province	Member
79.	Head of Research Center, Universitas Riau	Universitas Riau	Member
80.	Head of Research Center, Universitas Islam Riau	Universitas Islam Riau	Member
81.	Head of Research Center, Universitas Lancang Kuning	Universitas Lancang Kuning	Member
82.	Director of PT Riau Andalan Pulp and Paper (RAPP)	PT Riau Andalan Pulp and Paper (RAPP)	Member
83.	Director PT..... (oil palm plantation)	PT	Member
84.	Chairman of Yayasan Belantara	Yayasan Belantara	Member
85.	Chairman of Forum Komunikasi Kehutanan Masyarakat (FKKM) Riau	Forum Komunikasi Kehutanan Masyarakat (FKKM) Riau	Member
86.	Chairman of Forum Masyarakat Gambut Riau (FMGR)	Forum Masyarakat Gambut Riau (FMGR)	Member

GOVERNOR OF RIAU

ABDUL WAHID

ANNEX II GOVERNOR'S DECREE

Number : Kpts.

Date :

Description of Duties

Coordination Body Management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve

I. CHAIRMAN

1. Providing general guidance on the sustainable management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve in synergy with the spatial planning policies of the Regency and Province
2. Building a shared understanding of the vision, mission, and objectives of the management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.
3. Integrating the activities of various parties within the Biosphere Reserve area in accordance with the management concept of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.
4. Developing plans and priorities for the management of the Biosphere Reserve in a synergistic and environmentally conscious manner.
5. Approving the plans and priorities for the management activities of the Biosphere Reserve in a synergistic manner, along with guidelines for best management practices in land use activities.
6. Providing solutions to differences in interests and land use disputes.

II. VICE CHAIRMAN

Assisting the Chair in formulating general policies, coordinating activities, and preparing reports on the management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.

III. SECRETARY OF THE BODY

1. Assisting the Chair and Divisions in secretarial duties.
2. Acting as the organization's treasurer, including managing funds generated by the organization (such as fundraising, environmental service utilization, and CSR contributions).
3. Preparing materials to ensure the smooth execution of the Coordination Agency's tasks for the management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.
4. Facilitating the implementation of the work schedule for the Coordination Agency's activities.
5. Compiling periodic reports on the results of activities from each division and submitting them to the Governor, including financial reports.
6. Preparing, developing, and disseminating information related to biosphere reserve management.
7. Receiving input from other stakeholders for the Coordination Agency for the Management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.

IV. VICE OF SECRETARY OF THE BODY

Assisting the duties and functions of the Secretary of the Coordination Agency for the Management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.

V. MEMBER

1. Developing plans and priorities for the management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve in a synergistic and environmentally conscious manner.
2. Designing programs in alignment with the vision, mission, and administrative objectives of the biosphere reserve management.
3. Integrating various activities and programs within the Giam Siak Kecil - Bukit Batu Biosphere Reserve area.
4. Providing solutions to differences in interests and land use disputes in the context of biosphere reserve management and development.

5. Formulating financial plans for the management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.

VI. SECRETARIAT

Preparing and facilitating the administration of the Management Agency's activities in carrying out its duties for the management of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.

VII. CORE AREA MANAGEMENT DIVISION: CONSERVATION, EDUCATION, AND RESEARCH.

1. Formulating various policies for the implementation of conservation, education, and research programs both within and outside the conservation area.
2. Coordinating with relevant agencies and other divisions within the Coordination and Communication Agency in the preparation of plans.
3. Coordinating conservation activities (including rehabilitation and restoration of degraded areas/land) outside the conservation area.
4. Integrating and aligning ecosystem, species, and genetic conservation programs in the Giam Siak Kecil – Bukit Batu Biosphere Reserve with the development plans of the Riau Provincial Government, Bengkalis Regency, and Siak Regency.
5. Adjusting biosphere reserve program plans with the Spatial and Regional Planning of Riau Province, Bengkalis Regency, and Siak Regency.
6. Developing guidelines and oversight mechanisms, including reporting, evaluation, and monitoring of Community Empowerment and Sustainable Development Programs that are environmentally friendly and supported by conservation, education, and training activities.
7. Preparing proposals for the implementation of conservation, education, and research programs.

VIII. BUFFER ZONE MANAGEMENT DIVISION: SUSTAINABLE AND ENVIRONMENTALLY FRIENDLY DEVELOPMENT

1. Formulating various policies and programs for the implementation of sustainable and environmentally friendly development.
2. Providing input to the Chair and other divisions within the Coordination and Communication Forum in the formulation of sustainable and environmentally friendly development policies.
3. Developing best management practice guidelines for land use.
4. Coordinating with relevant agencies regarding sustainable and environmentally friendly development programs.
5. Identifying and analyzing issues arising in the implementation of sustainable and environmentally friendly development and proposing alternative solutions.
6. Preparing periodic reports, evaluations, and monitoring of sustainable and environmentally friendly development programs.
7. Drafting proposals for the implementation of sustainable and environmentally friendly development programs as a basis for planning within each institution.

IX. ECONOMIC DEVELOPMENT AND COMMUNITY EMPOWERMENT DIVISION

1. Formulating various policies and programs for community empowerment implementation.
2. Coordinating the planning and execution of social and economic development activities, including the utilization of environmental services and Corporate Social Responsibility (CSR) initiatives.
3. Providing input to the Chair and other divisions within the Coordination and Communication Agency in the formulation of community empowerment policies.
4. Coordinating with relevant agencies regarding community empowerment programs within the Giam Siak Kecil - Bukit Batu Biosphere Reserve.

5. Identifying and analyzing issues arising in community empowerment implementation and proposing alternative solutions.
6. Preparing periodic reports, evaluations, and monitoring of community empowerment programs.
7. Drafting proposals for community empowerment program implementation as a basis for planning within each institution.

X. SCIENTIFIC ASSEMBLY

1. Providing strategic and tactical considerations on the implementation of the management concept for the Giam Siak Kecil - Bukit Batu Biosphere Reserve.
2. Offering evaluative assessments and monitoring of the development implementation of the Giam Siak Kecil - Bukit Batu Biosphere Reserve.

GOVERNOR OF RIAU

ABDUL WAHID

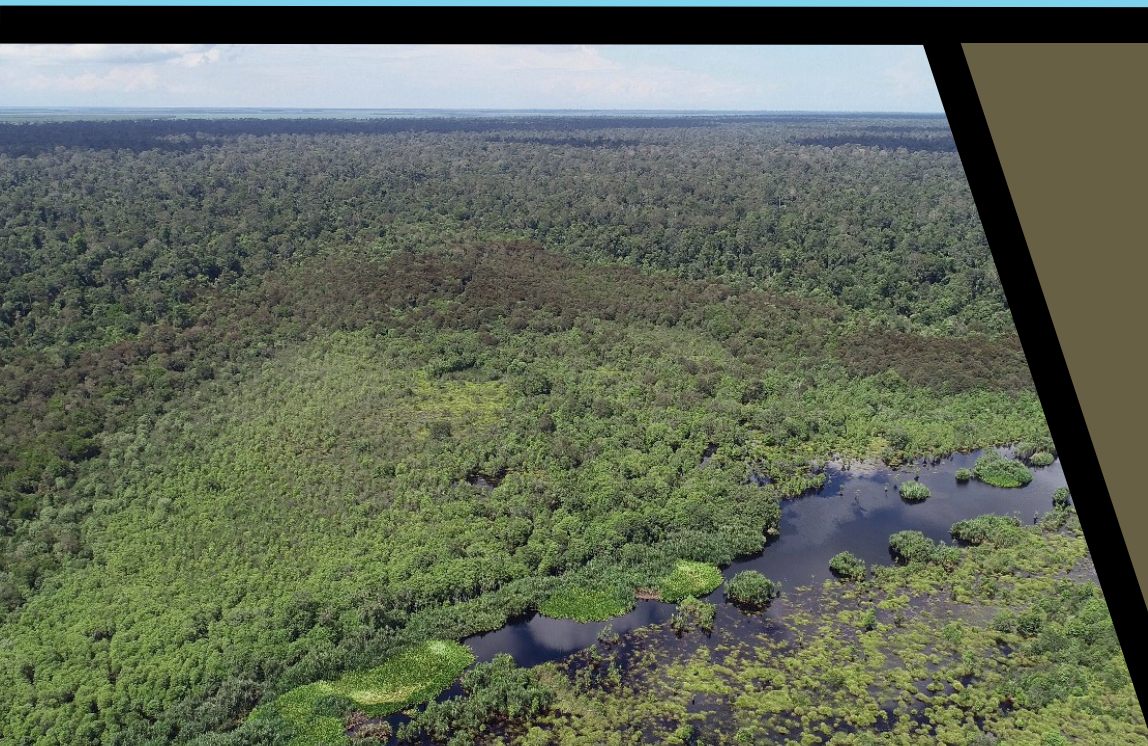


PROTOCOLS ON BIOSPHERE RESERVE MANAGEMENT OPERATIONS

By:
PMU ITTO PD 712/13

**MINISTRY OF ENVIRONMENT AND FORESTRY
INTERNATIONAL TROPICAL TIMBER ORGANIZATION (ITTO)
COLLABORATION FOR ITTO PD 712/13 REV.3 (F)**

Activity 2.3 To formulate and adopt protocols on biosphere
management operations





KEMENTERIAN LINGKUNGAN HIDUP DAN KEHUTANAN
BADAN STANDARDISASI INSTRUMEN LINGKUNGAN HIDUP DAN KEHUTANAN
JAKARTA - BOGOR

SERTIFIKAT LAYAK UJI TERAP STANDAR KHUSUS (SALTRA)

Nomor : 167 /SALTRA/PHB/10/2024

Berdasarkan Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor 15 Tahun 2021 tentang Organisasi dan Tata Kerja Kementerian Lingkungan Hidup dan Kehutanan pasal 608 ayat b, dan Keputusan Menteri Lingkungan Hidup dan Kehutanan Nomor 163 Tahun 2024 tentang Pedoman Tata Kelola Standar Khusus Alur Kerja, Output, dan Kinerja Lingkungan Hidup dan Kehutanan, bahwa terhadap standar perlu dilakukan uji terap setelah melalui proses pendalaman substansial dan proses penelaahan kematangan standar serta memiliki elemen penilaian kesesuaian standar. Untuk tertib administrasi pelaksanaan uji penerapan standar, maka Kepala Badan Standardisasi Instrumen Lingkungan Hidup dan Kehutanan menyatakan bahwa:

- Judul Standar : Standar Pengelolaan dan Pemantauan Lingkungan Hidup sebagai Upaya Mitigasi Dampak Kegiatan Pengelolaan pada Lanskap Cagar Biosfer
- Kegiatan/Sektor : Kehutanan
- Ruang Lingkup Kegiatan : Mitigasi dampak kegiatan pengelolaan lanskap cagar biosfer, meliputi area inti, area penyangga, dan area transisi
- Penanaman Standar pada Instrumen Wajib : -
- Kode KBLI : -
- Tingkat Risiko Usaha : -
- Jenis Standar : Standar Khusus non Persetujuan Lingkungan
- Dokumen lengkap : Lampiran 1 sebagai bagian tidak terpisahkan dari Sertifikat Layak Uji Terap

TELAH LAYAK
UNTUK DILAKUKAN UJI PENERAPAN STANDAR

Hasil uji terap standar agar digunakan sebagai bahan rekomendasi tindakan korektif dan identifikasi kebutuhan prakondisi/kondisi pemungkin (*enabling condition*) untuk selanjutnya sebagai bahan pertimbangan dalam penetapan standar khusus oleh Menteri Lingkungan Hidup dan Kehutanan.

Demikian untuk digunakan sebagaimana mestinya.

Diterbitkan di : Jakarta
Pada tanggal : 18 Oktober 2024

KEPALA BADAN,



Ir. Ary Sudijanto, MSE
NIP. 19681011 199403 1 001

**AGENCY FOR STANDARDIZATION OF ENVIRONMENT AND
FORESTRY INSTRUMENTS
MINISTRY OF ENVIRONMENT AND FORESTRY**



STANDARD TITLE:
ENVIRONMENTAL MANAGEMENT AND
MONITORING AS A MITIGATION EFFORT TO
THE IMPACT OF MANAGEMENT ACTIVITIES
ON BIOSPHERE RESERVE LANDSCAPES

Summary
STANDARD OF ENVIRONMENTAL MANAGEMENT AND MONITORING
AS A MITIGATION EFFORT TO THE IMPACT OF MANAGEMENT ACTIVITIES
ON BIOSPHERE RESERVE LANDSCAPES

This special standard is a newly developed standard designed to support mitigation efforts in addressing environmental impacts caused by business activities conducted within Biosphere Reserve landscapes, based on the area's zoning and existing conditions.

The Biosphere Reserve Standard outlines the management activities conducted within the core area, buffer zone, and transition area of the Biosphere Reserve that may potentially impact the environment. This standard regulates 10 business/activity components and 15 impacts managed and monitored in three management zone areas: core, buffer, and transition. It includes management and monitoring methods to mitigate such impacts by stakeholders across the Biosphere Reserve landscape. Types of activities include research, non-timber forest product harvesting, introduction of plant species/taxonomy/dendrology, ecotourism operations, forest utilization business licensing operations, housing and settlement development, plantation operations, subsistence farming, freshwater aquaculture, and commercial enterprises.

This standard has been developed as an operational protocol for Biosphere Reserve management activities, guided by best practices and experiences in area management based on the zoning designation of Biosphere Reserves as defined by UNESCO. This special standard document is accompanied by a supporting document—namely a Conformity Assessment—which serves as a Standard Operating Procedure (SOP) for evaluating the appropriateness of standard implementation.

This standard was developed by the Secretariat of the Agency for Standardization of Environment and Forestry Instruments (ASEFI) of the Ministry of Environment and Forestry (MoEF), in collaboration with relevant stakeholders, through a factual drafting process conducted on 20 September 2023. It subsequently underwent a factual public consultation process on 23 February 2024, attended by representatives from the Indonesian National Committee for Man and the Biosphere—as the implementing body for the development and management of Biosphere Reserves in Indonesia—alongside the Directorate of Conservation Area Management under the Directorate General of Natural Resources and Ecosystem Conservation as the manager of conservation areas in Indonesia, the non-governmental organization Belantara Foundation, forest utilization business license holder APP Sinarmas Forestry Group, the Riau Provincial Natural Resources Conservation Agency, the Riau Provincial Development Planning Agency, and experts in sustainable forest management.

The Biosphere Reserve Standard (operational protocol) has obtained a certificate of feasibility for pilot implementation number: 167/SALTRA/PHB/10/2024, endorsed by the Head of the Agency for Standardization of Environment and Forestry Instruments. Based on this certificate, the standard has been implemented across eight pilot entities representing various ecosystem typologies, including lower and upper montane forests, peatlands and freshwater swamps, savannas, coastal forests, and mangroves. These eight entities are distributed across three Biosphere Reserve landscapes: the Merapi-Merbabu-Menoreh Biosphere Reserve in Central Java Province and the Cibodas Biosphere Reserve in West Java Province (representing lower and upper montane ecosystem typologies), as well as the Blambangan Biosphere Reserve in East Java Province (representing 15 sub-ecosystem typologies).

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Preface

This special standard is a new standard to support the mitigation of the impact of sustainable Biosphere Reserve landscape management activities based on area zoning and its existing conditions. With the implementation of this special standard, it is hoped that the management parties of the Biosphere Reserve can implement effective environmental management and monitoring as an effort to mitigate the impact of management activities on the landscape of the biosphere reserve.

This standard is prepared based on best practices and experience in area management, as determined by the Biosphere Reserve zoning area established by UNESCO, encompassing core areas, buffer areas, and transition areas.

This Special Standard was prepared by the Secretariat of ASEFI – ITTO Project PD 712/13 Rev.3 (F) together with relevant stakeholders in person on 20 September 2023 and has gone through a factual public consultation process on 23 February 2024, which was attended by representatives from the National Committee on Man and Biosphere Indonesia as the implementer of the development and advancement of Biosphere Reserves in Indonesia, the Directorate of Conservation Area Management – the Directorate General of Conservation of Natural Resources and Ecosystems as the manager of conservation areas in Indonesia, the Non-Governmental Organization Yayasan Belantara, the permit holder for the business approval of forest utilization APP Sinarmas Forestry Group, the Riau Province Natural Resources Conservation Center, the Regional Development Planning and Development Research Agency Riau, as well as experts in sustainable forest management.

It is worth noting that there are possibilities that some elements of this standard document may be patents. Ministry of Environment and Forestry, c.q. The Secretariat of Agency for Standardization of Environment and Forestry Instruments is not responsible for identifying any existing patents.

Introduction

The Government of Indonesia is committed to maintaining and protecting ecosystems and biodiversity richness in forests and waters, 568 (five hundred and sixty-eight) conservation area units covering an area of $\pm$ 27.4 million hectares of forest area as conservation forests managed by the Ministry of Environment and Forestry. The conservation area does not only play a role as a representative of the ecosystem or habitat for flora and fauna, more than that this area can be a source of water/spring water for the residents of the community around the area, the source of life of the community in the form of non-timber forest products, as a function of protecting water system management, flood prevention, landslides and erosion, as part of the culture and customs of the local community, provides raw materials for medicines and germplasm diversity that can produce superior species in the future, which are more productive and resistant to pests and diseases. In addition, conservation areas are also intended to be able to be used and enjoyed for the existence of aesthetic value and other environmental services.

A Biosphere Reserve is an area covering various types of ecosystems determined by the MAB-UNESCO program to promote biodiversity conservation and sustainable development, supported by the study of science and technology. According to law number 32 of 2024 an amendment to law number 5 of 1990 concerning the conservation of biological natural resources and their ecosystems, the Biosphere Reserve is an integrated area that harmonizes the interests of the conservation of biological natural resources and their ecosystems in social, economic, and scientific and technological development whose existence is recognized at the international level. The Biosphere Reserve is managed by an area zoning system, covering the core area. Core areas and buffer areas can be in the form of nature reserves (strict nature reserves and wildlife reserves), nature conservation areas (national parks, forest parks, and nature tourism parks as well as permanent production forests). Transition areas are in the form of other use areas, limited production forests and convertible production forests, plantation cultivation rights title, housing and settlements, and agriculture.

For effective management, the Biosphere Reserve area must have a clear boundary, but that does not mean it has to be in the form of a boundary fence. The boundaries between areas within the Biosphere Reserve are ecosystem and landscape boundaries, not administrative boundaries of the government. The area of each area depends on the local biogeographical conditions, in addition to considering the complexity and strength of economic-social-environmental interactions and their impacts that are able to be managed by the management of the Biosphere Reserve. The management of the Biosphere Reserve should emphasize the mutual influence between the buffer area and the transition area with the core area. Similarly, the relationship between the Biosphere Reserve as a whole and the area outside it.

The concept of the Biosphere Reserve aims to be an effort to manage biological natural resource conservation areas and their ecosystems, sustainable development areas, and "*logistic support*" functions, namely research, education, monitoring, and evaluation. The concept of a Biosphere Reserve requires the integration of programs and activities accompanied by a strong commitment from the parties so that the goals of managing the Biosphere Reserve can be realized. These objectives include: (1) conserving biodiversity, restoring ecosystems and improving ecosystem services as well as accelerating the achievement of sustainable development, (2) contributing to sustainable development programs, health and economic justice for communities and building decent settlements, (3) facilitating education and scientific development related to the sustainable use of biological natural resources and their ecosystems to achieve sustainable development, sustainable

economic development, and (4) supporting the mitigation and adaptation of climate change and other aspects globally to environmental change.

Currently, in Indonesia, there are 20 (twenty) Conservation Areas with Biosphere Reserve status, including the following:

1. Cibodas Biosphere Reserve;
2. Komodo Biosphere Reserve;
3. Tanjung Puting Biosphere Reserve;
4. Lore Lindu Biosphere Reserve;
5. Siberut Biosphere Reserve;
6. Gunung Leuser Biosphere Reserve;
7. Giam Siak Kecil Bukit Batu Biosphere Reserve;
8. Wakatobi Biosphere Reserve;
9. Bromo Tengger Semeru-Arjuno Biosphere Reserve;
10. Takabonerate – Kepulauan Selayar Biosphere Reserve;
11. Belambangan Biosphere Reserve;
12. Betung Kerihun Danau Sentarum – Kapuas Hulu Biosphere Reserve;
13. Berbak – Sembilang Biosphere Reserve;
14. Rinjani – Lombok Biosphere Reserve;
15. Togean Tojo Una Biosphere Reserve;
16. Saleh Moyo Tambora "Samota" Biosphere Reserve;
17. Bunaken Tangkoko Minahasa Biosphere Reserve;
18. Karimunjawa Jepara Muria Biosphere Reserve;
19. Merapi Merbabu Menoreh Biosphere Reserve;
20. Bantimurung Bulusaraung Ma'rupannes Biosphere Reserve.

Environmental Management and Monitoring as a Mitigation Effort to the Impact of Activities Carried Out in the Biosphere Reserve Area

1 Scope

This special standard for environmental impact management and monitoring is intended as an effort to mitigate the impact of management activities carried out on the Biosphere Reserve landscape, including core areas, buffer areas, and transition areas. This special standard describes the management activities contained in the core areas, buffer areas, and transition areas of the Biosphere Reserve that have the potential to have an impact on the environment, along with the management and impact monitoring methods. The scope of this standard content includes management activities that have the potential to cause negative effects on the environment, including management and monitoring methods to mitigate these impacts by stakeholders on the landscape of the Biosphere Reserve.

This special standard is beneficial as a standard for the activities of sustainable Biosphere Reserve landscape management that have impacts on the area zoning-based environment, and the existing conditions of management activities to increase its benefits and preservation of the Biosphere Reserve landscape based on the applicable laws and regulations for all stakeholders of the Biosphere Reserve landscape.

2 Normative Reference

Law Number 32 of 2024 amends the 1990 Law concerning the Conservation of Biological Natural Resources and the Ecosystems.

Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Management;

Regulation of the Minister of Environment Number 7 of 2006 concerning Procedures for Measuring Standard Criteria for Soil Degradation for Biomass Production;

Regulation of the Minister of Forestry No. P.48/MENHUT-II/2014 concerning Procedures for the Implementation of Ecosystem Restoration in Nature Reserves and Nature Conservation Areas;

Regulation of the Minister of Environment and Forestry Number P.15/MENLHK/SETJEN/KUM.1/2/2017 concerning Procedures for Measuring Groundwater Level at Peat Ecosystem Compliance Points;

Regulation of the Minister of Environment and Forestry Number P.2/MENLHK/SETJEN/KUM.1/1/2018 concerning Access to Genetic Resources of Wild Species and Benefit Sharing for Its Utilization;

Regulation of the Minister of Environment and Forestry Number 11 of 2021 concerning Quality Standards for Internal Combustion Engine Emissions;

Instruction of the Minister of Environment and Forestry Number INS.1/MENLHK/SETJEN/KUM.1/6/2022 concerning the Protection of Wildlife from Entanglement and Illegal Hunting Inside and Outside of Forest Areas;

Regulation of the Director General of Natural Resources and Ecosystem Conservation Number: P.7/IV-SET/2011 concerning Procedures for Entering Nature Reserves, Nature Conservation, and Hunting Parks;

SNI 6989.27. Water and wastewater – Part 27: How to test Total Dissolved Solids (TDS) by gravimetry;

SNI 6989.3. Water and wastewater – Part 3: How to test Total Suspended Solids (TSS) by gravimetry;

SNI 6989.72. Water and wastewater – Section 72: *Biochemical Oxygen Demand* (BOD) test methods;

SNI 6989.73. Water and wastewater – Section 73: Chemical Oxygen Demand (COD) test with titrimetric closed reflux;

SNI 19-7119.6. Ambient air – Part 6: Determination of sampling locations for ambient air quality monitoring tests;

SNI 7119.14. Ambient air – Part 14: How to test particles with a size of $\leq 2.5 \mu\text{m}$ (PM 2.5) using a High-Volume Air Sampler (HVAS) equipment with gravimetric method;

SNI 7119.15. Ambient air – Part 15: How to test particles with a size of $\leq 10 \mu\text{m}$ (PM 10) using a High-Volume Air Sampler (HVAS) equipment with the gravimetric method.

3 Terms and definitions

3.1

core area of the Biosphere Reserve

it is a protected area for biodiversity conservation, monitoring of disturbed ecosystems, and non-destructive research, as well as other low-impact activities, such as education

3.2

buffer area of the Biosphere Reserve

it is usually an area that surrounds or is adjacent to the core area and is used for cooperative activities that are not ecologically contradictory, including environmental education, recreation, ecotourism, and research

3.3

transition/transition area of the Biosphere Reserve

areas that are important for the achievement of sustainable development, which may include agricultural activities, settlements, and other uses, and where local communities, management agencies, scientists, non-governmental organizations, and other stakeholders work together to manage and utilize resources sustainably

3.4

freshwater fisheries

activities to increase the productivity of waters, especially freshwater fish. This activity is carried out by raising fish to reproduce, grow, and enhance the quality of aquatic biota, thereby generating profits

3.5

biosphere reserve

an area consisting of native ecosystems, unique ecosystems, and/or degraded ecosystems whose entire natural elements are protected and preserved for research and educational purposes

3.6

environmental impact

the influence of changes in the environment that are very basic as a result of a business and/or activity

3.7

non-timber forest products (NTFP)

biological forest products other than wood, both vegetable and animal, along with derivative products and cultivation derived from State Forests, including rattan, honey, sap, fruits, seeds, mushrooms, leaves, flowers, swallow's nests, and/or other non-timber forest products

3.8

conservation areas

areas that are designated as nature reserves and nature conservation areas

3.9

impact mitigation

regulation of the impact control of the Business and/or Activities on the Environment

3.10

nature tourism

everything related to natural tourism, including businesses that utilize objects and attractions, as well as businesses related to natural tourism

3.11

forest utilization business license holder

business licenses granted to business actors to start and run businesses and/or forest utilization activities

3.12

collection of non-timber forest products

activities to take non-timber forest products

3.13

research

a scientific activity carried out according to systematic rules and methods to obtain information, data, and information for the benefit of Biosphere Reserve Conservation, science, and Biosphere Reserve Development

3.14

introduction of plant species/taxonomy/dendrology

part of plant taxonomy, which is the science that studies the tracing, sample storage, description, identification (identification), and grouping (classification) of plants

3.15

forest utilization business licensing

business licenses given to business actors to start and run businesses and/or forest utilization activities

3.16**plantation**

all activities in the management of natural resources, human resources, production facilities, tools and machinery, cultivation, harvesting, processing, and marketing related to plantation crops

3.17**settlements**

part of the residential environment consisting of more than one housing unit that has infrastructure, facilities, public utilities, and has support for other functional activities in urban areas or rural areas

3.18**subsistence farming**

an agricultural system in which farmers only grow enough for their own needs and those of their families

3.19**housing**

a collection of houses as part of settlements, both urban and rural, that are equipped with infrastructure, facilities, and public utilities as a result of efforts to fulfill livable houses

3.20**trading venture**

is a business whose activities are selling and buying goods or services to meet the needs of consumers, businesses, or the government to make profits, including being an intermediary in these activities

3.21**businesses and/or activities**

all forms of activities that can cause changes in the hue of the environment and have an impact on the environment

4 Description of business components and/or activities

Types of management activities in Biosphere Reserve areas that have the potential to have environmental impacts:

4.1 Research

Research activities can be carried out in all landscape areas of the Biosphere Reserve. Research activities that have no impact or low impact include:

1. Scientific and applied research activities, monitoring, training, and practical education in Biosphere Reserves, which are related to conservation and sustainable development issues at the local, national, and global levels, including biological natural resources and ecosystems, socio-cultural, socio-economic, and biological natural resource conservation.
2. Climate change adaptation and mitigation research, the use of biosphere reserves as laboratories, models, and learning sites for sustainable development.
3. Collaborative research projects. The results of the research are integrated into the management plan.

4.2 Introduction of plant species/taxonomy/dendrology

Introduction of plant species/taxonomy/dendrology is an activity conducted in the landscape of the Biosphere Reserve, which has the status of functions of all conservation forest areas, protected forests, and production forests. Introduction activities on plant species/taxonomy/dendrology are essential for identifying the names and types of plants to be researched. It is necessary to have practical information on species identification, especially from the local "flora" which is comprehensive.

The introduction of plant species emphasizes the traits or characteristics of generative (reproductive) characteristics based on the traits, anatomical structure, and morphology of flowers and fruits. In addition, it is also necessary to identify plant species based on the vegetative characteristics and life form of plants, such as the characteristic of the leaf structures, buds or stems (bark, sap, and wood), the shape of plant appearance whether in the form of trees, shrubs, or lianas. The process of identifying plant species uses the key of determination – comparing one plant with another previously known plant.

In identifying plant species, distinctive characteristics can be observed in the shape of the leaves. Because each tree has a different shape (*morfus*) of leaves from the others. These differences in leaf shape are unique to each species, genus, or plant family. The determination of tree species is mainly based on the characteristics of the leaves, for color, sap, smell, and other characteristics can be used in addition for identifying the types of trees that have these characteristics. Plant species/taxonomy/dendrology identification activities are non-destructive and have a low impact.

4.3 Collection of non-timber forest products

NTFP collection activities are carried out in the core area of the Biosphere Reserve in the form of: 1) the National Park utilization zone, 2) the traditional block of the Forest Park, 3) the utilization block, and the traditional block of the Nature Tourism Park. The collection of non-timber forest products is carried out to meet the needs of the construction of public facilities for local community groups and to meet the needs of individuals. The regulation of NTFP collection activities is guided by the Special Standards for Environment and Forestry Management of Business and/or Social Forestry Activities: Collection of Non-Timber Forest Products (Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number 1555 of 2024) and the UKL-UPL Form for Specific Standards for NTFP Collection Businesses and/or Activities.

The activities of non-timber forest products collection in protected forests follow the conditions:

1. non-timber forest products collected must be readily available naturally and/or resulted from rehabilitation;
2. does not harm the environment;
3. does not reduce, alter, or eliminate its main function; and
4. collect non-timber forest products according to the permitted amount, weight, or volume.

4.4. Natural tourism operations

Natural tourism operational activities are carried out in the buffer area and transition area of the Biosphere Reserve in the form of 1) utilization zones and traditional zones of National Parks, 2) utilization blocks of Wildlife Sanctuaries, 3) utilization blocks and traditional blocks of Forest Parks, 4) utilization blocks and traditional blocks of Nature Tourism Parks. Grouping the types and scales of natural tourism businesses and/or operational activities based on the Regulation of the Minister of Environment and Forestry Number 4 of 2021 concerning the List

of Businesses and/or Activities that Must Have an Analysis of Environmental Impacts, Environmental Management Efforts and Environmental Monitoring Efforts or the Statement of Environmental Management and Monitoring Ability and the Standard Classification of Indonesian Business Fields (*Klasifikasi Baku Lapangan Usaha Indonesia/KBLI*) 2020. The regulation of natural tourism operational activities guided by the Special Standards for Environment and Forestry Environmental Management for Social Forestry Businesses and/or Activities: Ecotourism (Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number 1608 of 2024) and the UKL-UPL Form for Specific Standards for Forestry Utilization Businesses and/or Activities Environmental Service Utilization Activities – Environmental Restoration (Decree of the Minister of Environment and Forestry of the Republic Indonesia Number 1548 of 2024).

4.5 Forest use business licensing operations

The Forest Utilization License (*Perizinan Berusaha Pemanfaatan Hutan/PBPH*) operational activities exist in the buffer area of the Biosphere Reserve in the functional status of the production forest area before the designation of the Biosphere Reserve. The regulation of PBPH's operational activities is guided by the Special Standards for Environment and Forestry, the UKL-UPL Form, Specific Standards for Forest Utilization Businesses and/or Activities, Area Utilization Activities in Production Forests (Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number 1460 of 2024) and the UKL-UPL Form for Specific Standards for Forestry Businesses and/or Activities for Forest Utilization of Area Utilization Activities - Protected Forests.

1. The PBPH activities in Protected Forests are carried out with Forestry Multi-Enterprises, including:
 - a. Area Utilization business;
 - b. Environmental services utilization business; and/or
 - c. Collection of NTFPs.
2. PBPH activities in Production Forests are carried out with Forestry Multi-Enterprises, including:
 - a. Area Utilization business;
 - b. Environmental services utilization business;
 - c. Timber Forest Products Utilization business;
 - d. NTFP Utilization Business;
 - e. Collection of Timber Forest Products; and/or
 - f. Collection of NTFPs.

4.6 Housing and settlements

Housing and settlements are located in the transition area of the Biosphere Reserve landscape in the status of permanent production forest land and convertible production forest, as well as other use areas (APL) whose management authority is by the Regional Government. The regulation of housing and settlement activities is guided by the Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number 1450 of 2024 concerning the Determination of Special Standards for Environment and Forestry Form UKL-UPL Specific Standards for Business and/or Activities on Prosperous Landed House Construction (*Rumah Tapak Sejahtera/RST*).

Housing and settlement waste management needs to be supported by adequate solid waste and domestic waste disposal infrastructure and facilities, including:

- a. garbage cans with waste sorting on a domestic or household scale;

- b. waste collection sites (*tempat pengumpulan sampah/TPS*) or TPS 3R (reduce, reuse, recycle) on an environmental scale;
- c. garbage carts and/or garbage trucks on an environmental scale; and
- d. integrated waste treatment plant (TPST) on an environmental scale.

4.7 Plantation operations

Plantation operational activities are carried out in the transition area of the Biosphere Reserve landscape in the status of permanent production forest land and convertible production forest, as well as other use areas (APL) whose management authority is by the Regional Government.

The types and licensing of plantation businesses consist of plantation crop cultivation businesses (pre-planting, planting, plant maintenance, harvesting, and sorting), plantation product processing business (processing where the raw material is mainly plantation products to obtain added value), and plantation service business (activities to support crop cultivation and/or plantation product processing business).

The regulation of oil palm plantation operational activities is guided by the Special Standards for Environment and Forestry, the Form for Environmental Management Efforts and Environmental Monitoring Efforts (*Upaya Pengelolaan Lingkungan Hidup - Upaya Pemantauan Lingkungan Hidup/UKL-UPL*), Specific Standards for Businesses and/or Activities of the Crude Palm Oil (CPO) Industry (Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number 1561 of 2024) and the KA-ANDAL Form for Specific Standards for Businesses and/or Activities of Oil Palm Plantations and the Oil Industry Crude Palm Oil (CPO).

4.8 Subsistence farming

Subsistence agriculture is carried out in the transition area of the Biosphere Reserve landscape in the status of permanent production forest land and convertible production forest, as well as areas for other land uses (*Areal Penggunaan Lain/APL*) whose management authority is by the Regional Government. Crops that can be grown in this type of agriculture are rice, non-staple food crops, and horticultural crops such as vegetables and fruits. The regulation of agricultural activities guided by the UKL-UPL Form of Specific Standards for Annual Vegetable Horticulture Cultivation Businesses and/or Agricultural Activities.

4.9 Freshwater Fisheries

Freshwater fisheries cultivation activities are carried out in the transition area of the Biosphere Reserve landscape which has the status of permanent production forest land and convertible production forest, as well as area for other land uses (APL) whose management authority is the Regional Government. The cultivation activities are maintenance activities to reproduce (reproduction activity), grow, and improve the quality of aquatic biota so that profits are obtained. In its implementation, it is necessary to pay attention to water quality management. For fish to grow well, the water used for aquaculture must not be polluted by industrial waste or household waste. Feed management can have a direct effect on water quality, leftover feed can cause pollution in the floating net cage (*Keramba Jaring Apung/KJA*) cultivation media.

The regulation of freshwater fisheries aquaculture activities refers to the Environmental Management Efforts and Environmental Monitoring Efforts (UKL-UPL) Form for Specific Standards for Freshwater Fish Farming Businesses and/or Activities in Floating Net Cages, UKL-UPL form for Specific Standards for Freshwater Fish Farming Activities in Cages (Flowing Water), and UKL-UPL Form Specific Standards for Freshwater Fish Farming Businesses and/or Activities.

5 Environmental impacts and environmental management, and monitoring standards

5.1 The Environmental impact caused

Activities that take place within the Biosphere Reserve area are predicted to have negative impact on the environment. The potential impacts arising from management activities on the landscape of the Biosphere Reserve are described in Table 1.

Table 1. Potential impact of management activities on Biosphere Reserve areas

No.	Businesses and/or Activities	Type of Impact	Potential Impact
A. Core areas of Biosphere Reserves (Nature Reserves and Wildlife Reserves)			
1.	Research	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)
		b. Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades solution, NaOH, formaldehyde, alcohol 75% and so on
		c. Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		d. Genetic material is taken out of the area	1. The amount of genetic material taken out of the area 2. Percentage decline in biodiversity
		e. Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (<i>zero accidents</i>) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/202 2. Number of disturbed fauna (key wildlife)
		f. Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (<i>zero accident</i>) according to the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014
2.	Introduction of plant species/taxonomy/dendrology	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)
		b. Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		c. Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (<i>zero accidents</i>) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022 2. Number of disturbed fauna (key wildlife)
		d. Wildlife and human conflict	Number of incidents of conflict/attack of key and human wildlife, success of wildlife protection (<i>zero accident</i>) according to the

No.	Businesses and/or Activities	Type of Impact	Potential Impact
			Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014
B. Core area of the Biosphere Reserve (National Parks, Forest Parks, Nature Tourism Parks)			
1.	Research	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)
		b. Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades solution, NaOH, formaldehyde, alcohol 75% and so on
		c. Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		d. Genetic material is taken out of the area	1. The amount of genetic material taken out of the area 2. Percentage decline in biodiversity
		e. Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (<i>zero accidents</i>) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of disturbed fauna (key wildlife)
		f. Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (<i>zero accident</i>) according to the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014
2.	Collection of Non-Timber Forest Products (NTFPs)	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)
		b. Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		c. Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (<i>zero accidents</i>) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of disturbed fauna (key wildlife)
		d. Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (<i>zero accident</i>) according to the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014
3.	Introduction of plant	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)

No.	Businesses and/or Activities	Type of Impact	Potential Impact
	species/taxonomy/dendrology	b. Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		c. Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (<i>zero accidents</i>) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of disturbed fauna (key wildlife)
		d. Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (<i>zero accident</i>) according to the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014
C. Biosphere Reserve Buffer Area			
1.	Research	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)
		b. Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades solution, NaOH, formaldehyde, alcohol 75% and so on)
		c. Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		d. Genetic material taken out of Area	1. The amount of genetic material taken out of the area 2. Percentage decline in biodiversity
		e. Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (<i>zero accidents</i>) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. The number of fauna (key wildlife) and their habitats are disturbed
2.	Natural tourism operations	a. Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		b. Deteriorating water quality	The quality of water parameters includes TDS, TSS, BOD, COD according to river water quality standards or the similar kind in attachment VI PP 22 of 2021 concerning the Implementation of Environmental Management
		c. Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (<i>zero accident</i>) according to the

No.	Businesses and/or Activities	Type of Impact	Potential Impact
			Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014
D. Biosphere Reserve Transition Area			
1.	Reserch	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)
		b. Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades solution, NaOH, formaldehyde, alcohol 75% and so on
		c. Solid waste generation and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		d. Genetic material is taken outside the area	1. The amount of genetic material taken out of the area 2. Percentage decline in biodiversity
2.	Natural tourism operations	a. Solid waste generation and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		b. Deteriorating water quality	The quality of water parameters includes TDS, TSS, BOD, COD according to river water quality standards or the similar kind in attachment VI PP 22 of 2021 concerning the Implementation of Environmental Management
3.	Operational of Forest use business licensing	Increased runoff, erosion and sedimentation rates	The amount of erosion and sedimentation that arises can be controlled in all areas granted with PBPH permits
		Deteriorating water quality	The control of the level of TDS, TSS, BOD, COD parameters, according to river water quality standards or the similar kind in attachment VI PP 22 of 2021 concerning the Implementation of Environmental Protection and Management
		Vegetation damage	The percentage of the amount of decrease in abundance and diversity of vegetation types in all areas granted with PBPH permits can be minimized
		Generation of solid waste and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		Generation of Hazardous and Toxic Waste (<i>Bahan Beracun dan Berbahaya/B3</i>)	The percentage of the number of B3 waste scatterings in the activity components that have the potential to have an impact on B3 waste scatterings by fulfilling Attachment IX of Government Regulation Number 22 of

No.	Businesses and/or Activities	Type of Impact	Potential Impact
			2021 concerning the Implementation of Environmental Management
		Decreased air quality from power plant emissions (Genset)	Emission air quality meets quality standards according to regulations: Minister of Environment and Forestry Regulation Number 11 of 2021 concerning Engine Emission Quality Standards with Internal Combustion
		Decreased ambient air quality (Increased dust levels)	TSP below the quality standard threshold of 230 micrograms per m3 24-hour measurement time PM10 below the quality standard threshold of 75 micrograms per m3 24-hour measurement time PM 2.5 below the quality standard threshold of 55 micrograms per m3 24-hour measurement time guided by Appendix VII Government Regulation Number 22 of 2021
		Decline in the hydrological quality of groundwater level	The groundwater level (<i>Tinggi Muka Air Tanah/TMAT</i>) at the compliance point meets the provisions in accordance with the Minister of Environment and Forestry Regulation Number P.15/MENLHK/SETJEN/KUM.1/2/2017 concerning Procedures for Measuring Groundwater Level at Peat Ecosystem Compliance Points
		Decreased soil quality and fertility	1. Percentage of total vegetation and soil damage 2. The physical, biological and chemical properties of the soil are maintained and support for optimal plant growth
		Increased traffic generation	Minimize traffic disruptions
3.	Housing and settlements	a. Solid waste and domestic waste generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
		b. Household liquid waste generation	1. There is a waste management system/ infrastructure for households 2. Cleanliness of residential areas and settlements is maintained
4.	Trading ventures	a. Solid waste generation and domestic waste	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day
5.	Operational of Plantation	a. Increased runoff, erosion and sedimentation rates	The amount of erosion and sedimentation that arises can be controlled in all areas of the Plantation Right to Cultivate (<i>Hak Guna Usaha/HGU</i>)

No.	Businesses and/or Activities	Type of Impact	Potential Impact
		b. Deteriorating water quality	The control of the level of TDS, TSS, BOD, COD parameters, according to river water quality standards or the similar kind in attachment VI PP 22 of 2021 concerning the Implementation of Environmental Protection and Management
		c. Vegetation damage	The percentage of the decrease in abundance and diversity of vegetation types in all Plantation HGU areas can be minimized
		d. Decreased air quality from power plant emissions (increased dust levels)	Emission air quality meets quality standards according to regulations: Minister of Environment and Forestry Regulation Number 11 of 2021 concerning Engine Emission Quality Standards with Internal Combustion
		e. Decreased ambient air quality (increased dust levels)	TSP below the quality standard threshold of 230 micrograms per m3 24-hour measurement time PM10 below the quality standard threshold of 75 micrograms per m3 24-hour measurement time PM 2.5 below the quality standard threshold of 55 micrograms per m3 24-hour measurement time guided by Appendix VII Government Regulation Number 22 of 2021
		f. Decline in the hydrological quality of groundwater level	The groundwater level (TMAT) at the compliance point meets the provisions in accordance with the Minister of Environment and Forestry Regulation Number P.15/MENLHK/SETJEN/KUM.1/2/2017 concerning Procedures for Measuring Groundwater Level at Peat Ecosystem Compliance Points
		g. Decreased soil quality and fertility	1. Percentage of total vegetation and soil damage 2. The physical, biological and chemical properties of the soil are maintained and support for optimal plant growth
		h. Increased traffic generation	Minimize traffic disruptions
6.	Subsistence farming	a. Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)
		b. Deteriorating water quality	The control of the level of TDS, TSS, BOD, COD parameters, according to river water quality standards or the similar kind in attachment VI PP 22 of 2021 concerning the Implementation of Environmental Protection and Management

No.	Businesses and/or Activities	Type of Impact	Potential Impact
		c. Increased runoff, erosion and sedimentation rates	The rate of erosion and sedimentation in the prepared land area can be controlled
		d. Decreased soil quality and fertility	1. Percentage of total vegetation and soil damage 2. The physical, biological and chemical properties of the soil are maintained and support for optimal plant growth
7.	Freshwater Fisheries	a. Decreased water quality (eutrophication)	The quality of water parameters includes TDS, TSS, BOD, COD according to river water quality standards or the like in attachment VI PP 22 of 2021 concerning the Implementation of Environmental Management

6 Environmental Mitigation Standards

Table 2. The Matrix on Environmental Management and Monitoring Mitigation from Biosphere Reserve Management Activities

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
Biosphere Reserve Core Areas (Nature Reserves and Wildlife Reserves)											
1	Research Activities	Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)	1. Sampling with the sampling and purposive sampling techniques according to the vegetation growth phase 2. The use of non-destructive and environmentally friendly research data sampling technology	According to the location of the research activity	During the research activities	Data collection methods: Observation on: It was carried out by conducting vegetation analysis using the transect pathway method Data analysis: Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	1. According to the location of the research activity; 2. Along the entrance path to the conservation area/tracking for research activities	Once every 6 (six) months during the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park	
		Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades solution, NaOH, formaldehyde, alcohol 75% and so on)	1. The use of non-destructive and environmentally friendly research data sampling technology 2. Material packaging is carried out according to the procedure/technical guidelines for taking and	According to the location of the research activity	During the research activities	Data collection methods: Observation on: 1. Carried out by vegetation analysis of the transect path method 2. Soil sampling by making profile holes / soil pedon Analysis data:	1. According to the location of the research activity; 2. Along the entrance path to the conservation area/tracking for research activities	Once every 6 (six) months during the research activities		

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				testing research sample materials			1. Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index 2. Analysis of soil physics, chemistry, and minerals includes texture, density/bulk density, porosity, permeability, and pH of the soil. The measurement results are compared with the standard quality criteria for soil damage in accordance with Minister of Environment and Forestry Regulation Number 7 of 2006 or other applicable regulation in the future				
		Solid Waste and Domestic	1. Volume of solid waste/dome	1. Do not littering solid waste during the	According to the location of the	During the research activities	The monitoring method is carried out by:	1. According to the location of the research activity	Once every 3 (three) months during the	Managing Institution: Researchers	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
		Waste Generation	stic waste of / day 2. The average amount of domestic solid waste generated is kg/day	implementation of research activities 2. Minimizing the use of research materials made of hard-to-decompose plastics 3. Bring back solid, liquid, B3 (Hazardous and Toxic Materials) waste when exiting the conservation area	research activity		1. Providing non-B3 garbage cans at strategic points such as shelters and resting places at the entrance path to the conservation /tracking area; 2. Conducting technical guidance to Researchers and/or Academics and the Public community before carrying out activities in conservation areas Data analysis: Tabulation and processing of observational data	2. Natural Resources Conservation Office (BBKSDA/BKSDA), National Park (BBTN/BTN) Office 3. Entrance path to the conservation area	research activities	and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park	
		Genetic material is brought out of the region and/or out of Indonesia	1. The amount of genetic material taken out of the area 2. Percentage decline in biodiversity	1. Researchers and/or Academics must obtain a permit (permit to enter a conservation area) when entering a conservation area in accordance with	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation on: Checking/inventory of sample data brought by researchers and/or academics out of conservation areas Data analysis:	Entrance of the conservation area	During the research activities	Managing Institution: Researchers and/or Academics Monitoring Institution: Natural Resources Conservation Office/National Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				the Decree of the Director General of KSDAE Number: P.7/IV-SET/2011 concerning Procedures for Entering Nature Reserve Areas, Nature Conservation Areas, and Hunting Parks 2. Refer to/guided by the Minister of Environment and Forestry Regulation Number P.2/MENLHK/SETJEN/KUM.1/1/2018 that genetic material is brought out of the region and/or out of Indonesia with government permission (Material transfer agreement)			Tabulation and processing of observational data				
		Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife	1. Determination of the location/sampling route of the	According to the location of the	During the research activities	The monitoring method is carried out by means of observation of:	1. Natural Resources Conservation	During the research activities	Managing Institution: Researchers and/or	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			(zero accidents) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of disturbed fauna (key wildlife)	research data is prohibited on the key wildlife corridor route 2. At the time of data collection, it is forbidden to make commotion, noise, and other activities that disturb key wildlife	research activity		1. Setting up the location/sampling route of research data 2. Checking the implementation of research data collection does not do any acts that disturb key wildlife disturbances and their habitats 3. Provision of sufficient and convenient feed sources according to the characteristics of key wildlife species; 4. It is mandatory to divide zones, areas, or areas with specific designation for research activities and/or outside the habitat and corridor path of wildlife habitats; 5. Installing GPS collars on animals that are indicated to be prone to leaving their habitat area;	Office/National Park 2. Research location points 3. Habitat patch and corridors of wildlife habitat in conservation areas		Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							Data analysis: Tabulation and processing of observational data				
		Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, the success of wildlife protection (zero accident) according to the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014	- Determination of the location/sampling route of the research data is prohibited on the key wildlife corridor path - At the time of data collection, it is forbidden to make commotion, noise, and other activities that disturb key wildlife - The use of complete personal protective equipment (PPE) consists of: boots, safety helmet, mask, and safety vest	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation of: - Setting up the location/sampling route of research data - Checking on the implementation of research data collection must not perform any activities that disturb (causes any disturbances) key wildlife and their habitats - Checking on the use of complete personal protective equipment (PPE) - Arrangement on the provision of facilities and infrastructure in the form of safety information signs and boards in forest areas with effective	- Conservation of Natural Resources Office/National Park - Research location points - Wildlife patches and corridors habitat in conservation areas	During the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							communication methods including hazard sources, safety signs, safety information boards; 5. Management of Safety Signs and Information Boards; 6. Technical Development of Safety Signs and Information Boards. Data analysis: Tabulation and processing of observational data				
2	Activity of Introduction on Plant Species/ Taxonomy/ Dendrology	Vegetation damage	Percentage of vegetation damage amount (undergrowth, seedlings, stakes, poles, trees)	1. Refer to Article 21 paragraph (1) of Law Number 32 of 2024 that everyone is prohibited a. Taking, cutting, possessing, destroying, exterminating, keeping, transporting, and/or trading protected plants or parts	According to the location of the activity Introduction on plant species/ taxonomy/ dendrology	During the Introduction on plant species/ taxonomy/ dendrology activities	Data collection methods: Observation on: 1. carried out by conducting vegetation analysis using the transect path method; 2. Checking/inventor y of researchers and/or academics as well as the public community who leave	1. According to the location of the activity of Introduction on plant species/ taxonomy/ dendrology;	Once every 6 (six) months during the Introduction on Plant Species/Taxon omy/Dendrolog y activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				thereof in a living state; b. Taking, possessing, damage, destroying, exterminating, transporting, and/or trading the Protected Plant or parts thereof in a dead state.			conservation areas Data analysis: Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	taxonomy/dendrology 3. Entrance to the conservation area			
		Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Do not littering solid waste during the implementation of Introduction on Plant Species/taxonomy/dendrology Activities 2. Minimizing the use of tableware made of hard-to-decompose plastic 3. Bring back solid or liquid waste when leaving the conservation area	According to the location of the Introduction on Plant Species/taxonomy/dendrology Activity	During the Introduction on Plant Species/Taxonomy/Dendrology Activity	The monitoring method is carried out by: 1. Providing non-B3 garbage cans at strategic points such as shelters for rest areas at the entrance to conservation areas/tracking path 2. Conducting technical guidance to Researchers and/or Academics and the public community before carrying out activities in conservation areas	1. According to the location of the Introduction on Plant Species/taxonomy/dendrology Activity 2. Natural Resources Conservation Office/National Park Office 3. Entrance to the conservation area	3 (three) months during the Introduction on Plant Species/Taxonomy/Dendrology Activity	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							Data analysis: Tabulation and processing of observational data				
		Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (zero accidents) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of disturbed fauna (key wildlife)	1. Defining location/pathway for the Identification on Plant species/taxonomy/dendrology activity (it is prohibited to conduct activity in wildlife/key species corridor pathways 2. During the Introduction on Plant Species/Taxonomy/Dendrology Activity, it is prohibited to make commotion, noise, and other activities that disturb key wildlife	According to the location of the Introduction on Plant Species/taxonomy/dendrology Activity	During the Introduction on Plant Species/Taxonomy/Dendrology Activity	The monitoring method is carried out by means of observation on: 1. Determine the location/pathways for the Identification on Plant species/taxonomy/dendrology Activities 2. Checking the implementation of the Identification on plant species/taxonomy/dendrology Activities to ensure it does not disturb the key species/wildlife and their habitats 3. Provision of sufficient and convenient feed sources according to the characteristics of key species /wildlife; 4. It is mandatory to divide zones,	1. Natural Resources Conservation Office / National Park office 2. Location point of the Introduction on Plant species/taxonomy/dendrology Activity 3. Habitat patch and corridors of wildlife habitat in conservation areas	During the Introduction on Plant species/Taxonomy/Dendrology Activity	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park office	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							areas, or areas with the designation for the Identification on Plant Species/Taxonomy/Dendrology Activities, to ensure it is not located in the habitat and corridor path of wildlife; 5. Installing GPS Collars on animals that are indicated to be prone to leaving their habitat area; Data analysis: Tabulation and processing of observational data				
		Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (zero accident) according to the Regulation of the Minister of Forestry	1. Location/pathway of the Identification on Plant species/taxonomy/dendrology Activity are prohibited to be conducted at key wildlife corridor pathways	According to the location of the Introduction on Plant species/taxonomy/dendrology Activity	During the Introduction on Plant species/Taxonomy/Dendrology Activity	The monitoring method is carried out by means of observation on: 1. Determination settings on the locations/pathways for the Identification on Plant species/taxonomy/dendrology Activities	1. Office of the Natural Resources Conservation Unit /National Park 2. Location point for the Introduction on Plant species/taxonomy/dendrology Activity	During the Introduction on Plant species/Taxonomy/Dendrology Activity	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			Number: P.48/MENHUT-II/2014	2. During the Introduction on Plant Species/Taxonomy/Dendrology Activity, it is prohibited to make commotion, noise, and other activities that disturb key wildlife 3. The use of complete personal protective equipment (PPE) consists of: Boots, safety helmets, masks, and safety vests			2. Checking the implementation of the Identification on plant species/taxonomy /dendrology Activities, to ensure it does not interfere/disturb key species/wildlife and their habitats 3. Checking the use of complete personal protective equipment (PPE) 4. Arrangement of the provision of facilities and infrastructure in the form of safety information signs and boards in forest areas with effective communication methods including hazard sources, safety signs, safety information boards; 5. Management of Safety Signs and Information Boards;	3. Habitat patch and corridors of wildlife habitat in conservation areas		Office/National Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							6. Technical Coaching on Safety Signs and Information Boards. Data analysis: Tabulation and processing of observational data				
Biosphere Reserve Core Areas (National Parks, Forest Parks, Nature Tourism Parks)											
3	Research Activities	Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)	1. Sampling technique and purposive sampling techniques according to the vegetation growth phase 2. The use of non-destructive and environmentally friendly research data sampling technology	According to the location of the research activity	During the research activities	Data collection methods: Observation: It was carried out by conducting vegetation analysis using the transect pathway method Data analysis: Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	1. According to the location of the research activity; 2. Along the entrance to the conservation area/tracking for research activities	Once every 6 (six) months during the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park/Regional technical implementation unit (UPTD) of the Forest Park	
		Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades)	1. The use of non-destructive and environmentally friendly research data sampling technology	According to the location of the research activity	During the research activities	Data collection methods: Observation: 1. Carried out by vegetation analysis of the transect path method	1. According to the location of the research activity; 2. Along the entrance to the conservation area/tracking	Once every 6 (six) months during the research activities	Managing Institution: Researchers and/or Academics, Public community	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			solution, NaOH, formadehyde, alcohol 75% and so on	2. Material packaging is carried out according to the procedure/technical guidelines for taking and testing research sample materials			2. Soil sampling by making soil profile/pedon holes Data analysis: 1. Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index 2. Analysis of soil physics, chemistry, and minerals includes texture, density/bulk density, porosity, permeability, and pH of the soil. The measurement results are compared with the standard quality criteria for soil damage in accordance with the regulation by the Minister of Environment Number 7 of 2006	for research activities		Monitoring Institution: Natural Resources Conservation Office/National Park / Regional technical implementation unit (UPTD) of the Forest Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							or other relevant regulation				
		Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Do not littering solid waste during the implementation of research activities 2. Minimizing the use of research materials made of hard-to-decompose plastics 3. Bring back solid, liquid, B3 waste when exiting the conservation area	According to the location of the research activity	During the research activities	The monitoring method is carried out by: 1. Providing non-B3 garbage cans at strategic points such as shelters and resting places at the entrance to the conservation/tracking area; 2. Conducting technical guidance to Researchers and/or Academics and the Public community before carrying out activities in conservation areas Data analysis: Tabulation and processing of observational data	1. According to the location of the research activity 2. Natural Resources Conservation (BKSDA)/National Park (TN) / Regional technical implementation unit of the Forest Park (UPTD Tahura) 3. Entrance to the conservation area	Once every 3 (three) months during the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park/ Regional technical implementation unit of the Forest Park	
		Genetic material is brought out of the region and/or out of Indonesia	1. The amount of genetic material taken out of the area	1. Researchers and/or Academics must obtain SIMAKSI/Surat Izin Masuk Kawasan	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation on: Checking/inventory of sample data brought by researchers and/or	Entrance to the conservation area	During the research activities	Managing Institution: Researchers and/or Academics, General Public	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			2. Percentage decline in biodiversity	<i>Konservasi</i> (a permit to enter a conservation area) when entering a conservation area in accordance with the Decree of the Director General of KSDAE Number: P.7/IV-SET/2011 concerning Procedures for Entering Nature Reserve Areas, Nature Conservation Areas, and Hunting Parks 2. Guided by the Minister of Environment and Forestry Regulation Number P.2/MENLHK/SETJEN/KUM.1/1/2018 that genetic material is brought out of the region and/or out of Indonesia with government			academics out of conservation areas Data analysis: Tabulation and processing of observational data			Monitoring Institution: Natural Resources Conservation Office/National Park / Regional technical implementation unit of the Forest Park (UPTD Tahura)	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				permission (Material transfer agreement)							
		Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (zero accidents) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of disturbed fauna (key wildlife)	1. Determination of the location/sampling route of the research data is prohibited on the key wildlife corridor route 2. At the time of data collection, it is forbidden to make commotion, noise, and other activities that disturb key wildlife	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation on: 1. Setting up the location/sampling route of research data 2. Checking the implementation of research data collection, to ensure it does not disturb key wildlife and their habitats 3. Provision of sufficient and convenient feed sources according to the characteristics of key wildlife species; 4. It is mandatory to divide zones, areas, or areas with the designation for research activities and/or not to be in the habitat and	1. Office of the Natural Resources Conservation Unit/National Park/ Regional technical implementation unit of the Forest Park (UPTD Tahura) 2. Research location points 3. Habitat patch and corridors of wildlife habitat in conservation areas	During the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park/Regional technical implementation unit of the Forest Park (UPTD Tahura)	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							corridor of wildlife habitats; 5. Installing GPS Collars on animals that are indicated to be prone to leaving their habitat area; Data analysis: Tabulation and processing of observational data				
		Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (zero accident) according to the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014	1. Determination of the location/sampling route of the research data is prohibited on the key wildlife corridor route 2. At the time of data collection, it is forbidden to make commotion, noise, and other activities that disturb key wildlife 3. The use of complete personal protective equipment (PPE) consists of: Boots, safety	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation on: 1. Setting up the location/sampling route of research data 2. Checking the implementation of research data to ensure the data collection does not disturb key wildlife and their habitats 3. Checking the use of complete personal protective equipment (PPE) 4. Arrangement of the provision of facilities and	1. Natural Resources Conservation Office /National Park National Park/Regional technical implementation unit of the Forest Park (UPTD Tahura) 2. Research location points 3. Habitat patch and corridors of wildlife habitat in conservation areas	During the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park National Park/Regional technical implementation unit of the Forest Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				helmets, masks, and safety vests.			infrastructure in the form of safety information signs and boards in forest areas with effective communication methods including hazard sources, safety signs, safety information boards; 5. Management of Safety Signs and Information Boards; 6. Technical Coaching of Safety Signs and Information Boards. Data analysis: Tabulation and processing of observational data				
4	Non-Timber Forest Products Collection Activities	Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings, stakes, poles, trees)	1. Use of the latest types and types of forest product collection equipment 2. Enrichment of vegetation in the form of planting plant species that are	According to the location and along the route of non-timber forest product collection activities	During the collection of non-timber forest products	Data collection methods: Observation: 1. It was carried out by analyzing vegetation using the transect path method 2. Use of the latest types and types	1. According to the location and along the route of non-timber forest product collection activities;	once every 6 (six) months during the non-timber forest product collection activity	Management Institution: Non-timber forest products collecting society Monitoring Institutions: Natural Resources	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				collected in the form of stems, fruits, sap, bark, leaves and roots			of forest product collection equipment 3. The regulation of the implementation of vegetation enrichment activities in the form of planting plant species collected in the form of stems, fruits, sap, bark, leaves and roots is carried out properly by the community collecting non-timber forest products Data analysis: Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	2. Entrance to the conservation area		Conservation Office/National Park National Park/Regional technical implementation unit of the Forest Park	
		Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of	1. Do not littering solid waste during the implementation of non-timber forest product	According to the location of the non-timber forest product collection	During the collection of non-timber forest products	The monitoring method is carried out by: Conduct technical guidance to non-timber forest products collectors before	1. According to the location of the non-timber forest product collection	once every 6 (six) months during the non-timber forest product collection activity	Management Institution: Non-timber forest products collecting society	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			domestic solid waste generated is kg/day	collection activities 2. Minimizing the use of non-wood forest products collection materials made of hard-to-decompose plastics 3. Bring back solid, liquid, B3 waste when exiting the conservation area			carrying out activities/activities to collect non-timber forest products in conservation areas Data analysis: Tabulation and processing of observational data	2. Entrance to the conservation area		Monitoring Institution: Natural Resources Conservation Office/National Park/Regional technical implementation unit of the Forest Park	
		Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (zero accidents) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of disturbed	1. Determination of non-timber forest product collection blocks/points is prohibited on key wildlife corridor routes 2. At the time of harvesting, non-timber forest products are prohibited from making noise, noise, and other activities that disturb key wildlife	According to the location of the non-timber forest product collection	During the collection of non-timber forest products	The monitoring method is carried out by means of observation on: 1. Arrangements for determining locations/routes for collecting non-timber forest products; 2. Checking the implementation of non-timber forest product collection activities does not interfere/disturb key wildlife and their habitats; 3. Provision of sufficient and	1. Natural Resources Conservation Office/National Park/ Regional technical implementation unit of the Forest Park 2. Location of non-timber forest products collection 3. Habitat patch and corridors of wildlife habitat in conservation areas	During the collection of non-timber forest products	Management Institution: Non-timber forest products collection community Monitoring Institution: Natural Resources Conservation Office/National Park/ Regional technical implementation unit of the Forest Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			fauna (key wildlife)				convenient feed sources according to the characteristics of key wildlife species; 4. Must divide zones, areas, or areas with the allocation of non-timber forest products and/or not located in the habitat and corridor of wildlife habitats; 5. Installing GPS Collars on animals that are indicated to be prone to leaving their habitat area. Data analysis: Tabulation and processing of observational data				
		Key wildlife and human conflicts	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (zero accident) according to	1. Determination of locations/ collection routes for non-timber forest products is prohibited on key wildlife corridor routes 2. At the time of harvesting, non-	according to the location of the non-timber forest product collection	During the collection of non-timber forest products	The monitoring method is carried out by means of observation on: 1. Setting up the location/sampling route of research data 2. Checking the implementation of	1. Natural Resources Conservation office/National Park 2. Location of non-timber forest products collection	During the collection of non-timber forest products	Management Institution: Non-timber forest products collecting society Monitoring Institution: Natural Resources	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014	timber forest products are prohibited from making commotion, noise, and other activities that disturb key wildlife 3. The use of complete personal protective equipment (PPE) consists of: Boots, safety helmet, mask, and safety vest.			research data collection to ensure it does not disturb key wildlife disturbances and their habitats 3. Checking the use of complete personal protective equipment (PPE) 4. Arrangement of the provision of facilities and infrastructure in the form of safety information signs and boards in forest areas with effective communication methods including hazard sources, safety signs, safety information boards; 5. Management of Safety Signs and Information Boards; 6. Technical Development of Safety Signs and Information Boards.	3. Habitat patch and corridors of wildlife habitat in conservation areas		Conservation Office/National Park/Regional technical implementation unit of the Forest Park	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							Data analysis: Tabulation and processing of observational data				
5	Activity of Introduction on Plant species/ Taxonomy/ Dendrology	Vegetation damage	Percentage of total vegetation damage (undergrowth, seedlings, stakes, poles, trees)	1. Guided by Article 21 paragraph (1) of Law Number 32 of 2024 that everyone is prohibited a. Taking, cutting, possessing, destroying, exterminating, keeping, transporting, and/or trading protected plants or parts thereof in a living state; b. Taking, possessing, destroying, exterminating, transporting, and/or trading the Protected Plant or parts thereof in a dead state.	According to the location of the Introduction on plant species/taxonomy/dendrology activity	During the Introduction on plant species/taxonomy/dendrology activities	Data collection methods: Observation: 1. It was carried out by conducting vegetation analysis using the transect path method; 2. Checking/ inventory of researchers and/or academics as well as the public community who leave conservation areas Data analysis: Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	1. According to the location of the Introduction of plant species/ taxonomy/ dendrology activity; 2. Along the entrance to the conservation area/tracking path for Introduction to plant species/taxonomy/dendrology activities 3. Entrance to the conservation area	Once every 6 (six) months during the Introduction of Plant Species/ Taxonomy/ Dendrology activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office (BKSDA)/National Park Center (TN) /Regional technical implementation unit of the Forest Park (UPTD Tahura)	
		Solid waste and domestic	1. Volume of solid waste/dome	1. Do not littering solid waste during the implementation	According to the location of Introduction	During the Activity of Introduction to Plant	The monitoring method is carried out by means of observation on:	1. According to the location of the Introduction to the Plant	3 (three) months during the Introduction to Plant	Managing Institution: Researchers and/or	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
		waste generation	stic waste of / day 2. The average amount of domestic solid waste generated is kg/day	Activities of Introduction to Plant Species/taxonomy/dendrology 2. Minimizing the use of tableware made of hard-to-decompose plastic 3. Bring back solid or liquid waste when leaving the conservation area	to the Plant Species/taxonomy/dendrology Activity	Species/Taxonomy/Dendrology	1. Arrangement of the provision of non-B3 waste bins at strategic points such as shelters at the entrance to the conservation area/tracking path 2. Conducting technical guidance to Researchers and/or Academics and the Public community before carrying out activities in conservation areas Data analysis: Tabulation and processing of observational data	Species/taxonomy/dendrology Activity 2. Natural Resources Conservation Office/National Park 3. Entrance to the conservation area	Species/Taxonomy/Dendrology Activity	Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park / Regional technical implementation unit of the Forest Park (UPTD Tahura)	
		Disturbance to wildlife and their habitats	1. The number of disturbances to wildlife (zero accidents) according to the Instruction of the Minister of Environment	1. Location/pathway Activity of Identification to Plant species/taxonomy/dendrology are prohibited to be done in corridor pathways of key wildlife 2. During the Activity of	According to the location of the Activity of Introduction to Plant species/taxonomy/dendrology	During the Plant Species/Taxonomy/Dendrology Introduction Activity	The monitoring method is carried out by means of observation on: 1. Location/path determination settings for Activities of Introduction to Plant species/taxonomy/dendrology	1. Natural Resources Conservation office/National Park 2. Location point of Activity for Introduction to Plant Species/taxonomy/dendrology	During the Activity of Introduction to Plant Species/Taxonomy/Dendrology	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			and Forestry Number: INS.1/MENL HK/SETJEN /KUM.1/6/2022. 2. Number of disturbed fauna (key wildlife)	Introduction to Plant Species/ Taxonomy/ Dendrology it is prohibited to make noise, noise, and other activities that disturb key wildlife			2. Checking the implementation of Activities on Introduction to plant species/taxonomy /dendrology does not interfere/causes disturbance to key wildlife and their habitats 3. Provision of sufficient and convenient feed sources according to the characteristics of key wildlife species; 4. It is mandatory to divide zones, areas, or areas with the designation for Activities on Introduction to Plant Species/Taxonomy/Dendrology that are not located in the habitat and corridor habitats of wildlife; 5. Installing <i>GPS Collars</i> on animals that are	3. Habitat patch and habitat corridors of wildlife in conservation areas		Office/National Park/Regional technical implementation unit of the Forest Park (UPTD Tahura)	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							indicated to be prone to leaving their habitat area; Data analysis: Tabulation and processing of observational data				
		Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and human, success of wildlife protection (zero accident) according to the Regulation of the Minister of Forestry Number: P.48/MENHUT-II/2014	1. Location/pathway for Activity of Plant species Identification /taxonomy/dendrology are prohibited to be done on key wildlife corridor pathways 2. During the Activity of Introduction to Plant Species/Taxonomy/Dendrology, it is prohibited to make commotion, noise, and other activities that disturb key wildlife 3. The use of complete personal protective equipment	According to the location of the Introduction to Plant Species/taxonomy/dendrology Activity	During the Introduction to Plant Species/Taxonomy/Dendrology Activity	The monitoring method is carried out by means of observation on: 1. Location/path determination settings for Activities on Introduction to Plant species/taxonomy/dendrology 2. Checking the implementation of Activities Introduction to plant species/taxonomy/dendrology does not interfere/cause the disturbance of key wildlife and their habitats 3. Checking the use of complete personal protective equipment (PPE)	1. Office of the Center for Conservation of Natural Resources/National Park Center/National Park Center 2. Location point for the Activity of Introduction to Plant Species/taxonomy/dendrology 3. Habitat patch and corridors of wildlife habitat in conservation areas	During the Activity of Introduction to Plant Species/Taxonomy/Dendrology	Managing Institution: Researchers and/or Academics, Public community Monitoring Institution: Natural Resources Conservation Office/National Park/Regional technical implementation unit of the Forest Park (UPTD Tahura)	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				(PPE) consists of: Boots, safety helmets, masks, and safety vests.			4. Arrangement of the provision of facilities and infrastructure in the form of safety information signs and boards in forest areas with effective communication methods including hazard sources, safety signs, safety information boards; 5. Management of Safety Signs and Information Boards; 6. Technical Development of Safety Signs and Information Boards. Data analysis: Tabulation and processing of observational data				
Biosphere Reserve Buffer Area											
6	Research Activities	Vegetation damage	Percentage of the amount of vegetation damage (undergrowth,	1. Sampling with sampling and purposive sampling techniques	According to the location of the research activity	During the research activities	Data collection methods: Observe on: It was carried out by conducting vegetation	1. According to the location of the research activity;	Once every 6 (six) months during the research activities	Managing Institution: Researchers and/or Academics,	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			seedlings, stakes, poles, trees)	according to the vegetation growth phase 2. The use of non-destructive and environmentally friendly research data sampling technology			analysis using the transect pathway method Data analysis: Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	2. Along the entry / tracking route for research activities		Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	
		Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades solution, NaOH, formaldehyde, alcohol 75% and so on	1. The use of non-destructive and environmentally friendly research data sampling technology 2. Material packaging is carried out according to the procedure/technical guidelines for taking and testing research sample materials	According to the location of the research activity	During the research activities	Data collection methods: Observe on: 1. Carried out by vegetation analysis of the transect path method 2. Soil sampling by making soil profile/pedon holes Data analysis: 1. Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index 2. Analysis of soil physics,	1. According to the location of the research activity; 2. Along the entry / tracking route for research activities	Once every 6 (six) months during the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							chemistry, and minerals includes texture, density/bulk density, porosity, permeability, and pH of the soil. The measurement results are compared with the standard quality criteria for soil damage in accordance with Minister of Environment Regulation Number 7 of 2006 or other applicable future regulation				
		Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Do not littering solid waste during the implementation of research activities 2. Minimizing the use of research materials made of hard-to-decompose plastics 3. Bring back solid, liquid, B3	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation on: 1. Provision of non-B3 garbage cans at strategic points such as shelters for rest on the entrance to the area/tracking path; 2. Conducting technical guidance to	1. According to the location of the research activity 2. Area management office 3. Area entrance	Once every 3 (three) months during the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				waste when leaving the area			Researchers and/or Academics and the Public community before carrying out activities/activities in the area Data analysis: Tabulation and processing of observational data			Environment Agency	
		Genetic material is brought out of the region and/or out of Indonesia	1. The amount of genetic material taken out of the area 2. Percentage decline in biodiversity	1. Researchers and/or Academics must obtain a permit to enter the forest area 2. Guided by the Minister of Environment and Forestry Regulation Number P.2/MENLHK/S ETJEN/KUM.1/1/2018 that genetic material is brought out of the region and/or out of Indonesia with government permission (Material transfer agreement)	According to the location of the research activity	During the research activities	The monitoring method is carried out by observation on: Checking/inventory of sample data brought by researchers and/or academics out of the forest area Data analysis: Tabulation and processing of observational data	Forest area manager/stakeholder entrance	During the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
		Disturbance to key wildlife and their habitats	1. The number of disturbances to wildlife (zero accidents) according to the Instruction of the Minister of Environment and Forestry Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. The number of fauna (key wildlife) and their habitats are disturbed.	1. Determination of the location/sampling route of the research data, is prohibited on the key wildlife corridor route 2. At the time of data collection, it is forbidden to make commotion, noise, and other activities that disturb key wildlife	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation on: 1. Setting up the location/sampling route of research data 2. Checking the implementation of research data collection, do not do any acts that disturb or cause disturbances to key wildlife and their habitats 3. Provision of sufficient and convenient feed sources according to the characteristics of key wildlife species; 4. It is mandatory to divide zones, areas, or areas with the designation for research activities and/or not to be in the habitat and corridor of wildlife habitats; 5. Installing a GPS Collar on animals	1. Forest area manager/stakeholder entrance 2. Research location points 3. Pockets and corridors of wildlife habitat in forest areas	During the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							that are indicated to be prone to leaving their habitat area. Data analysis: Tabulation and processing of observational data				
7	Natural Tourism Operational Activities	Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Do not littering solid waste when in a nature tourism location 2. Minimizing the use of construction materials made of hard-to-decompose plastics 3. Collect solid, liquid, B3 waste in the trash bin that has been provided 4. Providing non-B3 bins at strategic points	All areas of natural tourism operational activities	During the operational activities of nature tourism	The monitoring method is carried out by means of observation on: 1. Solid waste disposal arrangements at natural tourism sites 2. Minimizing the use of construction materials made of plastic that is difficult to decompose 3. The existence of solid, liquid, non-B3 and B3 waste orders 4. Conducting technical coaching to business managers/natural tourism activities Data analysis:	All areas of natural tourism operational activities	Once every 6 (six) months during the operational activities of Nature Tourism	Management Institution: Business actors/natural tourism activities, Visitors Monitoring Institutions: Provincial Tourism and Creative Economy Office; Regency Culture and Tourism Office	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
		Deteriorating water quality	The quality of water parameters includes TDS, TSS, BOD, COD according to river water quality standards or the similar types in attachment IV of the Government Regulation No 22 of 2021 concerning the Implementation of Environmental Management	Technological approach: 1. Immediately conduct road compaction and pavement on the road tracks that have been opened. 2. Making trenches on the left and right of the road as a flow of water, so that the flow of water entering the water body (canal / river) is relatively clear. 3. Maintain the presence of plants on the left and right of the road that are opened which function to resist soil particles carried by surface flows during rain. 4. Maintain the existence of the	All areas of natural tourism operational activities	During the operational activities of nature tourism	Tabulation and processing of observational data The monitoring method is carried out by means of observation on: 1. Compaction and road pavement arrangements on road tracks that have been opened. 2. The existence of trenches on the left and right of the road as a flow of water 3. The presence of plants on the left and right of the road that are opened 4. Arrangement on the existence of river boundaries 5. Sampling of river water quality parameters TDS, TSS, BOD, COD using the SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009,	1. All areas of natural tourism operational activities 2. Water/lake/river bodies with designated coordinates and locations	Once every 6 (six) months during the operational activities of Nature Tourism	Management Institution: Natural tourism business actors Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				river border area.			SNI 6989.73:2019 or applicable in the future in collaboration with the Ministry of Environment and Forestry's registered laboratories Data analysis: The measurement results are compared with the quality standards of water quality levels in accordance with attachment VI of the Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management				
		Wildlife and human conflict	Number of incidents of conflict/attack of key wildlife and humans	1. Not feeding the wildlife found 2. When carrying out activities, it is forbidden to make commotion, noise, and other activities that	All areas of natural tourism operational activities	During the operational activities of nature tourism	The monitoring method is carried out by means of observation on: 1. Setting location/path of natural tourism activities is prohibited to be done on the key	All areas of natural tourism operational activities	Once every 6 (six) months during the operational activities of Nature Tourism	Managing Institution: Nature tourism visitors Monitoring Institutions: Provincial Environment and Forestry Service;	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				disturb key wildlife			wildlife corridors path 2. Arrangement of the Provision of Facilities and Infrastructure in the form of safety information signs and boards in forest areas with effective communication methods including hazard sources, safety signs, safety information boards; 3. Management of Safety Signs and Information Boards; 4. Technical Development of Safety Signs and Information Boards. Data analysis: Tabulation and processing of observational data			Regency/City Environment Agency	
Biosphere Reserve Transition Area											
8	Research Activities	Vegetation damage	Percentage of the amount of vegetation damage	1. Sampling with sampling and purposive sampling	According to the location of the	During the research activities	Data collection methods: Observation on:	1. According to the location of the research activity;	Once every 6 (six) months during the	Managing Institution: Researchers and/or	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			(undergrowth, seedlings, stakes, poles, trees)	techniques according to the vegetation growth phase 2. The use of non-destructive and environmentally friendly research data sampling technology.	research activity		It was carried out by conducting vegetation analysis using the transect pathway method Data analysis: Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	2. Along the entry / tracking route for research activities	research activities	Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	
		Chemical waste spatters	Percentage of total vegetation and soil damage due to chemical liquids (aquades solution, NaOH, formaldehyde, alcohol 75% and so on	1. The use of non-destructive and environmentally friendly research data sampling technology 2. Material packaging is carried out according to the procedure/technical guidelines for taking and testing research sample materials.	According to the location of the research activity	During the research activities	Data collection methods: Observe on: 1. Carried out by vegetation analysis of the transect path method 2. Soil sampling by making soil profile holes/pedons. Data analysis: 1. Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index	1. According to the location of the research activity 2. Along the entry / tracking route for research activities	Once every 6 (six) months during the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							2. Analysis of soil physics, chemistry, and minerals includes texture, density/bulk density, porosity, permeability, and pH of the soil. The measurement results are compared with the standard quality criteria for soil damage in accordance with the Minister of Environment Regulation Number 7 of 2006 or those that apply in the future.				
		Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Do not littering solid waste during the implementation of research activities 2. Minimizing the use of research materials made of hard-to-decompose plastics	According to the location of the research activity	During the research activities	The monitoring method is carried out by means of observation of: 1. Providing non-B3 garbage cans at strategic points such as shelters for rest on the area entrance/tracking path;	1. According to the location of the research activity 2. Area management office 3. Area entrance	Once every 3 (three) months during the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service;	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				3. Bring back solid, liquid, B3 waste when leaving the area.			2. Conducting technical guidance to Researchers and/or Academics and the Public community before carrying out activities/activities in the area.			Regency/City Environment Agency	
		Genetic material is brought out of the region and/or out of Indonesia	1. The amount of genetic material taken out of the area 2. Percentage decline in biodiversity	1. Researchers and/or Academics must obtain a permit to enter the forest area 2. Guided by the Minister of Environment and Forestry Regulation Number P.2/MENLHK/SETJEN/KUM.1/1/2018 that genetic material is brought out of the region and/or out of Indonesia with government permission (material transfer agreement).	According to the location of the research activity	During the research activities	The monitoring method is carried out by observation on: Checking/inventory of sample data brought by researchers and/or academics out of the forest area Data analysis: Tabulation of observation data	Forest area manager/stakeholder entrance	During the research activities	Managing Institution: Researchers and/or Academics, Public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
9	Natural Tourism Operational Activities	Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Do not littering solid waste when in a nature tourism location 2. Minimizing the use of construction materials made of hard-to-decompose plastics 3. Collect solid, liquid, B3 waste in the trash bin that has been provided 4. Provide non-B3 trash cans at strategic points.	All areas of natural tourism operational activities	During the operational activities of nature tourism	The monitoring method is carried out by means of observation of: 1. Solid waste disposal arrangements at natural tourism sites 2. Minimizing the use of construction materials made of plastic that is difficult to decompose 3. The existence of solid, liquid, non-B3 and B3 waste orders 4. Conducting technical guidance to business managers/natural tourism activities. Data analysis: Tabulation of observation data	All areas of natural tourism operational activities	Once every 6 (six) months during the operational activities of Nature Tourism	Management Institution: Business actors/natural tourism activities, Visitors Monitoring Institutions: Provincial Tourism and Creative Economy Office; Regency Culture and Tourism Office	
		Deteriorating water quality	The quality of water parameters includes TDS, TSS, BOD, COD according to	Technological approach: 1. Immediately conduct compaction and road pavement	All areas of natural tourism operational activities	During the operational activities of nature tourism	The monitoring method is carried out by means of observation on: 1. Compaction and road pavement arrangements on	All areas of natural tourism operational activities	Once every 6 (six) months during the operational activities of Nature Tourism	Management Institution: Natural tourism business actors Monitoring Institutions:	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			river water quality standards or others in attachment VI of the Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Management	on the road tracks that have been opened. 2. Making trenches on the left and right of the road as a flow of water, so that the flow of water entering the water body (canal / river) is relatively clear 3. Maintain the presence of plants on the left and right of the road that are opened which function to resist soil particulates carried by surface streams during rainfall 4. Maintain the existence of the river border area.			road tracks that have been opened. 2. The existence of trenches on the left and right of the road as a flow of water 3. The presence of plants on the left and right of the road that are opened 4. Arrangement of the existence of river boundaries 5. Sampling of river water quality parameters TDS, TSS, BOD, COD using the SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019 methods or those that apply in the future in collaboration with laboratories registered by the Ministry of			Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							Environment and Forestry. Data analysis: The measurement results were compared with the quality standards of water quality levels in accordance with attachment VI of the Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management.				
10	PBPH (Forest Utilization Business Permit) Operational Activities	Increased runoff, erosion and sedimentation rates	The amount of erosion and sedimentation that arises can be controlled in all areas granted with PBPH permits	1. Replanting in open areas that have been cut down, former skid trails, former wood collection sites (TPn), and around the base camp, with fast-growing varieties, local varieties and fruits. 2. The land cleared for the Base Camp, the wood collection	All areas granted with PBPH permits	During PBPH (Forest Utilization Business Permit) activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan	Data collection methods: Observe on: 1. Replanting arrangements in open areas of former cutting, former skid trails, former timber collection sites (TPn), and around the base camp, with fast-growing varieties, local varieties and fruits. 2. The arrangement of land cleared for	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				site (TPn) was selected with a slope of less than 15%. 3. Make a road trajectory with a maximum slope of 10% 4. Normalizing drainage channels that have occurred siltation, narrowing and blockage; 5. Routine maintenance of drainage channels; 6. Creating and distributing runoff water and water infiltration areas. 7. Logging must not exceed the Annual Work Plan/AWP (<i>Rencana Kegiatan Tahunan/RKT</i>) targets on the approved block. 8. It is forbidden to carry out logging in protected areas		(<i>Rencana Kegiatan Tahunan/RKT</i>) and General Work Plan (<i>Rencana Kegiatan Umum/RKU</i>)	Base Camp, where wood collection (TPn) is selected with a slope of less than 15%. 3. The existence of a road track with a maximum slope of 10% 4. Normalization of drainage channels where siltation, narrowing and blockage have occurred; 5. Regular maintenance arrangements of drainage channels; 6. Existence and regulation of the construction and distribution of runoff water and water catchment areas. 7. Logging arrangements must not exceed the AWP target on the approved block. 8. Regulations prohibit logging in				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				(<i>hutan lindung</i>/HL), right and left of river borders, germplasm, 40% slopes, animal bags, seed gardens, permanent measuring plots, spring water sources, buffer zones. 9. Construction, repair of bridges and culverts at the confluence of roads and canals/ watercourse.			protected areas (<i>hutan lindung</i>/HL), right and left river borders, germplasm, 40% slopes, animal bags, seed gardens, permanent measuring plots, spring sources, buffer zones. 9. The existence and arrangement of making, repairing bridges and culverts at the intersection of roads with canals/watercourse. Data analysis: Tabulation and processing of observational data				
		Deteriorating water quality	The controlled of TDS, TSS, BOD, COD parameter levels, according to river water quality standards or those similar	Technological approach: 1. Immediately conduct compaction and pavement of the road on the road tracks that have been opened	All areas granted with PBPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation stages) in	The monitoring method is carried out by means of observation on: 1. Compaction and road pavement arrangements on road tracks that have been opened.	1. All areas granted with PBPH permits 2. Water/lake/ river bodies with designated coordinates and locations	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service;	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			to as in the attachment VI of Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management	2. Making trenches on the left and right of the road as a channel for water flow, so that the flow of water entering the water body (canal/river) is relatively clear 3. Maintain the presence of plants on the left and right of the road that are opened which function to resist soil particulates that are carried to the surface stream when rain occurs 4. Maintain the condition of the river border area.		accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	2. The existence of trenches on the left and right of the road as a flow of water 3. The presence of plants on the left and right of the road that are opened 4. Arrangement of the existence of river boundaries 5. Sampling of river water quality parameters TDS, TSS, BOD, COD using the SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019 or applicable in the future in collaboration with the Ministry of Environment and Forestry's registered laboratories Data analysis:			Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							The measurement results are compared with the quality standards of water quality levels in accordance with attachment VI of Government Regulation number 22 of 2021 concerning the Implementation of Environmental Protection and Management				
		Vegetation damage	The percentage of the amount of decrease in abundance and diversity of vegetation species in all areas granted with PBPH permits can be minimized	1. Reduce excessive forest clearing and select unproductive locations for the creation of timber collection sites (TPn), Base Camps and so on. 2. Carry out good forest nurturing such as the exemption of standing stands, the appointment of fostered trees (core trees as many as ± 25 trees/Ha), the procurement of	All areas granted with PBPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data collection methods: Observe on: 1. Arrangements to reduce excessive forest clearing and select unproductive locations for the creation of timber collection sites (TPn), Base Camps and so on. 2. Checking the implementation of good forest development such as the exemption of standing stands, the appointment	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				seedlings/making seedlings, planting/enrichment, and maintenance in accordance with the silviculture Indonesian Selective Cutting and Planting System (<i>Tebang Pilih Tanam Indonesia</i>/TPTI) system in each RKT run. 3. Provide protection areas for protected vegetation/flora. 4. Create areas for protected areas and not logging on: river borders, germplasm, 40% slopes, animal patch, seed gardens, permanent measuring plots, spring water sources, buffer zones (protected area/HL).			of fostered trees (core trees as $\pm$ 25 trees/ha), the procurement of seedlings/making seedlings, planting/enrichment, and maintenance in accordance with the silviculture TPTI system in each ongoing AWP/RKT. 3. The existence of protection areas in the types of vegetation/flora that are protected. 4. The existence of areas for protected areas (<i>Hutan Lindung</i>/HL) and not logging on: river borders, germplasm, 40% slopes, animal pockets, seed gardens, permanent measuring plots, spring water sources, buffer zones. 5. Arrangements for				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							the implementation of the inauguration/arrangement of conservation area boundaries (KPPN and KPSL) and maintaining the pioneers/pal batas made 6. The existence of notification boards in KPPN, KPSL, river borders, buffer areas of Protected Forests and other conservation areas - If there are trees that are protected in the plan of staple plant and life plant area, then the tree is not cut down and a notification sign is made 7. The existence of forest security posts in areas that are prone to timber theft or forest				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							encroachment disturbances as an effort to prevent/counter wood theft and forest encroachment. 8. Arrangements for the implementation of education and training for employees of the production unit so that they can carry out their work properly. Thus, damage to the standing can be suppressed to a minimum 9. Arrangements for the implementation of counseling to the community in and around the PBPH location about the importance of the existence of conservation areas Data analysis: Tabulation & data processing of observation results				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
		Solid waste and domestic waste generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Provision of garbage containers in the base camp area that are easy to lift, closed and easy to empty by the cleaners 2. Conducting environmental cleanliness supervision and cleaning the water area around the project from domestic garbage by cleaning officers 3. Appeal not to litter, especially in the waters 4. Waste collection in garbage cans provided to then be disposed of at the landfill routinely every 3 days 5. Garbage transportation uses closed trucks to prevent	All areas granted with PBPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation stages in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data collection methods: Observe on: 1. The existence of garbage containers in the base camp area that are easy to lift, closed and easy to empty by the cleaners 2. Arrangement of environmental hygiene supervision and cleaning of the water area around the project from domestic garbage by the janitor 3. A call sign not to litter, especially in the water areas 4. Check the garbage collection arrangements at the garbage bins provided to be disposed of at the landfill routinely every 3 days 5. Garbage hauling arrangement using enclosed	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				garbage splatters.			trucks to prevent garbage splatters 6. Coordination arrangements with the local Environmental Agency. Data analysis: Tabulation and processing of observational data				
		Generation of B3 waste	The percentage of the number of B3 waste scatterings in the activity components that have the potential to have an impact on B3 waste scatterings by fulfilling Attachment IX of Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Management	1. Prohibit residents/workers with PBPH permits from disposing of B3 either in the form of used oil, used TL lamps to domestic TPS or water bodies 2. Apply strict sanctions to PBPH permit residents/workers who litter dispose of LB3 3. Appealing to all residents/workers with PBPH permits who produce LB3 to record the volume of waste produced every	All areas granted with PBPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data collection methods: Observe on: 1. Arrangements prohibit residents/workers from PBPH permits to dispose of B3 in the form of used oil, used TL (fluorescents) lamps to domestic TPS and water bodies 2. Arrangements for the application of strict sanctions to PBPH permit residents/workers who littering/ dispose of B3 waste 3. Setting an appeal to all PBPH	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				day in the form of B3 waste balance and B3 waste manifestation 4. Provision of facilities for the container, collection and storage of B3 waste in each PBPH permit - Cooperate with licensed third parties in the collection, transportation and management of B3 waste 5. Temporary storage of B3 waste is carried out at garbage dump (<i>Tempat Pembuangan Sampah/TPS</i>) B3 before the waste is handed over to a licensed third party.			permit residents/workers who produce B3 permit to record the volume of waste produced every day in the form of B3 waste balance and B3 waste manifestation 4. Existence of facilities for containerization, collection and storage of B3 waste in each PBPH permit - Cooperate with a licensed third party in the collection, transportation and management of B3 waste 5. Temporary storage of B3 waste is carried out at B3 garbage dump before the waste is handed over to a licensed third party. Data analysis:				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							Tabulation and processing of observational data				
		Decreased air quality from power plant emissions (Genset)	Emission air quality meets quality standards according to regulations: Minister of Environment and Forestry Regulation Number 11 of 2021 concerning Engine Emission Quality Standards with Internal Combustion	1. Regular maintenance of power plants (generators) 2. Emission testing for generator set power generation equipment on a regular basis 3. Limiting the life of an operational generator power plant 4. Requiring workers/residents to wear personal protective equipment such as masks 5. Carry out reforestation and tree planting that can reduce air pollution to the maximum in the PBPH licensing area 6. Create a buffer zone	All areas granted with PBPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data collection methods: Observe on: 1. The existence of documents on the results of periodic maintenance of power plants (generators) 2. The existence of emission test results documents for generator power generation equipment on a regular basis 3. Setting the age limit of operating generator power plants 4. Arrangement of the obligation of workers/residents to wear personal protective equipment such as masks 5. The existence of reforestation and tree planting results that can reduce air pollution to the	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				7. Carry out land rehabilitation.			maximum in the PBPH licensing area 6. The existence of a buffer zone 7. The existence of rehabilitated plants. Data analysis: Tabulation and processing of observational data				
		Decreased ambient air quality (Increased Dust levels)	TSP below the quality standard threshold of 230 micrograms per m3 24-hour measurement time PM10 below the quality standard threshold of 75 micrograms per m3 24-hour measurement time PM 2.5 below the quality standard threshold of 55 micrograms	1. Washing vehicle tires every time they leave the PBPH site 2. Cleaning and watering of roads passed by PBPH vehicles is regularly prioritized during the day between 09.00 - 15.00 every day 3. Regulation of traffic flow in and out of PBPH vehicles by officers/workers/operators 4. Setting the PBPH vehicle	All areas granted with PBPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data Collection Method: Observation on: 1. Vehicle tire washing arrangements every time leave the PBPH site 2. Regular cleaning and watering arrangements for roads passed by PBPH vehicles are prioritized during the day between 09.00 - 15.00 every day 3. Regulation of traffic flow in and out of PBPH vehicles by	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			per m3 24-hour measurement time guided by Appendix VII of the Government Regulation Number 22 of 2021	operating hours schedule 5. Providing a cover for the tailgate of a truck transporting wood product 6. The use of vehicles that meet the requirements for roadworthiness administratively			officers/workers/operators 4. Setting the PBPH vehicle operating hours schedule 5. Arrangement of covering the timber truck body 6. Administrative regulation of the use of vehicles that meet roadworthiness requirements 7. Measurement of TSP, PM10, PM 2.5 levels in accordance with SNI 19-7119.6-2005, SNI 7119.14:2016, SNI 7119.15:2016 or in the future in collaboration with the registered laboratory of the Ministry of Environment and Forestry. Data analysis: Tabulation of observation data &				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							The measurement results are compared with the quality standards of TSP, PM10, and PM2.5 levels in accordance with Annex VII Government Regulation Number 22 of 2021 or other future regulation				
		Decline in the hydrological quality of groundwater level	The groundwater level (<i>Tinggi Muka Air Tanah/TMAT</i>) at the compliance point meets the provisions in accordance with the Minister of Environment and Forestry Regulation Number P.15/MENLHK/SETJEN/KUM.1/2/2017 concerning Procedures for Measuring Groundwater Level at Peat Ecosystem	1. Conducting a survey of land topography as the basis for planning and designing a system of canals, roads and the arrangement of plant blocks 2. Construction of canal networks by following the principles of eco-hydro 3. Carry out water management to maintain TMAT by making canal blockings (dam) as needed, both in the form of canal blocks without runoff channels	All areas granted with BPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data Collection Method: Observation on: 1. Arrangement of land topographic survey as the basis for planning and designing canal network systems, roads and arrangement of plant blocks 2. The existence of a canal network by following the principle of eco-hydro 3. Regulating water management to maintain TMAT by creating canal blockings (dams) as needed, both in the form of canal blocks	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			Compliance Points	(spillways) and with runoff channels (spillways). 4. Normalization of water outlets/ rivers located inside concessions and/or community areas. The Peat Dome Peak Area is managed as follows: 1. The area is allocated as a Peat Ecosystem Protected Function Area (<i>Fungsi Lindung Ekosistem Gambut/FLEG</i>) and is managed as the management of the Protected Area as an area that is prohibited from being recultivated after harvesting, for PBPH business			without and with spillways. 4. Normalization of water outlets /rivers located inside concessions and/or community areas. The Peat Dome Peak Area is managed as follows: 1. The existence of the area is allocated as a Peat Ecosystem Protected Functional Area (FLEG) and is managed as the management of the Protected Area as an area that is prohibited from being recultivated after harvesting, for PBPH business 2. The existence of a canal network by following the principle of eco-hydro; 3. Regulating water levels and				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				2. The construction of a canal network by following the principles of eco-hydro; 3. Regulate water levels and groundwater levels by building canal barriers at every water level difference $\pm$ 50cm 4. Carry out water management to maintain TMAT by making canal blockings (dam) as needed, both in the form of canal blocks without runoff channels (spillways) and with runoff channels (spillways). 5. The area allocated as a Peat Ecosystem Protected Function Area (FLEG) at the top of the peat dome is			groundwater level by building canal barriers at every water level difference $\pm$ 50cm 4. Regulating water management to maintain TMAT by creating canal blockings (dams) as needed, both in the form of canal blocks without spillways and with spillways. 5. The existence of the area allocated as a Peat Ecosystem Protected Function Area (FLEG) at the top of the peat dome is managed as the management of the Protected Area Data analysis: Tabulation of observation data				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				managed by how the Protected Area is managed.							
		Decreased soil quality and fertility	1. Percentage of total vegetation and soil damage 2. The physical, biological and chemical properties of the soil are maintained and support for optimal plant growth	1. Land clearing is carried out in blocks with an area of ± 25-30 Ha and land preparation is carried out by agricultural activities, logging, felling and land clearing; 2. Planting immediately after harvest: from handing over the harvest area to the start of planting activities ≤ 14 days 3. Carrying out fertilization activities with Macro Fertilizers, Micro Fertilizers and Organic Fertilizers/biomass to meet the needs of plant microelements	All areas granted with PBPH permits	During PBPH activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data collection methods: Observation on: 1. Land clearing arrangements carried out in blocks with an area of ± 25-30 Ha and land preparation carried out by agricultural activities, logging, felling and land clearing; 2. Planting arrangements immediately after harvest: from handing over the harvest area to the start of planting activities ≤ 14 days 3. Arrangement of Fertilization activities with Macro Fertilizers, Micro Fertilizers and Organic Fertilizers/biomass to meet the	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				4. Peat consolidation by taking into account and avoiding areas that have "undrained" potential, namely areas with potential elevations below the highest tide elevation of river water. 5. The use of fertilizers and pesticides according to the right dosage and dosage 6. Avoid land clearing for a long time.			needs of plant microelements 4. The regulation of peat consolidation by taking into account and avoiding areas that have "undrained" potential, namely areas with potential elevations below the highest tidal elevation of river water. 5. Regulating the use of fertilizers and pesticides according to the right dosage and dosage 6. Arrangements: Avoid land clearing for a long time. 7. Performed by vegetation analysis 8. Soil sampling by making soil profile holes/pedon. Data analysis:				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							1. Tabulation & data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index 2. Analysis of soil physics, chemistry, and minerals includes texture, density/bulk density, porosity, permeability, and pH of the soil. The measurement results are compared with the standard quality criteria for soil damage in accordance with the Minister of Environment Regulation Number 7 of 2006 or those that apply in the future.				
		Increased traffic generation	Minimize traffic disruptions	1. Arrange the transportation of timber, so that it does not go hand in hand	All areas granted with PBPH permits	During PBPH activities (pre-construction,	Data Collection Method: Observation on : 1. Arrangement of timber	All areas granted with PBPH permits	Once every 6 (six) months during PBPH activities	Managing Institution: PBPH permit holder	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				2. Installing road signs as needed to prevent accidents 3. Periodic vehicle inspections according to SOPs so that there is no damage during operation 4. Provision of signs (flashlights, signs of PBPH activities) in the PBPH area 5. Provision of officers to regulate traffic at PBPH permit locations 6. Heavy vehicle mobilization is carried out outside of heavy traffic hours, both in the morning (06.00-09.00) and in the afternoon (16.00-19.00) and is prioritized at night		construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	transportation trips, so that they do not go hand in hand 2. The existence of road signs as needed to prevent accidents 3. The existence of documents from the results of periodic vehicle inspections according to the SOP so that there is no damage during operation 4. The presence of signs (flashlights, signs of PBPH activities) in the PBPH area 5. The presence of officers to regulate traffic at the PBPH permit location 6. Arrangements for the mobilization of heavy vehicles transporting wood are carried out outside of heavy traffic hours both in the morning (06.00-09.00) and in the afternoon			Monitoring Institutions: Provincial Transportation Office; Regency/City Transportation Agency	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				7. Implement all recommendations listed in the traffic study document.			(16.00-19.00) and are prioritized at night 7. Implement all recommendations listed in the Lalin study document. Data analysis: Tabulation of observation data				
11	Housing and Settlement Activities	Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Processing organic waste into compost 2. Processing non-organic household waste is by Reuse, Reduce, and Recycle Reducing waste production can be done by: 1. Using durable materials or items. 2. Reduce the use of single-use items. 3. Reduce spending on goods that are not really needed. 4. Caring for and repairing	Housing and residential areas	During Housing and Settlement activities	The monitoring method is carried out by means of observation on: 1. Regulation of processing organic waste into compost fertilizer 2. The arrangement for processing non-organic household waste is by Reuse, Reduce, and Recycle. Reducing waste production can be done by: 1. Arrangements using durable materials or items. 2. Arrangements reduce the use of single-use items.	Housing and residential areas	6 (six) months during the Housing and Settlement activities	Managing Institution: public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environmental Agency; Regency/City Public Work and Community Housing (PUPR) Office	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				clothing, toys, appliances and household appliances rather than replacing them with new ones. 5. Use plastic bags up to 5 times for shopping. 6. Use a reusable basket or bag.			3. Arrangements reduce the spending of goods that are not really needed. 4. Arrangements care for and repair clothing, toys, appliances, and household appliances rather than replacing them with new ones. 5. Arrange the use of plastic bags up to 5 times for shopping. 6. Settings for the use of reusable baskets or bags. 7. Technical coaching to residents/communities of settlements 8. Provision of general infrastructure assistance for the treatment of domestic solid waste. Data analysis: Tabulation of observation data				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
		Household liquid waste generation	1. There is a waste management system/ infrastructure for households 2. Cleanliness of residential areas and settlements is maintained	The manufacture is made of a sewage collection tank (septic tank) consisting of a collection tank and an infiltration tank and connected to a PVC pipeline by paying attention to the following: 1. It does not pollute drinking water sources in the surrounding area, both ground surface water and underground water. 2. Does not pollute the soil surface. 3. Avoid the spread of hookworms on the ground surface. 4. Prevents the breeding of flies and other insects. 5. Does not create an annoying odor. 6. Construction to be made simply with materials	Community residential sewers	During Housing and Settlement activities	The monitoring method is carried out by means of observation on: In the construction should be made a sewage collection tank (septic tank) consisting of a collection tank and an infiltration tank and connected to a PVC pipeline by paying attention to the following: 1. The setting so it does not pollute drinking water sources in the surrounding area, both groundwater and ground-level water. 2. The arrangement so it does not foul the ground surface. 3. The arrangement to avoid the spread of hookworms on the ground level. 4. Arrangements for preventing the breeding of flies and other insects.	Residential areas and community sewers	6 (six) months during the Housing and Settlement activities	Management Institutions: The Public community, the Provincial Employment Agency, Spatial Planning and Water Resources (<i>Sumber Daya Air/SDA</i>); Provincial Public Works and Highways Office Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environmental Agency; Regency/City Public Work and Community Housing (PUPR) Office	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				that are easy to obtain and inexpensive. 7. The minimum distance between the water source and the infiltration basin is 10 m.			5. The setting so it does not create any unpleasant odor. 6. Construction arrangements to be made simple with materials that are easy to obtain and inexpensive. 7. Setting the minimum distance between the water source and the infiltration basin is 10 m 8. Conducting technical coaching to residents/communities in housing and settlements 9. Provide assistance in general infrastructure for the treatment of domestic household liquid waste. Data analysis: Tabulation of observation data				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
12	Trading Business Activities	Solid Waste and Domestic Waste Generation	1. Volume of solid waste/domestic waste of / day 2. The average amount of domestic solid waste generated is kg/day	1. Processing organic waste into compost 2. Processing waste for non-organic trading business activities is by reuse, reduce, and recycle. Reducing waste production can be done by: 1. Reduce the use of single-use items. 2. Use plastic bags (crackers) up to 5 times for shopping. 3. Use a reusable basket or bag.	According to the location of the trading business activities	During trading activities	The monitoring method is carried out by means of observation on: 1. Regulation of processing organic waste into compost fertilizer 2. The regulation of non-organic trade business waste processing is by reuse, reduce, and recycle Reducing waste production can be done by: 1. Regulation to reduce the use of plastic bags up to 5 times for shopping. 2. Settings for the use of reusable baskets or bags. 3. Technical guidance to trade business actors Data analysis: Tabulation of observation data	According to the location of the trading business activities	6 (six) months during the trading activities	Managing Institution: public community Monitoring Institutions: Provincial Environment and Forestry Service; Regency/City Environment Agency	
13	Plantation Operational Activities	Increased runoff, erosion and	The amount of erosion and sedimentation that arises can	1. Replanting in open areas that have been harvested,	All Plantation permit (HGU) Areas	During the Plantation permit (HGU)	Data collection methods: Observe on:	All Plantation permit (HGU) Areas	Once every 6 (six) months during the Plantation	Managing Institution: Plantation business actors	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
		sedimentation rates	be controlled in all areas of the Plantation Right To Cultivate (<i>Hak Guna Usaha</i> /HGU)	former roads for transporting garden products, former garden product collection sites, and around the base camp. Fast-growing varieties, local varieties and fruits. 2. The land cleared for Base Camp, where the plantation products are collected, was chosen with a slope of less than 15%. 3. Make a road trajectory with a maximum slope of 10% 4. Normalizing drainage channels that have occurred siltation, narrowing and blockage; 5. Routine maintenance of drainage channels;		activities (pre-construction, construction, operational, and post-operation stages in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	1. Replanting arrangements in open areas used for harvesting, former roads for transporting garden products, former collection places for garden products, and around the base camp. Fast-growing varieties, local varieties and fruits. 2. The arrangement of land cleared for Base Camp, where plantation products are collected is chosen with a slope of less than 15%. 3. The existence of a road track with a maximum slope of 10% 4. Normalization of drainage channels where siltation, narrowing and blockage have occurred; 5. Regular maintenance		permit (HGU) activities	Monitoring Institutions: Provincial Plantation Service; Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				6. Creating and distributing runoff water and water infiltration areas. 7. Yield harvesting must not exceed the annual work plan (<i>Rencana Kerja Tahunan/RKT</i>) target on the verified block. 8. It is forbidden to carry out logging in protected areas (<i>hutan lindung/HL</i>) on the right and left of river borders, germplasm, 40% slopes, animal bags, seed gardens, permanent measuring plots, spring water sources, buffer zones. 9. Construction and repairment of bridges and culverts at the confluence of roads and			arrangements of drainage channels; 6. Existence and regulation of the manufacture and distribution of runoff water and water catchment areas. 7. Harvesting arrangements must not exceed the RKT target on the approved block. 8. Regulations prohibit logging in protected areas (<i>hutan lindung/HL</i>) on the right and left river borders, germplasm, 40% slopes, animal bags, seed gardens, permanent measuring plots, spring sources, buffer zones (HL). 9. The existence and arrangement of making, repairing bridges and culverts at the intersection of				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				canals/water streams			roads with canals/tributaries. Data analysis: Tabulation and processing of observational data				
		Deteriorating water quality	The level of TDS, TSS, BOD, COD parameters are under control, according to river water quality standards or those similar type as in the attachment VI of Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management	Technological approach: 1. Immediately conduct compaction and pavement of the road on the road tracks that have been opened 2. Making trenches on the left and right of the road as a channel for water flow, so that the flow of water entering the water body (canal/river) is relatively clear 3. Maintain the presence of plants on the left and right of the road that are opened which function to resist soil	All Plantation permit (HGU) Areas	During the Plantation permit HGU activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	The monitoring method is carried out by means of observation on: 1. Compaction and road pavement arrangements on road tracks that have been opened. 2. The existence of trenches on the left and right of the road as a flow of water 3. The presence of plants on the left and right of the road that are opened 4. Arrangement of the existence of river boundaries 5. Sampling of river water quality parameters TDS, TSS, BOD, COD using the SNI 6989.27:2019, SNI 6989.3:2019,	1. All Plantation HGU Areas 2. Water/lake/river bodies with designated coordinates and locations	Once every 6 (six) months during the Plantation HGU activities	Managing Institution: Plantation business actors Monitoring Institutions: Provincial Plantation Service; Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				particulates that are carried to the surface stream when rain occurs 4. Maintain the condition of the river border area.			SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019 methods or those that apply in the future in collaboration with laboratories registered by the Ministry of Environment and Forestry. Data analysis: The measurement results are compared with the quality standards of water quality levels in accordance with attachment VI PP 22 of 2021 concerning the Implementation of Environmental Protection and Management				
		Vegetation damage	The percentage of the decrease in abundance and diversity of vegetation types in all Plantation HGU areas	1. Reduce excessive forest clearing and choose unproductive locations for the creation of plantation product	All Plantation HGU Areas	During the Plantation HGU activities (pre-construction, construction, operational, and post-	Data collection methods: Observation on: 1. The arrangement to reduce excessive forest clearing and selected unproductive	All Plantation HGU Areas	Once every 6 (six) months during the Plantation HGU activities	Managing Institution: Plantation business actors Monitoring Institutions: Provincial Plantation Service;	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			can be minimized	- collection sites, Base Camps and so on. 2. Implementing good forest construction 3. Provide protection areas for protected vegetation/flora. 4. Create areas for protected areas (<i>Hutan Lindung</i>/HL) and do not conduct logging on: river borders, germplasm, 40% slopes, animal bags, seed gardens, permanent measuring plots, spring water sources, buffer zones.		operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	- locations for the creation of plantation product collection sites, Base Camps and so on. 2. Checking the implementation of good forest construction 3. The existence of protection areas in the types of vegetation/flora that are protected. 4. The existence of areas for protected areas (<i>hutan lindung</i>) and not conducting logging on: river borders, germplasm, 40% slopes, animal pockets, seed gardens, permanent measuring plots, spring water sources, buffer zones. 5. Arrangements for the implementation of the			Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							inauguration/arrangement of conservation area boundaries (KPPN/<i>Kawasan Perlindungan Plasma Nutfah</i>/Germ Plasm protection Area and KPSL/<i>Kawasan Perlindungan Satwa Liar</i>/Wildlife Protection Area), and maintaining the pioneers/ boundary markers developed 6. The existence of notification boards in KPPN, KPSL, river borders, buffer areas of Protected Forests and other conservation areas - If there are trees that are protected in the plan of the tree and life plant area, then the tree is not cut				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							down and a notification sign is made 7. The existence of forest security posts in areas that are prone to disturbances of theft of garden products or forest encroachment is an effort to prevent/counter theft of garden products and forest encroachment. 8. Arrangements for the implementation of education and training for employees of the production unit so that they can carry out their work properly. Thus, damage to the standing can be suppressed to a minimum 9. Arrangements for the implementation of counseling to the community in and around the				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							location of the Plantation HGU about the importance of the existence of conservation areas Data analysis: Tabulation and processing of observational data				
		Decreased air quality from power plant emissions (<i>Genset</i>)	Emission air quality meets quality standards according to regulations: Minister of Environment and Forestry Regulation Number 11 of 2021 concerning Engine Emission Quality Standards with Internal Combustion	1. Regular maintenance of power plants (generators) 2. Emission testing for generator set power generation equipment on a regular basis 3. Limiting the life of an operational generator power plant 4. Requiring workers/residents to wear personal protective equipment such as masks 5. Carry out reforestation	The entire plantation HGU area	During the plantation HGU activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data collection methods: Observation on: 1. The existence of documents on the results of periodic maintenance of power plants (generators) 2. The existence of emission test results documents for generator power generation equipment on a regular basis 3. Setting the age limit of operating generator power plants 4. Arrangement of the obligation of workers/residents to wear personal	The entire plantation HGU area	Once every 6 (six) months during the Plantation HGU activities	Managing Institution: Plantation business actors Monitoring Institutions: Provincial Plantation Service; Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				and tree planting that can reduce air pollution to the maximum in the PBPH licensing area 6. Create a buffer zone 7. Carry out land rehabilitation.			protective equipment such as masks 5. The existence of reforestation and tree planting results that can reduce air pollution to the maximum in the PBPH licensing area 6. The existence of a buffer zone 7. The existence of rehabilitated plants. Data analysis: Tabulation and processing of observational data				
		Decreased ambient air quality (Increased Dust levels)	TSP below the quality standard threshold of 230 micrograms per m3 24-hour measurement time PM10 below the quality standard threshold of 75 micrograms	1. Washing vehicle tires every time they leave the location of the Plantation HGU site 2. Cleaning and watering of roads passed by Plantation HGU vehicles is periodically prioritized during the day	The entire plantation HGU area	During the plantation HGU activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT)	Data Collection Method: Observation on: 1. Vehicle tire washing arrangements every time they leave the Plantation HGU site location 2. Regular cleaning and watering arrangements for roads passed	The entire plantation HGU area	Once every 6 (six) months during the Plantation HGU activities	Managing Institution: Plantation business actors Monitoring Institutions: Provincial Plantation Service; Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			per m3 24-hour measurement time PM 2.5 below the quality standard threshold of 55 micrograms per m3 24-hour measurement time guided by Appendix VII Government Regulation Number 22 of 2021	3. Regulation of traffic flow in and out of Plantation HGU vehicles by officers/workers /operators 4. Setting the schedule of operational working hours of HGU Plantation vehicles 5. Providing a cover on the tailgate of a truck transporting garden produce 6. The use of vehicles that meet the requirements for roadworthiness administratively.		and General Work Plan (RKU)	by Plantation HGU vehicles are prioritized during the day between 09.00 - 15.00 every day 3. Regulation of traffic flow in and out of Plantation HGU vehicles by officers/workers/ operators 4. Setting the schedule of operational working hours of HGU Plantation vehicles 5. Arrangement of covering the tailgate of the garden product transport truck 6. Administrative regulation of the use of vehicles that meet roadworthiness requirements 7. Measurement of TSP, PM10, PM 2.5 levels in accordance with SNI 19-7119.6-2005, SNI 7119.14:2016,				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							SNI 7119.15:2016 or in the future in collaboration with the registered laboratory of the Ministry of Environment and Forestry Data analysis: Tabulation of observation data & The measurement results are compared with the quality standards of TSP, PM10, and PM2.5 levels in accordance with Annex VII Government Regulation Number 22 of 2021 or in the future				
		Decline in the hydrological quality of groundwater level	The groundwater level (<i>Tinggi Muka Air Tanah/TMAT</i>) at the compliance point meets the provisions in accordance with the Minister of	1. Conducting a survey of land topography as the basis for planning and designing a system of canals, roads and the arrangement of plant blocks	The entire plantation HGU area	During the plantation HGU activities (pre-construction, construction, operational, and post-operation stages) in accordance	Metode Data collection: Observation on: 1. Arrangement of land topographic survey as the basis for planning and designing canal network systems, roads and arrangement of plant blocks	The entire plantation HGU area	Once every 6 (six) months during the Plantation HGU activities	Managing Institution: Plantation business actors Monitoring Institutions: Provincial Plantation Service; Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			Environment and Forestry Regulation Number P.15/MENLHK/SETJEN/KUM.1/2/2017 concerning Procedures for Measuring Groundwater Level at Peat Ecosystem Compliance Points	2. Construction of canal networks by following the principles of eco-hydro 3. Carry out water management to maintain TMAT by making canal blockings (dam) as needed, both in the form of canal blocks without runoff channels (spillways) and with runoff channels (spillways). 4. Normalization of water outlets/rivers located in concessions and/or community areas. The Peat Dome Peak Area is managed as follows: 1. The area is allocated as a Peat Ecosystem Protected Functional Area		with the Annual Work Plan (RKT) and General Work Plan (RKU)	2. The existence of a canal network by following the principle of eco-hydro 3. Regulating water management to maintain TMAT by creating canal blockings (dams) as needed, both in the form of canal blocks without spillways and with spillways. 4. Normalization of water outlets /rivers located in concessions and/or community areas. The Peat Dome Peak Area is managed as follows: 1. The existence of the area is allocated as a Peat Ecosystem Protected Functional Area (FLEG) and is managed as the management of the Protected				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				(Fungsi Lindung Ekosistem Gambut/ FLEG) and is managed as the management of the Protected Area as an area that is prohibited from being recultivated after harvesting, for Plantation business 2. The construction of a canal network by following the principles of eco-hydro 3. Regulate water levels and groundwater levels by building canal barriers at every water level difference $\pm$ 50cm 4. Carry out water management to maintain TMAT by making canal blockings (dam) as needed, both in the form of			Area as an area that is prohibited from being recultivated after harvesting, for PBPH business 2. The existence of a canal network by following the principle of eco-hydro; 3. Regulating water levels and groundwater level by building canal barriers at every water level difference $\pm$ 50cm 4. Regulating water management to maintain TMAT by creating canal blockings (dams) as needed, both in the form of canal blocks without spillways and with spillways. 5. The existence of the area allocated as a Peat Ecosystem Protected Function Area (FLEG) at the top of the peat dome				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				canal blocks without runoff channels (spillways) and with runoff channels (spillways). 5. The area allocated as a Peat Ecosystem Protected Function Area (FLEG) at the top of the peat dome is managed by how the Protected Area is managed.			is managed as well as the management of the Protected Area. Data analysis: Tabulation of observation data				
		Decreased soil quality and fertility	1. Percentage of total vegetation and soil damage 2. The physical, biological and chemical properties of the soil are maintained and support for optimal plant growth	1. Land clearing is carried out in blocks with an area of ±25-30 Ha and land preparation is carried out by agricultural activities, logging, felling and land clearing; 2. Planting immediately after harvest: from handing over the harvest area to the start	The entire plantation HGU area	During the plantation HGU activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data collection methods: Observe on: 1. Land clearing arrangements carried out in blocks with an area of ±25-30 Ha and land preparation carried out by agricultural activities, logging, felling and land clearing; 2. Planting arrangements immediately after	The entire plantation HGU area	Once every 6 (six) months during the Plantation HGU activities	Managing Institution: Plantation business actors Monitoring Institutions: Provincial Plantation Service; Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				of planting activities ≤ 14 days 3. Carrying out fertilization activities with Macro Fertilizers, Micro Fertilizers and Organic Fertilizers/biomass to meet the needs of plant microelements 4. Peat consolidation by taking into account and avoiding areas that have "undrained" potential, namely areas with potential elevations below the highest tide elevation of river water. 5. The use of fertilizers and pesticides according to the right dosage and dosage			harvest: from handing over the harvest area to the start of planting activities ≤ 14 days 3. Arrangement of Fertilization activities with Macro Fertilizers, Micro Fertilizers and Organic Fertilizers/biomass to meet the needs of plant microelements 4. The regulation of peat consolidation by taking into account and avoiding areas that have "undrained" potential, namely areas with potential elevations below the highest tidal elevation of river water. 5. Regulating the use of fertilizers and pesticides according to the				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				6. Avoid land clearing for a long time.			right dosage and dosage 6. Arrangements: Avoid land clearing for a long time. 7. Performed by vegetation analysis 8. Soil sampling by making soil profile holes/pedon. Data analysis: 1. Tabulation and data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index. 2. Analysis of soil physics, chemistry, and minerals includes texture, density/bulk density, porosity, permeability, and pH of the soil. The measurement results are compared with the standard				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							quality criteria for soil damage in accordance with the Minister of Environment Regulation Number 7 of 2006 or those that apply in the future.				
		Increased traffic generation	Minimize traffic disruptions	1. Arrange the transportation of garden/ plantation products, so that they do not go hand in hand 2. Installing road signs as needed to prevent accidents 3. Periodic vehicle inspections according to SOPs so that there is no damage during operation 4. Provision of signs (flashlights, signs of Plantation HGU activities) in the Plantation HGU area	All areas granted with Plantation permits	During plantation activities (pre-construction, construction, operational, and post-operation stages) in accordance with the Annual Work Plan (RKT) and General Work Plan (RKU)	Data Collection Method: Observation on: 1. Arrangement of the transportation of garden/plantation products, so that they do not go hand in hand 2. The existence of road signs as needed to prevent accidents 3. The existence of documents from the results of periodic vehicle inspections according to the SOP so that there is no damage during operation 4. The existence of signs (flashlights, signs of Plantation HGU	The entire plantation HGU area	Once every 6 (six) months during the Plantation HGU activities	Managing Institution: Plantation business actors Monitoring Institutions: Provincial Plantation Service; Regency/City Plantation and Forestry Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				5. Provision of officers to regulate traffic at the location of the Plantation HGU permit 6. The mobilization of heavy vehicles transporting garden products is carried out outside of busy traffic hours (both in the morning (06.00-09.00 and in the afternoon (16.00-19.00) and is prioritized at night 7. Implement all recommendations listed in the traffic study document.			activities) in the Plantation HGU area 5. The presence of officers to regulate traffic at the location of the Plantation HGU permit 6. Arrangements for the mobilization of heavy vehicles transporting garden products is carried out outside of heavy traffic hours, both in the morning (06.00-09.00) and in the afternoon (16.00-19.00) and is prioritized at night 7. Implement all recommendations listed in the Lalin study document. Data analysis: Tabulation of observation data				
14	Subsistence Farming Activities	Vegetation damage	Percentage of the amount of vegetation damage (undergrowth, seedlings,	Technological approaches, including: 1. Minimizes the open areas	All agricultural land areas are opened	During subsistence farming activities	Data collection methods: Observe on: 1. The arrangement to minimize the open areas	All agricultural land areas are opened	6 (six) months during subsistence farming activities	Managing Institution: Subsistence farming community	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			stakes, poles, trees)	without vegetation. 2. Clearing land gradually according to the activity plan. 3. Relocating the existence of protected flora around the prepared land site 4. Revegetation with plant species that are in accordance with the local soil and climate conditions on vacant land such as MPTS plants and grasses (Cover crop). 5. Reforestation of the activity area using plant species that are a source of animal feed. 6. Prohibit hunting and capturing activities and taking protected flora.			without vegetation. 2. The arrangement of land clearing is gradually in accordance with the activity plan. 3. Arrangement to relocate the presence of protected flora around the prepared land footprint 4. The existence of revegetation with plant species that are in accordance with soil conditions and local climate on vacant land such as Multi-Purpose Tree Species/MPTS plants and grasses (Cover crop). 5. The existence of reforestation of activity areas using plant species that are a source of animal feed. 6. The existence of a ban on hunting			Monitoring Institutions: Provincial Food, Food Crops, and Horticulture Office; District Food, Food Crops, and Horticulture Office	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							and catching activities and taking protected flora. 7. It was carried out by analyzing vegetation using the transect path method. Data analysis: Tabulation and data processing using the calculation of the Dominance Index, Diversity Index (Shannon-Wiener) and Equality Index.				
		Deteriorating water quality	The level of TDS, TSS, BOD, COD parameters are under control, according to river water quality standards or the like in attachment VI PP 22 of 2021 concerning the Implementation of Environmental Protection and Management	Technological approaches, including: 1. Controlling erosion technically and vegetatively. For example, by planting trees perpendicular to the stream or parallel to the contour or in open areas that are prone to erosion 2. Continue the erosion and	All agricultural land areas are opened	During subsistence farming activities	The monitoring method is carried out by means of observation on: 1. Controlling erosion technically and vegetatively. For example, by planting trees perpendicular to the stream or parallel to the contour or in open areas that are prone to erosion 2. Continue the erosion and sedimentation	All agricultural land areas are opened	6 (six) months during subsistence farming activities	Managing Institution: Subsistence farming community Monitoring Institutions: Provincial Food, Food Crops, and Horticulture Office; District Food, Food Crops, and Horticulture Office	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				sedimentation management that has been carried out at the post-land preparation stage.			management that has been carried out in the post-land preparation stage 3. Sampling of river water quality parameters TDS, TSS, BOD, COD using the SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019 methods or those that apply in the future in collaboration with laboratories registered by the Ministry of Environment and Forestry. Data analysis: The measurement results are compared with the quality standards of water quality levels in accordance with attachment VI PP 22 of 2021 concerning the Implementation of				

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							Environmental Protection and Management.				
		Increased runoff, erosion and sedimentation rates	The rate of erosion and sedimentation in the prepared land area can be controlled	1. Application of vegetative soil conservation techniques: agroforestry includes alley cropping, strip cropping, grass strips, row of plant residues, cover crops, the application of planting patterns including crop rotation, intercropping, and relay cropping 2. Application of soil conservation techniques technical methods: 1) Tillage of the soil according to the contour; 2) development of contour terrace; 3) terraces; 4) Water Channels 3. The application of mechanized	All agricultural land areas are opened	During subsistence farming activities	Data collection methods: Observe on: 1. Arrangements for the application of vegetative soil conservation techniques: agroforestry includes alley cropping, strip cropping, grass strips, crop residues, cover crops, planting patterns including crop rotation, intercropping, and relay cropping 2. Arrangements for the application of soil conservation techniques technical methods: 1) Soil tillage according to contour; 2) development of contour terrace; 3) terraces; 4) Water Channels 3. Arrangements for the application of mechanical	All agricultural land areas are opened	6 (six) months during subsistence farming activities	Managing Institution: Subsistence farming community Monitoring Institutions: Provincial Food, Food Crops, and Horticulture Office; District Food, Food Crops, and Horticulture Office	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
				method soil conservation techniques: 1) land preparation with a terraced system, 2) a contour embankment system, 3) a stone row system, 4) a stone bench terrace system, 5) an avoidance channel system, and 6) a final sewer system.			method soil conservation techniques: 1) land preparation with a terraced system, 2) contour grading system, 3) stone row system, 4) stone bench terrace system, 5) avoidance channel system, and 6) final sewer system 4. Monitoring of the visual appearance of erosion/absence of infiltration, rate of infiltration and percolation of water into the soil was fast (< of 30 minutes). Data analysis: Tabulation and processing of observational data				
		Decreased soil quality and fertility	1. Percentage of total vegetation and soil damage 2. The physical,	1. Land preparation carried out by agricultural activities, logging, felling	All agricultural land areas are opened	During subsistence farming activities	Data collection methods: Observe on: 1. Land preparation carried out by agricultural activities, logging,	All agricultural land areas are opened	6 (six) months during subsistence farming activities	Managing Institution: Subsistence farming community Monitoring Institutions:	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
			biological and chemical properties of the soil are maintained and support for optimal plant growth	and land clearing 2. Planting immediately after harvest: from handing over the harvest area to the start of planting activities ≤ 14 days 3. Carrying out fertilization activities with Macro Fertilizers, Micro Fertilizers and Organic Fertilizers/biomass to meet the needs of plant microelements 4. The use of fertilizers and pesticides according to the right dosage and dosage 5. Avoid land clearing for a long time.			felling and land clearing 2. Planting immediately after harvest: from handing over the harvest area to the start of planting activities ≤ 14 days 3. Carrying out fertilization activities with Macro Fertilizers, Micro Fertilizers and Organic Fertilizers/biomass to meet the needs of plant microelements 4. The use of fertilizers and pesticides according to the right dosage and dosage 5. Avoid land clearing for a long time. Data analysis: Tabulation and processing of observational data			Provincial Food, Food Crops, and Horticulture Office; District Food, Food Crops, and Horticulture Office	
15	Freshwater Fisheries	Deteriorating water quality	The quality of water	1. Planting hydroponic	Cages/ponds/fishing nets	During freshwater	The monitoring method is carried	Cages/ponds/fishing nets	6 (six) months during	Managing Institution:	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
	Aquaculture Activities	(Eutrophication)	parameters includes TDS, TSS, BOD, COD according to river water quality standards or those similar as in the attachment VI PP 22 of 2021 concerning the Implementation of Environmental Management	plants around floating net cage units (<i>Keramba Jaring Apung/KJA</i>) to reduce phosphorus and nitrogen content in water 2. The use of double net KJA technology and fish stocking outside KJA 3. Regulating the stocking density of fish so that it can grow evenly according to the biological properties and type of fish 4. Conducting environmental quality management, regulation and circulation of freshwater aquaculture water flow on a regular basis.		fisheries cultivation activities	out by means of observation of: 1. Planting hydroponic plants around floating net cage units (KJA) to reduce phosphorus and nitrogen content in water 2. The use of double net KJA technology and fish stocking outside KJA 3. Regulating the stocking density of fish so that it can grow evenly according to the biological properties and type of fish 4. Conducting regular management of environmental quality, regulation and circulation of freshwater aquaculture water flow 5. Sampling of river water quality parameters TDS, TSS, BOD, COD using the SNI		subsistence farming activities	Fishing community Monitoring Institutions: Provincial Fisheries and Marine Service; District Marine and Fisheries Service	

No	Sources of Impact	Impact Type	Magnitude of Impact	Management Plan			Monitoring Plan			Environmental Management and Monitoring Institutions	Remarks
				Outline	Location	Period	Outline	Location	Period		
							6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019 methods or those that apply in the future in collaboration with laboratories registered by the Ministry of Environment and Forestry. Data analysis: The measurement results were compared with the quality standards of water quality levels in accordance with attachment VI PP 22 of 2021 concerning the Implementation of Environmental Protection and Management.				

Information:

**The environmental impact written above is an example that can be adopted entirely, reduced, or added according to the conditions of the location and the business and/or activity plan*

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STANDARD OPERATING PROCEDURE (SOP) FOR CONDUCT OF MANAGEMENT OPERATIONS BY DIFFERENT STAKEHOLDERS

Prepared by:
PMU ITTO PD 712/13

MINISTRY OF ENVIRONMENT
AND FORESTRY

INTERNATIONAL TROPICAL
TIMBER ORGANIZATION (ITTO)
COLLABORATION FOR ITTO PD
712/13 REV.3 (F)



Activity 2.4 To develop SOP
for conduct of management
operations by different
stakeholders



KEMENTERIAN LINGKUNGAN HIDUP DAN KEHUTANAN
BADAN STANDARDISASI INSTRUMEN LINGKUNGAN HIDUP DAN KEHUTANAN
JAKARTA - BOGOR

SERTIFIKAT LAYAK UJI TERAP STANDAR KHUSUS (SALTRA)

Nomor : 167 /SALTRA/PHB/10/2024

Berdasarkan Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor 15 Tahun 2021 tentang Organisasi dan Tata Kerja Kementerian Lingkungan Hidup dan Kehutanan pasal 608 ayat b, dan Keputusan Menteri Lingkungan Hidup dan Kehutanan Nomor 163 Tahun 2024 tentang Pedoman Tata Kelola Standar Khusus Alur Kerja, Output, dan Kinerja Lingkungan Hidup dan Kehutanan, bahwa terhadap standar perlu dilakukan uji terap setelah melalui proses pendalaman substansial dan proses penelaahan kematangan standar serta memiliki elemen penilaian kesesuaian standar. Untuk tertib administrasi pelaksanaan uji penerapan standar, maka Kepala Badan Standardisasi Instrumen Lingkungan Hidup dan Kehutanan menyatakan bahwa:

- Judul Standar : Standar Pengelolaan dan Pemantauan Lingkungan Hidup sebagai Upaya Mitigasi Dampak Kegiatan Pengelolaan pada Lanskap Cagar Biosfer
- Kegiatan/Sektor : Kehutanan
- Ruang Lingkup Kegiatan : Mitigasi dampak kegiatan pengelolaan lanskap cagar biosfer, meliputi area inti, area penyangga, dan area transisi
- Penanaman Standar pada Instrumen Wajib : -
- Kode KBLI : -
- Tingkat Risiko Usaha : -
- Jenis Standar : Standar Khusus non Persetujuan Lingkungan
- Dokumen lengkap : Lampiran 1 sebagai bagian tidak terpisahkan dari Sertifikat Layak Uji Terap

TELAH LAYAK
UNTUK DILAKUKAN UJI PENERAPAN STANDAR

Hasil uji terap standar agar digunakan sebagai bahan rekomendasi tindakan korektif dan identifikasi kebutuhan prakondisi/kondisi pemungkin (*enabling condition*) untuk selanjutnya sebagai bahan pertimbangan dalam penetapan standar khusus oleh Menteri Lingkungan Hidup dan Kehutanan.

Demikian untuk digunakan sebagaimana mestinya.

Diterbitkan di : Jakarta
Pada tanggal : 18 Oktober 2024

KEPALA BADAN,



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**ASSESSMENT OF COMPLIANCE IN MONITORING THE
IMPLEMENTATION OF MANAGEMENT STANDARDS AND
ENVIRONMENTAL MONITORING AS AN EFFORT TO
MITIGATE THE IMPACT OF MANAGEMENT ACTIVITIES ON
THE BIOSPHERE RESERVE LANDSCAPE**



**AGENCY FOR STANDARDIZATION OF ENVIRONMENTAL AND FORESTRY
INSTRUMENTS, MINISTRY OF ENVIRONMENT AND FORESTRY**

2024

Summary
ASSESSMENT OF COMPLIANCE IN MONITORING
THE IMPLEMENTATION OF MANAGEMENT STANDARDS AND
ENVIRONMENTAL MONITORING AS AN EFFORT TO MITIGATE THE IMPACT
OF MANAGEMENT ACTIVITIES ON THE BIOSPHERE RESERVE LANDSCAPE

Assessment of compliance is an activity carried out to evaluate the compliance of standard implementation by activity implementers based on reference requirements. This assessment serves as a tool for the Ministry responsible for the environmental and forestry sector or for the designated Conformity Assessment Body in monitoring standard implementation. The results of this conformity assessment also provide feedback for activity implementers to improve their application of standards, and serve as input for standard developers to revise, refine, or review existing standards."

Assessment of Compliance in Monitoring the Implementation of Management Standards and Environmental Monitoring as an Effort to Mitigate the Impact of Management Activities on the Biosphere Reserve Landscape is an integral document that cannot be separated from the protocol/standard document titled "Environmental Management and Monitoring as a Mitigation Effort to the Impact of Management Activities on Biosphere Reserve Landscapes."

This Assessment of Compliance serves as a Standard Operating Procedure (SOP) to evaluate the compliance of standard implementation, as follows:

1. Monitoring and inspection of the implementation of environmental management and monitoring standards as a mitigation effort to address environmental impacts caused by business and/or activities conducted by business actors within the Biosphere Reserve landscape.
2. Identifying the success of standard implementation based on specific criteria or indicators under the authority of the Ministry responsible for the environment and forestry sector or the designated Conformity Assessment Body.
3. The Assessment of Compliance is carried out to evaluate the performance of established environmental and forestry standards. Important records regarding environmental management and monitoring activities conducted by standard-applying entities—beyond those explicitly listed in the standards—may demonstrate the performance of the implementing entity and serve as valuable input for revising or reviewing the standards.

The output of the Conformity Assessment is in the form of recommendations for reviewing established standards, enabling conditions for implementing standards, and recommendations to implementers and implementing entities regarding improvements to the implementation of standards.

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ASSESSMENT OF COMPLIANCE IN MONITORING THE IMPLEMENTATION OF MANAGEMENT STANDARDS AND ENVIRONMENTAL MONITORING AS AN EFFORT TO MITIGATE THE IMPACT OF MANAGEMENT ACTIVITIES ON THE BIOSPHERE RESERVE LANDSCAPE

1. GENERAL

1.1 Background

Assessment of Compliance is an activity conducted to evaluate whether the implementation of standards by the activity implementer aligns with the reference requirements. This assessment serves as a tool for the Ministry responsible for environment and forestry affairs, or Assessment of Compliance Bodies designated to monitor the application of standards. The results of the assessment of compliance can provide input for the implementer to improve standard implementation, as well as serve as feedback for the standard-setting body to revise, enhance, or review the standards.

1.2 Objective

As a reference for the implementation of Compliance Assessment in monitoring the application of management standards and environmental monitoring as an effort to mitigate the impact of management activities on the Biosphere Reserve Landscape.

1.3 Scope

The scope of Compliance Assessment for Management Standards and Environmental Monitoring as an effort to mitigate the impacts of management activities on the Biosphere Reserve Landscape includes:

- Compliance Assessment: Examination of the implementation of environmental management and monitoring standards in addressing environmental impacts caused by businesses and/or activities. This includes assessing the effectiveness of implementation based on specific criteria or indicators under the authority of The Ministry responsible for environment and forestry affairs

1.4 Reference

1. Law Number 32 of 2024, amending the 1990 Law on the Conservation of Biological Natural Resources and Their Ecosystems.
2. Government Regulation Number 22 of 2021 on the Implementation of Environmental Management governs various aspects of environmental protection
3. Regulation of the Minister of Environment Number 7 of 2006 on Procedures for Measuring Standard Criteria for Soil Damage for Biomass Production
4. Regulation of the Minister of Forestry Number P.48/MENHUT-II/2014 on Procedures for Ecosystem Restoration in Nature Reserve Areas and Conservation Areas.
5. Regulation of the Minister of Environment and Forestry Number P.15/MENLHK/SETJEN/KUM.1/2/2017 on Procedures for Measuring Groundwater Levels at Compliance Points in Peat Ecosystems.
6. Regulation of the Minister of Environment and Forestry Number P.2/MENLHK/SETJEN/KUM.1/1/2018 on Access to Genetic Resources of Wild Species and Benefit-Sharing from Their Utilization
7. Regulation of the Minister of Environment and Forestry Number 11 of 2021 on

- Emission Quality Standards for Internal Combustion Engines
8. Instruction of the Minister of Environment and Forestry Number INS.1/MENLHK/SETJEN/KUM.1/6/2022 on the Protection of Wildlife from Trapping and Illegal Hunting Inside and Outside Forest Areas
 9. Regulation of the Director General of Natural Resources and Ecosystem Conservation Number P.7/IV-SET/2011 on Procedures for Entering Nature Reserves, Conservation Areas, and Hunting Parks
 10. SNI 6989.27. Water and Wastewater – Part 27: Test Method for Total Dissolved Solids (TDS) by Gravimetry.
 11. SNI 6989.3. Water and Wastewater – Part 3: Test Method for Total Suspended Solids (TSS) by Gravimetry.
 12. SNI 6989.72. Water and Wastewater – Part 72: Test Method for Biochemical Oxygen Demand (BOD)
 13. SNI 6989.73. Water and Wastewater – Part 73: Test Method for Chemical Oxygen Demand (COD) with Closed Reflux by Titrimetry
 14. SNI 19-7119.6. Ambient Air – Part 6: Determination of Sampling Locations for Ambient Air Quality Monitoring
 15. SNI 7119.14. Ambient Air – Part 14: Test Method for Particles $\leq 2.5 \mu\text{m}$ (PM 2.5) Using High Volume Air Sampler (HVAS) with Gravimetric Method
 16. SNI 7119.15. Ambient Air – Part 15: Test Method for Particles $\leq 10 \mu\text{m}$ (PM 10) Using High Volume Air Sampler (HVAS) with Gravimetric Method

2. IMPLEMENTATION OF COMPLIANCE ASSESSMENT

2.1 Determination of Compliance Assessment

The compliance assessment is carried out by the compliance assessment team appointed by the Head of the Working Unit responsible for standard implementation at the Ministry in charge of environmental and forestry affairs. This team consists of the working unit personnel and may involve personnel from regional government agencies responsible for environmental affairs at the provincial or district/city level. The appointment of personnel and/or the compliance assessment team considers their competency and/or expertise.

2.2 Implementation Mechanism of Assessment of Compliance

a. Preparation of Assessment of Compliance

The Assessor of Compliance distributes questionnaires to business actors and/or activities to gather information regarding the scope of business and/or activities carried out by the standard-implementing entity. The questionnaire format consists of:

- Company/Institution Name
- Company/Institution Office Address
- Email Address
- Company/Institution Phone Number
- Scope of Business and/or Activities
- Information on the stages of business/activities that have been and are being carried out by the Standard-Implementing Entity.
 - 1) In the core area of the Biosphere Reserve landscape
 - 2) In the buffer area of the Biosphere Reserve landscape
 - 3) In the transition area of the Biosphere Reserve landscape

b. Administration

Explaining the information that needs to be completed in conducting assessment of compliance as stated in Annex 1, including:

- Information related to the standard-implementing entity to be assessed, including: Name of the standard-implementing entity, Business Identification Number (NIB), Taxpayer Identification Number (NPWP), address of the standard-implementing entity (office address and business/activity address), email address, telephone/fax number, entity level (MSMEs or Home Industry/corporation/government/others), Responsible Person's Name, Brief Description of the Standard-Implementing Entity, as well as the stages of business and/or activities that have been and are being carried out by business actors/activities.
- Information related to the Assessor of Compliance, including: Name of the assessment team and the position/title of personnel conducting the assessment of compliance, assessment institution, email address and telephone number, specific standards being assessed, assessment date, results, and Notes/Suggestions.

c. Implementation of Assessment of Compliance

- Assessment of Compliance can be conducted using a combination of document review, interviews, field inspections, and/or testing.
- The Assessment of Compliance evaluates the implementation of environmental management and monitoring standards to mitigate environmental impacts arising from business and/or activities carried out by business actors. It also identifies the success of its implementation based on specific criteria or indicators under the authority of The Ministry responsible for environmental and forestry affairs. The assessed standards apply to activities that have been and are being implemented by the Standard-Implementing Entity.
- The Assessment of Compliance is carried out to evaluate the performance of the established Performance of environment and forestry standard standards. Any significant environmental management and monitoring activities conducted by the standard-implementing entity beyond the stipulated standards may indicate the entity's performance and serve as input for improvements or a standard review.
- In conducting the Assessment of Compliance, assessors use the Assessment of Compliance form outlined in Annex 2.

d. Weighting

- Assessment of Compliance

The Assessment of Compliance form includes weighting for each criterion of standard implementation, as follows.

Standard Performance Assessment Categories		Score
1	The standard-implementing entity does not apply the environmental management and monitoring standards as outlined in the standard document but instead conducts environmental management and monitoring in accordance with its environmental documentation (beyond what is stipulated in the standard).	1
2	The standard-implementing entity applies one or more environmental management and monitoring measures in accordance with the standard	2

Standard Performance Assessment Categories		Score
	document but does not conduct testing on key parameters.	
3	The standard-applying entity implements one or more environmental management and monitoring measures in accordance with standard documents, but all key parameter test results > quality standards or other criteria	3
4	The standard-applying entity implements one or more environmental management and monitoring measures in accordance with standard documents, but some key parameter test results are ≤ quality standards or other criteria (with one or more key parameters > quality standards).	4
5	The standard-applying entity implements one or more management and monitoring measures as outlined in the standard documents, and all key parameter test results are ≤ quality standards or other criteria	5

Standard Implementation Level : $\left(\frac{\text{Total hasil penilaian}}{\text{Total nilai maksimal } (\sum \text{ jenis dampak} \times 5)} \right) \times 100\%$

Explanation:

- The maximum total score may vary for each standard-applying entity and is adjusted based on the activity phases of the business and/or activities carried out by the entity.
- The maximum total score is obtained from the number of types of environmental impacts caused by the activity phases undertaken by the business actor ($\sum \text{ types of impacts} \times 5$).

Table 1. Score Determination

Assessment Range (%)	Standard Implementation Category	Follow up
>75 - 100	Good	The standard is not yet recommended for review
50 – 75	Fair	The standard is recommended for review with minor improvements
< 50	Poor	The standard is recommended for review with major improvements

Explanation: The above values indicate the level of standard implementation (standard performance) by the applying entity and serve as input for determining whether an evaluation of the established standard (standard review) is necessary.

3. RESULT OF STANDARD COMPLIANCE

3.1 Assessment of Compliance Review

The assessment of compliance results will be reviewed by the compliance assessment team and documented in the Monitoring and Standard Implementation Report

3.2 Compliance Assessment Report

The Compliance Assessment Report will be submitted by the Head of the Working Unit responsible for standard implementation at the Ministry in charge of environmental and forestry affairs. Additionally, the compliance assessment data may also be forwarded to the relevant Technical Directorate-General within the Ministry responsible for environmental and forestry affairs for follow-up actions.

The analysis of the Monitoring and Standard Implementation Report will be used

by standard developers at the Instrument Standardization Center within BSILK for review purposes or by the Standard Implementation Facilitation Center to facilitate the enabling conditions for established standards, particularly those related to environmental management and monitoring standards. Moreover, the report will also be utilized by other technical units within the Ministry responsible for environmental and forestry affairs for follow-up actions and/or as a reference in decision-making.

3.3 Compliance Assessment Output

- **Compliance Assessment Output**

The output of the Conformity Assessment is in the form of recommendations for reviewing established standards, enabling conditions for implementing standards, and recommendations to implementers and implementing entities regarding improvements to the implementation of standards.

Annex 1. Administrative Form

Administrative Form for Compliance Assessment in Standard Implementation Monitoring	
A. Standard Implementer Identity	
Name of the Standard Implementing Entity	: PT.... / Government / Community group.....
NIB	:
NPWP	:
Office address of the standard implementing entity	:
Business/Activity Address	:
Email address & No. Telepon/Fax	:
Person in charge's name	:
Level of standard implementing entity	: <i>Home industry/corporation/government/others*</i>
Brief Description of the Standard Implementing Entity	:
Stages of Business and/or Activities that Have Been and Are Being Implemented by the Business Operator	: Information on the Stages of Business/Activity Already and Currently Implemented by the Standard Implementing Entity: 1) In the Core Area of the Biosphere Reserve Landscape 2) In the Buffer Area of the Biosphere Reserve Landscape 3) In the Transition Area of the Biosphere Reserve Landscape
B. Identity of Compliance Assessor	
Name of Assessor Team	: 1. (Head) / Personnel position 2. (Member 1) / Personnel position 3. (Member 2) / Personnel position 4. (Member 3) / Personnel position
Assessor Unit	:
Email address and phone number	:
Specific Standards Assessed for Compliance in Standard Implementation Monitoring	: Standard
Date of Assessing	:
Result	:
Noted/Suggestion	:

*) Cross out what is not necessary.

Annex 2. Compliance Assessment Form

A. Monitoring of Environmental Management Standard Implementation and Environmental Monitoring by the Standard Implementing Entity

1) Key Components (Biogeophysical and Chemical Components)

Guidelines for Filling Out the Form:

The conformity assessor fills in the columns for impact sources, types of environmental impacts, as well as environmental management and monitoring standards for each stage of business/activity that has been and is being implemented by the Standard Implementing Entity: 1). In the Core Area of the Biosphere Reserve Landscape; 2). In the Buffer Area of the Biosphere Reserve Landscape; 3). In the Transition Area of the Biosphere Reserve Landscape which is carried out by the business operator as stated in standard of the Environmental and forestry standard.

Implementation Guidelines for Conformity Assessment:

In conducting the Compliance Assessment, the Assessment Team must take into account the environmental impact management and monitoring activities implemented by the Standard Implementing Entity (Business Operator and/or Activity) that are not listed in standard of the Environmental and forestry standard. The compliance assessment is only carried out for environmental management and monitoring standards related to environmental impacts identified in the business and/or activities implemented by the standard implementing entity. If the type of impact from a particular stage of activity is not identified in the business and/or activities carried out by the business operator/activity, that type of impact may be excluded and will not be part of the assessment.

Standard Performance Assessment Categories		Score
1	The standard implementing entity does not apply the environmental management and monitoring standards as stated in the standard document but conducts environmental management and monitoring in accordance with its own environmental document (outside of what is listed in the standard)	1
	The standard implementing entity applies one or more environmental management and monitoring measures in accordance with the standard document but does not conduct testing on key parameters	2
3	The standard implementing entity applies one or more environmental management and monitoring measures in accordance with the standard document, but all test results for key parameters > the Quality Standards or other criteria	3
4	The standard implementing entity applies one or more environmental management and monitoring measures in accordance with the standard document, but all test results for key parameters > the Quality Standards or other criteria	4
5	The standard implementing entity applies one or more management and monitoring measures listed in the standard document, and all test results for key parameters are ≤ Quality Standards or other criteria	5

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes***
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant	1	2	3	4	5		
	Describe the sources of impact according to Environmental and forestry standard standards.	Describe the types of environmental impacts caused by impact sources according to Environmental and forestry standard standards	Describe environmental management activities according to Environmental and forestry standard standards	Describe environmental monitoring activities according to Environmental and forestry standard standards	Describe the key parameters tested along with their test results (meeting quality standards or not)	Provide an assessment/evaluation of the performance of standard implementation by business actors according to their category					Provide a score according to the standard performance assessment category	Describe the records of other environmental management and monitoring activities carried out by business actors beyond those listed in the Environmental and forestry standard standards.

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
Core Area of the Biosphere Reserve (Nature Reserve and Wildlife Sanctuary)												
1	Research Activity	Vegetation damage	1. Sampling using sampling techniques and purposive sampling according to the vegetation growth phase. 2. Utilization of technology for research data sampling tools that are non-destructive and environmentally friendly.	Data Collection Method: Conducting observations by performing vegetation analysis using the transect method. Data Analysis: Tabulation and data processing using calculations for Dominance Index, Diversity Index (Shannon-Wiener), and Evenness Index	Percentage of vegetation damage (understory plants, seedlings, saplings, poles, trees)							
		Spilled chemical waste	1. Utilization of technology for research data sampling tools that are non-destructive and environmentally friendly. 2. Material packaging is carried out in accordance with technical procedures/guidelines for sampling and testing research materials.	Data Collection Method: Conducting observations through: 1. Vegetation analysis using the transect method. 2. Soil sampling by creating soil profile/Pedon pits. Data Analysis: 1. Tabulation and data processing using calculations for Dominance Index, Diversity Index (Shannon-Wiener), and Evenness Index. 2. Physical, chemical, and mineral soil analysis includes	Percentage of vegetation and soil damage due to chemical liquids (distilled water solution, NaOH, formaldehyde, 75% alcohol, etc.)							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				texture, bulk density, porosity, permeability, and soil pH. The measurement results are compared with the standard criteria for soil damage based on Ministerial Regulation No. 7 of 2006 or any future applicable regulations								
		The production of solid waste and household effluents	- Do not dispose of solid waste indiscriminately during research activities. - Minimize the use of research materials made of non-degradable plastic. - Bring back solid waste, liquid waste, and hazardous waste (B3) when leaving the conservation area	Monitoring methods are carried out by: - Providing non-hazardous waste (non-B3) disposal bins at strategic points, such as rest shelters along the entrance/tracking route of the conservation area. - Conducting technical guidance for researchers, academics, and the general public before engaging in activities within the conservation area. Data Analysis: - Tabulation and processing of observational data	- The volume of solid waste/domestic waste is per day. - The average amount of solid domestic waste generated is kg per day.							
		Genetic material taken out of the area and/or out of Indonesia	- Researchers and/or Academics must obtain a SIMAKSI permit (entry permit for conservation areas) before entering a conservation area, in accordance with Directorate General of KSDAE Decree No. P.7/IV-SET/2011 on Procedures for Entering Nature Reserves, Conservation Areas, and Hunting Parks. - Referring to Ministerial Regulation No. P.2/MENLHK/SETJEN/KUM.1/1/2018, genetic material taken out of the area and/or	Monitoring method is carried out through observation of: Checking/inventorying data samples taken by researchers and/or academics out of the conservation area. Data Analysis: Tabulation and processing of observational data	- Quantity of genetic material taken out of the area. - Percentage decline in biodiversity.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			out of Indonesia requires government authorization (Material Transfer Agreement).									
		Disturbance to key wildlife species and their habitat	1. The determination of the location/path for research data sampling is prohibited in the key wildlife corridor. 2. During data collection, noise, disturbances, and activities that disrupt key wildlife are strictly prohibited.	Monitoring methods are carried out through observation of: 1. Regulating the determination of the location/path for research data sampling. 2. Ensuring that data collection activities do not disrupt key wildlife species and their habitat. 3. Providing adequate and suitable food sources based on the characteristics of key wildlife species. 4. Mandatory zoning, area, or territorial division for research activities to ensure they are not conducted within wildlife habitat or habitat corridor routes. 5. Installing GPS collars on wildlife identified as vulnerable to leaving their habitat area. Data Analysis: 1. Tabulation and processing of observational data.	1. Number of disturbances to wildlife (zero accident) in accordance with Minister of Environment and Forestry Instruction No. INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of key wildlife species affected.							
		Human-wildlife conflict	1. The determination of the location/path for research data sampling is prohibited from being in the corridor of key wildlife. 2. During data collection, making noise, disturbances, or any activities that interfere with key wildlife is strictly prohibited.	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for research data sampling. 2. Verification that research data collection does not involve activities that disturb key wildlife and their habitat. 3. Inspection of the use of complete personal protective	The number of incidents of human-wildlife conflict/attacks involving key wildlife species, as well as the success of wildlife protection efforts (<i>zero accidents</i>) in accordance with Minister of							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			3. The use of complete personal protective equipment (PPE) consists of: boots, safety helmets, masks, and safety vests.	4. Provision of facilities and infrastructure in the form of signs and safety information boards in forest areas using effective communication methods, including hazard sources, safety signs, and safety information boards. 5. Management of safety signs and information boards. 6. Technical guidance on safety signs and information boards. Data analysis: Tabulation & processing of observational data.	Forestry Regulation Number: P.48/MENHUT-II/2014.							
2	Introduction to plant species/taxonomy/dendrology activities.	Vegetation damage	In accordance with Article 21, paragraph (1) of Law Number 32 of 2024, every individual is prohibited from: a. Taking, cutting, possessing, damaging, destroying, keeping, transporting, and/or trading protected plants or their parts in a living state. b. Taking, possessing, damaging, destroying, transporting, and/or trading protected plants or their parts in a deceased state	Data collection methods: Observation conducted through: 1. Vegetation analysis using the transect method. 2. Verification/inventory of researchers, academics, and the general public exiting the conservation area. Data analysis: Tabulation & processing of data using calculations for Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index.	Percentage of vegetation damage (understory plants, seedlings, saplings, poles, and trees).							
		The production of solid waste and household effluents	1. Do not dispose of solid waste carelessly during the implementation of plant species/taxonomy/dendrology introduction activities. 2. Minimize the use of eating utensils made of non-biodegradable plastic.	Monitoring methods are conducted through: 1. Providing non-B3 waste bins at strategic points, such as rest shelters along entry routes to the conservation area/tracking paths. 2. Conducting technical guidance for researchers, academics, and the general	1. Volume of solid waste/domestic waste generated is per day. 2. Average amount of solid domestic waste produced is kg per day.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			3. Take back all solid and liquid waste when exiting the conservation area.	public before carrying out activities within the conservation area. Data analysis: Tabulation & processing of observational data								
		Disturbance to key wildlife and their habitat.	1. The determination of location/path for plant species/taxonomy/dendrology introduction activities is prohibited from being in the corridor of key wildlife. 2. During plant species/taxonomy/dendrology introduction activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for plant species/taxonomy/dendrology introduction activities. 2. Verification that the activities do not involve actions that disturb key wildlife or their habitat. 3. Provision of adequate and suitable food sources according to the characteristics of key wildlife species. 4. Mandatory zoning, area, or territory designation to ensure plant species/taxonomy/dendrology introduction activities do not take place in key wildlife habitats or corridors. 5. Installation of GPS collars on wildlife identified as prone to leaving their habitat. Data analysis: Tabulation & processing of observational data.	1. Number of disturbances to wildlife (<i>zero accident</i>) in accordance with Minister of Environment and Forestry Instruction Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of affected fauna (key wildlife species)							
		Human-wildlife conflict	1. The determination of location/path for plant species/taxonomy/dendrology introduction activities is prohibited from being in the corridor of key wildlife.	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for plant species/taxonomy/dendrology introduction	Number of incidents of human-wildlife conflict/attacks involving key wildlife species, as well as the							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			2. During plant species/taxonomy/dendrology introduction activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited. 3. The use of complete personal protective equipment (PPE) consists of boots, safety helmets, masks, and safety vests.	activities. 2. Verification that the activities do not involve actions that disturb key wildlife or their habitat. 3. Inspection of the use of complete personal protective equipment (PPE). 4. Provision of facilities and infrastructure in the form of signs and safety information boards in forest areas using effective communication methods, including hazard sources, safety signs, and safety information boards. 5. Management of safety signs and information boards. 6. Technical guidance on safety signs and information boards. Data analysis: Tabulation & processing of observational data.	success of wildlife protection efforts (<i>zero accident</i>) in accordance with Minister of Forestry Regulation Number: P.48/MENHUT-II/2014							
Core Area of the Biosphere Reserve (National Park, Grand Forest Park, Nature Tourism Park)												
3	Research Activity	Vegetation damage	1. Sampling using sampling techniques and purposive sampling according to the vegetation growth phase. 2. Utilization of technology for research data sampling tools that are non-destructive and environmentally friendly.	Data Collection Method: Conducting observations by performing vegetation analysis using the transect method. Data Analysis: Tabulation and data processing using calculations for Dominance Index, Diversity Index (Shannon-Wiener), and Evenness Index	Percentage of vegetation damage (understory plants, seedlings, saplings, poles, trees)							
		Spilled chemical waste	1. Utilization of technology for research data sampling tools that are non-destructive and environmentally friendly. 2. Material packaging is carried out in accordance	Data Collection Method: Conducting observations through: 1. Vegetation analysis using the transect method. 2. Soil sampling by creating soil profile/Pedon pits.	Percentage of vegetation and soil damage due to chemical liquids (distilled water solution, NaOH, formaldehyde,							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			with technical procedures/guidelines for sampling and testing research materials.	Data Analysis: 1. Tabulation and data processing using calculations for Dominance Index, Diversity Index (Shannon-Wiener), and Evenness Index. 2. Physical, chemical, and mineral soil analysis includes texture, bulk density, porosity, permeability, and soil pH. The measurement results are compared with the standard criteria for soil damage based on Ministerial Regulation No. 7 of 2006 or any future applicable regulations	75% alcohol, etc.)							
		The production of solid waste and household effluents	1. Do not dispose of solid waste indiscriminately during research activities. 2. Minimize the use of research materials made of non-degradable plastic. 3. Bring back solid waste, liquid waste, and hazardous waste (B3) when leaving the conservation area	Monitoring methods are carried out by: 1. Providing non-hazardous waste (non-B3) disposal bins at strategic points, such as rest shelters along the entrance/tracking route of the conservation area. 2. Conducting technical guidance for researchers, academics, and the general public before engaging in activities within the conservation area. Data Analysis: Tabulation and processing of observational data	1. The volume of solid waste/domestic waste is per day. 2. The average amount of solid domestic waste generated is kg per day.							
		Genetic material taken out of the area and/or out of Indonesia	1. Researchers and/or Academics must obtain a SIMAKSI permit (entry permit for conservation areas) before entering a conservation area, in accordance with	Monitoring method is carried out through observation of: Checking/inventorying data samples taken by researchers and/or academics out of the conservation area.	1. Quantity of genetic material taken out of the area. 2. Percentage decline in							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			Directorate General of KSDAE Decree No. P.7/IV-SET/2011 on Procedures for Entering Nature Reserves, Conservation Areas, and Hunting Parks. 2. Referring to Ministerial Regulation No. P.2/MENLHK/SETJEN/KU M.1/1/2018, genetic material taken out of the area and/or out of Indonesia requires government authorization (Material Transfer Agreement).	Data Analysis: Tabulation and processing of observational data	biodiversity.							
		Disturbance to key wildlife and their habitat.	1. The determination of location/path for plant species/taxonomy/dendrology introduction activities is prohibited from being in the corridor of key wildlife. 2. During plant species/taxonomy/dendrology introduction activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for plant species/taxonomy/dendrology introduction activities. 2. Verification that the activities do not involve actions that disturb key wildlife or their habitat. 3. Provision of adequate and suitable food sources according to the characteristics of key wildlife species. 4. Mandatory zoning, area, or territory designation to ensure plant species/taxonomy/dendrology introduction activities do not take place in key wildlife habitats or corridors. 5. Installation of GPS collars on wildlife identified as prone to leaving their habitat.	1. Number of disturbances to wildlife (<i>zero accident</i>) in accordance with Minister of Environment and Forestry Instruction Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of affected fauna (key wildlife species)							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				Data analysis: Tabulation & processing of observational data.								
		Human-wildlife conflict	1. The determination of location/path for plant species/taxonomy/dendrology introduction activities is prohibited from being in the corridor of key wildlife. 2. During plant species/taxonomy/dendrology introduction activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited. 3. The use of complete personal protective equipment (PPE) consists of boots, safety helmets, masks, and safety vests.	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for plant species/taxonomy/dendrology introduction activities. 2. Verification that the activities do not involve actions that disturb key wildlife or their habitat. 3. Inspection of the use of complete personal protective equipment (PPE). 4. Provision of facilities and infrastructure in the form of signs and safety information boards in forest areas using effective communication methods, including hazard sources, safety signs, and safety information boards. 5. Management of safety signs and information boards. 6. Technical guidance on safety signs and information boards. Data analysis: Tabulation & processing of observational data.	Number of incidents of human-wildlife conflict/attacks involving key wildlife species, as well as the success of wildlife protection efforts (<i>zero accident</i>) in accordance with Minister of Forestry Regulation Number: P.48/MENHUT-II/2014							
4	Non-Timber Forest Product Harvesting Activities	Vegetation damage	1. Utilization of the latest, practical, and environmentally friendly types of equipment for non-timber forest product harvesting activities. 2. Vegetation enrichment through the planting of harvested plant species, including stems, fruits,	Data collection methods: Observation conducted through: 1. Vegetation analysis using the transect method. 2. Utilization of the latest, practical, and environmentally friendly equipment for non-timber forest product harvesting activities.	Percentage of vegetation damage (understory plants, seedlings, saplings, poles, and trees)							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			resins, bark, leaves, and roots	3. Regulation of vegetation enrichment activities, ensuring proper planting of harvested plant species—including stems, fruits, resins, bark, leaves, and roots—by non-timber forest product collectors. Data analysis: Tabulation & processing of data using calculations for Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index.								
		The production of solid waste and household effluents	1. Do not dispose of solid waste carelessly during the implementation of non-timber forest product harvesting activities. 2. Minimize the use of materials for non-timber forest product harvesting that are made of non-biodegradable plastic. 3. Take back all solid, liquid, and hazardous (B3) waste when exiting the conservation area.	Monitoring methods are conducted through: Technical guidance for non-timber forest product harvesters prior to engaging in harvesting activities within the conservation area. Data analysis: Tabulation & processing of observational data.	1. Volume of solid waste/domestic waste generated is per day. 2. Average amount of solid domestic waste produced is kg per day.							
		Disturbance to key wildlife and their habitat	1. The determination of blocks/points for non-timber forest product harvesting is prohibited from being in the corridor of key wildlife. 2. During non-timber forest product harvesting activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for non-timber forest product harvesting activities. 2. Verification that the harvesting activities do not involve actions that disturb key wildlife or their habitat. 3. Provision of adequate and suitable food sources according to the characteristics of key wildlife	1. Number of disturbances to wildlife (<i>zero accident</i>) in accordance with Minister of Environment and Forestry Instruction Number: INS.1/MENLHK/SETJEN/KUM. 1/6/2022. 2. Number of affected fauna							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				species. 4. Mandatory zoning, area, or territory designation to ensure non-timber forest product harvesting activities do not take place in key wildlife habitats or corridors. 5. Installation of GPS collars on wildlife identified as prone to leaving their habitat. Data analysis: Tabulation & processing of observational data.	(key wildlife species).							
		Human-wildlife conflict	1. The determination of location/path for non-timber forest product harvesting is prohibited from being in the corridor of key wildlife. 2. During non-timber forest product harvesting activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited. 3. The use of complete personal protective equipment (PPE) consists of boots, safety helmets, masks, and safety vests	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for research data sampling activities. 2. Verification that the research data collection process does not involve actions that disturb key wildlife or their habitat. 3. Inspection of the use of complete personal protective equipment (PPE). 4. Provision of facilities and infrastructure in the form of signs and safety information boards in forest areas, using effective communication methods that include hazard sources, safety signs, and safety information boards. 5. Management of safety signs and information boards. 6. Technical guidance on safety signs and information boards. Data analysis: Tabulation &	Number of incidents of human-wildlife conflict/attacks involving key wildlife species, as well as the success of wildlife protection efforts (zero accident) in accordance with Minister of Forestry Regulation Number: P.48/MENHUT-II/2014							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				processing of observational data.								
5	Introduction to plant species/taxonomy/dendrology activities.	Vegetation damage	In accordance with Article 21, paragraph (1) of Law Number 32 of 2024, every individual is prohibited from: a. Taking, cutting, possessing, damaging, destroying, keeping, transporting, and/or trading protected plants or their parts in a living state. b. Taking, possessing, damaging, destroying, transporting, and/or trading protected plants or their parts in a deceased state	Data collection methods: Observation conducted through: 1. Vegetation analysis using the transect method. 2. Verification/inventory of researchers, academics, and the general public exiting the conservation area. Data analysis: Tabulation & processing of data using calculations for Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index.	Percentage of vegetation damage (understory plants, seedlings, saplings, poles, and trees).							
		The production of solid waste and household effluents	1. Do not dispose of solid waste carelessly during the implementation of plant species/taxonomy/dendrology introduction activities. 2. Minimize the use of eating utensils made of non-biodegradable plastic. 3. Take back all solid and liquid waste when exiting the conservation area.	Monitoring methods are conducted through: 1. Providing non-B3 waste bins at strategic points, such as rest shelters along entry routes to the conservation area/tracking paths. 2. Conducting technical guidance for researchers, academics, and the general public before carrying out activities within the conservation area. Data analysis: Tabulation & processing of observational data	1. Volume of solid waste/domestic waste generated is per day. 2. Average amount of solid domestic waste produced is kg per day.							
		Disturbance to key wildlife and their habitat.	1. The determination of location/path for plant species/taxonomy/dendrology introduction activities is prohibited from being in the corridor of key wildlife. 2. During plant species/taxonomy/dendrology introduction activities,	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for plant species/taxonomy/dendrology introduction activities. 2. Verification that the activities do not involve	1. Number of disturbances to wildlife (<i>zero accident</i>) in accordance with Minister of Environment and Forestry Instruction							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited	actions that disturb key wildlife or their habitat. 3. Provision of adequate and suitable food sources according to the characteristics of key wildlife species. 4. Mandatory zoning, area, or territory designation to ensure plant species/taxonomy/dendrology introduction activities do not take place in key wildlife habitats or corridors. 5. Installation of GPS collars on wildlife identified as prone to leaving their habitat. Data analysis: Tabulation & processing of observational data.	Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of affected fauna (key wildlife species)							
		Human-wildlife conflict	1. The determination of location/path for plant species/taxonomy/dendrology introduction activities is prohibited from being in the corridor of key wildlife. 2. During plant species/taxonomy/dendrology introduction activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited. 3. The use of complete personal protective equipment (PPE) consists of boots, safety helmets, masks, and safety vests.	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for plant species/taxonomy/dendrology introduction activities. 2. Verification that the activities do not involve actions that disturb key wildlife or their habitat. 3. Inspection of the use of complete personal protective equipment (PPE). 4. Provision of facilities and infrastructure in the form of signs and safety information boards in forest areas using effective communication methods, including hazard sources, safety signs, and safety information boards.	Number of incidents of human-wildlife conflict/attacks involving key wildlife species, as well as the success of wildlife protection efforts (<i>zero accident</i>) in accordance with Minister of Forestry Regulation Number: P.48/MENHUT-II/2014							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				5. Management of safety signs and information boards. 6. Technical guidance on safety signs and information boards. Data analysis: Tabulation & processing of observational data.								
Buffer Zone of the Biosphere Reserve												
6	Research Activity	Vegetation damage	1. Sampling using sampling techniques and purposive sampling according to the vegetation growth phase. 2. Utilization of technology for research data sampling tools that are non-destructive and environmentally friendly.	Data Collection Method: Conducting observations by performing vegetation analysis using the transect method. Data Analysis: Tabulation and data processing using calculations for Dominance Index, Diversity Index (Shannon-Wiener), and Evenness Index	Percentage of vegetation damage (understory plants, seedlings, saplings, poles, trees)							
		Spilled chemical waste	1. Utilization of technology for research data sampling tools that are non-destructive and environmentally friendly. 2. Material packaging is carried out in accordance with technical procedures/guidelines for sampling and testing research materials.	Data Collection Method: Conducting observations through: 1. Vegetation analysis using the transect method. 2. Soil sampling by creating soil profile/Pedon pits. Data Analysis: 1. Tabulation and data processing using calculations for Dominance Index, Diversity Index (Shannon-Wiener), and Evenness Index. 2. Physical, chemical, and mineral soil analysis includes texture, bulk density, porosity, permeability, and soil pH. The measurement results are compared with the standard criteria for soil damage based on	Percentage of vegetation and soil damage due to chemical liquids (distilled water solution, NaOH, formaldehyde, 75% alcohol, etc.)							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				Ministerial Regulation No. 7 of 2006 or any future applicable regulations								
		The production of solid waste and household effluents	- Do not dispose of solid waste indiscriminately during research activities. - Minimize the use of research materials made of non-degradable plastic. - Bring back solid waste, liquid waste, and hazardous waste (B3) when leaving the conservation area	Monitoring methods are carried out by: - Providing non-hazardous waste (non-B3) disposal bins at strategic points, such as rest shelters along the entrance/tracking route of the conservation area. - Conducting technical guidance for researchers, academics, and the general public before engaging in activities within the conservation area. Data Analysis: Tabulation and processing of observational data	- The volume of solid waste/domestic waste is per day. - The average amount of solid domestic waste generated is kg per day.							
		Genetic material taken out of the area and/or out of Indonesia	- Researchers and/or Academics must obtain a SIMAKSI permit (entry permit for conservation areas) before entering a conservation area, in accordance with Directorate General of KSDAE Decree No. P.7/IV-SET/2011 on Procedures for Entering Nature Reserves, Conservation Areas, and Hunting Parks. - Referring to Ministerial Regulation No. P.2/MENLHK/SETJEN/KU M.1/1/2018, genetic material taken out of the area and/or out of Indonesia requires government authorization	Monitoring method is carried out through observation of: Checking/inventorying data samples taken by researchers and/or academics out of the conservation area. Data Analysis: Tabulation and processing of observational data	- Quantity of genetic material taken out of the area. - Percentage decline in biodiversity.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			(Material Transfer Agreement).									
		Disturbance to key wildlife and their habitat.	1. The determination of location/path for plant species/taxonomy/dendrology introduction activities is prohibited from being in the corridor of key wildlife. 2. During plant species/taxonomy/dendrology introduction activities, noise, disturbances, or any other activities that disrupt key wildlife are strictly prohibited	Monitoring methods are conducted through observation of: 1. Regulation of location/path determination for plant species/taxonomy/dendrology introduction activities. 2. Verification that the activities do not involve actions that disturb key wildlife or their habitat. 3. Provision of adequate and suitable food sources according to the characteristics of key wildlife species. 4. Mandatory zoning, area, or territory designation to ensure plant species/taxonomy/dendrology introduction activities do not take place in key wildlife habitats or corridors. 5. Installation of GPS collars on wildlife identified as prone to leaving their habitat. Data analysis: Tabulation & processing of observational data.	1. Number of disturbances to wildlife (<i>zero accident</i>) in accordance with Minister of Environment and Forestry Instruction Number: INS.1/MENLHK/SETJEN/KUM.1/6/2022. 2. Number of affected fauna (key wildlife species)							
7	Operational Activities of Nature Tourism	The production of solid waste and household effluents	1. Do not dispose of solid waste carelessly while at nature tourism locations. 2. Minimize the use of construction materials made of non-biodegradable plastic. 3. Collect solid, liquid, and hazardous (B3) waste in designated waste disposal areas.	Monitoring methods are conducted through observation of: 1. Regulation of solid waste disposal at nature tourism locations. 2. Regulation of minimizing the use of non-biodegradable plastic construction materials. 3. Availability of solid waste,	1. Volume of solid waste/domestic waste generated is per day. 2. Average amount of solid domestic waste produced is kg per day							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			4. Provide non-B3 waste bins at strategic locations.	liquid waste, non-B3, and B3 waste bins. 4. Technical guidance for business operators or managers of nature tourism activities. Data analysis: Tabulation & processing of observational data.								
		Decline in water quality	Technological Approaches: 1. Immediately compact and reinforce roads on opened road traces. 2. Construct drainage ditches on both sides of the road to channel water flow, ensuring that water entering water bodies (canals/river) remains relatively clear. 3. Preserve vegetation on both sides of the opened road to trap soil particulates carried by surface runoff during rainfall. 4. Maintain the integrity of riverbank buffer zones	Monitoring methods are conducted through observation of: 1. Regulation of road compaction and reinforcement on opened road traces. 2. Presence of drainage ditches on both sides of the road to channel water flow. 3. Existence of vegetation on both sides of the opened road. 4. Regulation of riverbank buffer zones. 5. Sampling and measurement of water quality parameters (TDS, TSS, BOD, COD) in rivers, using methods SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019, or future applicable standards, in collaboration with The Ministry responsible for environmental and forestry affairs registered laboratories. Data analysis: Measurement results are compared against water quality	Water quality parameters include TDS, TSS, BOD, and COD, in accordance with river water quality standards or similar benchmarks outlined in Annex VI of Government Regulation No. 22 of 2021 on Environmental Management Implementation							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				standards based on Annex VI of Government Regulation No. 22 of 2021 on Environmental Protection and Management Implementation.								
		Human – wildlife conflict	- Do not feed wildlife encountered. - During activities, noise, disturbances, and any other actions that disrupt key wildlife are strictly prohibited.	Monitoring methods are conducted through observation of: - Regulation of location/path determination for nature tourism activities, ensuring they do not overlap with key wildlife corridors. - Provision of facilities and infrastructure, including safety signs and information boards in forest areas, utilizing effective communication methods covering hazard sources, safety signs, and safety information boards. - Management of safety signs and information boards. - Technical guidance on safety signs and information boards. Data analysis: Tabulation & processing of observational data.	Number of incidents of human-wildlife conflict/attacks involving key wildlife species.							
Transition Area of the Biosphere Reserve												
8	Research Activity	Vegetation damage vegetasi	- Sampling collection using sampling techniques and purposive sampling according to vegetation growth phases. - Utilization of non-destructive and environmentally friendly technology for research data sampling.	Data Collection Methods: Observation conducted through vegetation analysis using the transect method. Data Analysis: Tabulation & processing of data using calculations for Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index	Percentage of vegetation damage (<i>understory, seedlings, saplings, poles, trees</i>).							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
		Spillage of chemical waste.	- Utilization of non-destructive and environmentally friendly technology for research data sampling. - Packaging of materials is carried out in accordance with technical procedures/guidelines for sampling and testing research materials.	Data Collection Methods: Observation conducted through: - Vegetation analysis using the transect method. - Soil sampling by creating soil profile/Pedon pits. Data Analysis: - Tabulation & processing of data using calculations for Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index. - Physical, chemical, and mineral analysis of soil, including texture, bulk density, porosity, permeability, and soil pH. Measurement results are compared with soil damage quality standards in accordance with Minister of Environment Regulation No. 7 of 2006 or future applicable regulations.	Percentage of vegetation and soil damage caused by chemical solutions (<i>distilled water, NaOH, formaldehyde, 75% alcohol, etc.</i>).							
		The production of solid waste and household effluents	- Do not dispose of solid waste carelessly during research activities. - Minimize the use of research materials made of non-biodegradable plastic. - Bring back solid waste, liquid waste, and hazardous (B3) waste when leaving the area.	Monitoring methods are conducted through observation of: - Provision of non-B3 waste bins at strategic locations, such as rest shelters along entrance/tracking routes. - Technical guidance for researchers, academics, and the general public before conducting activities within the area	- Volume sampah padat/ limbah domestik sebesar /hari - Besaran limbah padat domestik yang dihasilkan rata-rata sebanyak kg/hari							
		Genetic material is taken out of the area and/or out of Indonesia	- Researchers and/or Academics must obtain a permit to enter forest areas. - In accordance with Ministry of Environment and Forestry Regulation	Monitoring Method: Conducted through observation, specifically by verifying/inventorying data samples taken by researchers and/or academics outside the forest area.	- Number of genetic materials transported out of the area. - Percentage of biodiversity							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			No. P.2/MENLHK/SETJEN/KU M.1/1/2018, the transfer of genetic material outside the forest area and/or outside Indonesia requires government authorization (Material Transfer Agreement).	Data Analysis: Tabulation of observational data results.	decline							
9	Operational Activities of Nature Tourism	The production of solid waste and household effluents	- Do not dispose of solid waste carelessly while at nature tourism locations. - Minimize the use of construction materials made of non-biodegradable plastic. - Collect solid, liquid, and hazardous (B3) waste in designated waste disposal areas. - Provide non-B3 waste bins at strategic locations.	Monitoring methods are conducted through observation of: - Regulation of solid waste disposal at nature tourism locations. - Regulation of minimizing the use of non-biodegradable plastic construction materials. - Presence of solid waste, liquid waste, non-B3, and B3 waste bins. - Technical guidance for business operators or managers of nature tourism activities. Data analysis: Tabulation of observational data.	- Volume of solid waste/domestic waste generated is per day. - Average amount of solid domestic waste produced is kg per day							
		Decline of water quality	Technological Approaches: - Immediately compact and reinforce roads on opened road traces. - Construct drainage ditches on both sides of the road to channel water flow, ensuring that water entering water bodies (canals/streams) remains relatively clear. - Preserve vegetation on both sides of the opened road to trap soil particulates carried by	Monitoring methods are conducted through observation of: - Regulation of road compaction and reinforcement on opened road traces. - Presence of drainage ditches on both sides of the road as water flow channels. - Existence of vegetation on both sides of the opened road. - Regulation of riverbank buffer zones.	Water quality parameters include TDS, TSS, BOD, and COD, in accordance with river water quality standards or similar benchmarks outlined in Annex VI of Government Regulation No. 22 of 2021 on Environmental Management							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			surface runoff during rainfall. 4. Maintain the integrity of riverbank buffer zones.	5. Sampling and measurement of water quality parameters (TDS, TSS, BOD, COD) in rivers, using methods SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019, or future applicable standards, in collaboration with The Ministry responsible for environmental and forestry affairs registered laboratories. Data analysis: Measurement results are compared against water quality standards based on Annex VI of Government Regulation No. 22 of 2021 on Environmental Protection and Management Implementation.	Implementation							
10	Operational Activities of PBPH (Business Permit for Utilization of Timber Forest Products)	Increase in runoff rate, erosion, and sedimentation	1. Replanting in open areas affected by logging, skid trails, timber collection points (TPn), and around the base camp, using fast-growing species, local species, and fruit-bearing trees. 2. Base camp and timber collection point (TPn) locations must be selected on land with a slope of less than 15%. 3. Road traces should be constructed with a maximum slope of 10%. 4. Normalization of drainage channels that have experienced sedimentation, narrowing, or blockages.	Data Collection Methods: Observation conducted on: 1. Regulation of replanting in open areas affected by logging, skid trails, timber collection points (TPn), and around the base camp, using fast-growing species, local species, and fruit-bearing trees. 2. Regulation of land selection for base camps and timber collection points (TPn) with slopes under 15%. 3. Presence of road traces with a maximum slope of 10%. 4. Regulation of drainage channel normalization to address sedimentation, narrowing, or blockages. 5. Regulation of routine	The amount of erosion and sedimentation that occurs can be controlled in all PBPH areas.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			5. Routine maintenance of drainage channels. 6. Development and management of runoff channels and water infiltration areas. 7. Logging must not exceed the RKT target for approved blocks. 8. Logging is prohibited in protected areas (<i>riparian zones, genetic resource conservation areas, slopes above 40%, wildlife pockets, seed orchards, permanent plots, water sources, buffer zones</i>). 9. <i>Construction and maintenance of bridges and culverts at road intersections with drainage channels or streams</i>	maintenance of drainage channels. 6. Presence and regulation of runoff water management and infiltration areas. 7. Regulation of logging limits, ensuring activities do not exceed RKT targets in approved blocks. 8. Regulation prohibiting logging in protected areas (<i>riparian zones, genetic resource sites, slopes over 40%, wildlife pockets, seed orchards, permanent plots, water sources, buffer zones</i>). 9. Presence and regulation of bridge and culvert construction/maintenance at road intersections with drainage channels or streams. Data Analysis: Tabulation & processing of observational data.								
		Decline of water quality	Technological Approaches: 1. Immediately compact and reinforce roads on opened road traces. 2. Construct drainage ditches on both sides of the road to channel water flow, ensuring that water entering water bodies (canals/rivers) remains relatively clear. 3. Preserve vegetation on both sides of the opened road to trap soil particulates carried by surface runoff during rainfall.	Monitoring methods are conducted through observation of: 1. Regulation of road compaction and reinforcement on opened road traces. 2. Presence of drainage ditches on both sides of the road as water flow channels. 3. Existence of vegetation on both sides of the opened road. 4. Regulation of riverbank buffer zones. 5. Sampling and measurement	Controlled levels of TDS, TSS, BOD, and COD parameters, in accordance with river water quality standards or similar benchmarks outlined in Annex VI of Government Regulation No. 22 of 2021 on Environmental Protection and Management Implementation							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			4. Maintain the integrity of riverbank buffer zones.	of water quality parameters (TDS, TSS, BOD, COD) in rivers, using methods SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019, or future applicable standards, in collaboration with The Ministry responsible for environmental and forestry affairs registered laboratories. Data analysis: Measurement results are compared against water quality standards based on Annex VI of Government Regulation No. 22 of 2021 on Environmental Protection and Management Implementation								
		Vegetation damage	1. Reduce excessive forest clearing and select non-productive locations for timber collection points (TPn), base camps, and similar facilities. 2. Implement proper forest management, including clearing retained stands, designating core trees (approximately 25 trees/Ha), seed procurement/nursery development, planting/enrichment, and maintenance following the TPTI silvicultural system for each ongoing RKT. 3. Provide protected areas for conserved vegetation/flora species.	Data Collection Methods: Observation conducted on: 1. Regulation to minimize excessive forest clearing and selection of non-productive locations for timber collection points (TPn), base camps, and similar facilities. 2. Verification of proper forest management practices, including clearing retained stands, designating core trees (±25 trees/Ha), seed procurement/nursery development, planting/enrichment, and maintenance following the TPTI silvicultural system for each ongoing RKT. 3. Existence of protected areas for conserved	The percentage of decline in abundance and species diversity of vegetation across all areas covered by the PBPH permit can be minimized							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			4. Establish conservation zones and prohibit logging in riparian zones, genetic resource sites, slopes exceeding 40%, wildlife pockets, seed orchards, permanent plots, water sources, and buffer zones (HL).	4. Presence of conservation zones and enforcement of logging prohibitions in riparian zones, genetic resource sites, slopes exceeding 40%, wildlife pockets, seed orchards, permanent plots, water sources, and buffer zones (HL). 5. Implementation of conservation area boundary delineation (KPPN and KPSL) and maintenance of demarcation markers. 6. Installation of information boards for KPPN, KPSL, riparian zones, buffer areas in protected forests, and other conservation areas. If any protected trees are present in planned planting areas, these trees must not be felled and must be marked with information signs. 7. Presence of forest security posts in areas vulnerable to illegal logging or forest encroachment, aimed at preventing and mitigating disturbances. 8. Implementation of education and training for production unit employees to ensure proper execution of tasks, thereby minimizing damage to retained stands. 9. Execution of public outreach programs targeting communities inside and around PBPH locations to								

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				emphasize the importance of conservation areas. Data Analysis: Tabulation & processing of observational data.								
		The production of solid waste and household effluents	- Provision of waste bins at the base camp area that are easy to lift, covered, and can be conveniently emptied by sanitation staff. - Monitoring of environmental cleanliness and cleaning of water bodies around the project area from domestic waste by sanitation personnel. - Public advisories discouraging littering, especially in aquatic areas. - Collection of waste in designated bins for routine disposal to the final waste disposal site (TPA) every three days. - Waste transport using closed trucks to prevent spillage.	Data Collection Method: Observation is conducted on the following aspects: - The availability of waste bins at the base camp area that are easy to lift, covered, and can be conveniently emptied by sanitation staff. - The arrangement of environmental cleanliness monitoring and cleaning of nearby water bodies from domestic waste by sanitation personnel. - The presence of advisory boards/signs discouraging littering, particularly in aquatic areas. - Verification of waste collection arrangements using designated bins for routine disposal to the final disposal site (TPA) every three days. - Regulation of waste transport using closed trucks to prevent spillage. - Coordination arrangements with the local Environmental Agency (Dinas Lingkungan Hidup). Data Analysis: Tabulation and processing of observation results.	- Volume of solid waste/domestic waste generated is per day. - Average amount of solid domestic waste produced is kg per day.							
		The generation of hazardous and toxic	Prohibit PBPH permit holders/residents or workers from disposing of	Data Collection Method: Observation is carried out on the following:	Percentage of the amount of B3 waste spills in							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
		materials (Hazardous Waste/B3 Waste)	hazardous and toxic waste (B3), such as used oil or fluorescent lamps, into domestic waste facilities or water bodies. 2. Impose strict sanctions on PBPH permit holders/residents or workers who dispose of hazardous and toxic waste (B3) improperly. 3. Encourage all PBPH permit holders/residents or workers who generate hazardous and toxic waste (B3) to record daily waste volumes in a B3 waste balance sheet and B3 waste manifest. 4. Provide facilities for the containment, collection, and storage of hazardous and toxic waste (B3) at each PBPH site— collaborating with licensed third parties for collection, transport, and treatment. 5. Temporarily store hazardous and toxic waste (B3) at a designated B3 Waste Storage Facility (TPS B3) before handing it over to licensed third parties.	1. The regulation prohibiting PBPH permit holders/residents or workers from disposing of hazardous and toxic waste (B3), such as used oil and fluorescent lamps, into domestic waste bins or water bodies. 2. The implementation of strict sanctions against PBPH permit holders/residents or workers who improperly dispose of hazardous and toxic waste (B3). 3. The provision of advisories requiring all PBPH permit holders/residents or workers who generate B3 waste to record the volume of waste produced daily in a B3 waste balance sheet and B3 waste manifest. 4. The availability of facilities for containment, collection, and storage of B3 waste at each PBPH site — in collaboration with licensed third parties for collection, transportation, and treatment of B3 waste. 5. Temporary storage of B3 waste at designated B3 Waste Storage Facilities (TPS B3) before it is handed over to licensed third parties. Data Analysis: Tabulation and processing of observation results.	activity components that have the potential to have an impact on B3 waste spills by fulfilling Appendix IX of PP Number 22 of 2021 concerning the Implementation of Environmental Management							
		Degradation of ambient air quality caused by emissions from electricity	1. Routine maintenance of power generators (Gensets). 2. Regular emission testing of Genset power	Data Collection Method: Observation is conducted on the following aspects: 1. The availability of documentation on routine	Air emission quality meets the emission standards in accordance with							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
		generators (Gensets)	equipment. 3. Limiting the operational lifespan of Genset power generators. 4. Mandating the use of personal protective equipment (e.g., masks) for workers/residents. 5. Implementing greening initiatives and tree planting within the PBPH permit area to effectively reduce air pollution. 6. Establishing a buffer zone. 7. Carrying out land rehabilitation.	maintenance of power generators (Gensets). 2. The availability of documentation on regular emission testing of Genset equipment. 3. Regulations on the operational age limit of power generators (Gensets). 4. Regulations requiring workers/residents to use personal protective equipment such as masks. 5. The presence of results from greening efforts and tree planting activities aimed at significantly reducing air pollution within the PBPH permit area. 6. The existence of a buffer zone. 7. The presence of vegetation resulting from land rehabilitation efforts. Data Analysis: Tabulation and processing of observation data.	Regulation of the Minister of Environment and Forestry (PermenLHK) No. 11 of 2021 concerning Emission Standards for Internal Combustion Engine Machinery							
		Deterioration of ambient air quality due to elevated particulate matter levels	1. Washing vehicle tires upon exiting the PBPH site. 2. Routine cleaning and watering of roads used by PBPH vehicles, prioritized between 09:00–15:00 WIB daily. 3. Traffic flow regulation for incoming and outgoing PBPH vehicles by designated personnel/workers/operators. 4. Scheduling operational hours for PBPH vehicles.	Data Collection Method: Observation is conducted on the following aspects: 1. Regulation of vehicle tire washing each time vehicles exit the PBPH site. 2. Regulation of routine road cleaning and watering on routes used by PBPH vehicles, prioritized daily between 09:00 and 15:00 WIB. 3. Regulation of traffic flow for PBPH vehicles entering and exiting the site by designated personnel/	TSP is below the quality standard threshold of 230 micrograms per m ³ for a 24-hour measurement period. PM ₁₀ is below the quality standard threshold of 75 micrograms per m ³ for a 24-hour measurement period. PM _{2.5} is below the quality standard threshold of 55 micrograms							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			5. Covering the beds of timber transport trucks. 6. Using vehicles that meet administrative roadworthiness requirements.	workers/operators. 4. Regulation of operational working hours for PBPH vehicles. 5. Regulation on covering the beds of timber transport trucks. 6. Regulation on the use of vehicles that meet administrative roadworthiness standards. 7. Measurement of TSP, PM ₁₀ , and PM _{2.5} levels in accordance with SNI 19-7119.6-2005, SNI 7119.14:2016, SNI 7119.15:2016 or other applicable standards in cooperation with laboratories registered with The Ministry responsible for environmental and forestry affairs Data Analysis: Tabulation of observation data and comparison of measurement results with ambient air quality standards for TSP, PM ₁₀ , and PM _{2.5} as set forth in Appendix VII of Government Regulation No. 22 of 2021 or other applicable future regulations.	per m ³ for a 24-hour measurement period, in accordance with Appendix VII of Government Regulation No. 22 of 2021.							
		Decline in hydrological quality related to groundwater table levels	1. Conducting topographic surveys of the land as the basis for planning and designing canal networks, roads, and plantation block layouts. 2. Developing canal networks in accordance with eco-hydrological principles.	Data Collection Method: Observation is conducted on the following aspects: 1. Regulation of topographic land surveys as a basis for planning and designing canal networks, roads, and plantation block arrangements. 2. The existence of canal networks developed in	Groundwater level (TMAT) at the compliance point meets the provisions in accordance with ministerial regulation Number P.15/MENLHK/SE TJEN/KUM.1/2/2017 concerning							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			3. Managing water systems to maintain groundwater table levels (TMAT) by constructing canal blocks (canal blocking/dams) as needed, either without or with overflow channels (spillways). 4. Rehabilitating or normalizing outlets/rivers located within the concession area and/or community lands. For the Management of the Peat Dome Peak Area: 1. Allocating the area as a Peat Ecosystem Protection Function Zone (FLEG), managed as a conservation area, and designated as non-cultivation land following harvesting activities for PBPH operations. 2. Developing canal networks in accordance with eco-hydrological principles. 3. Regulating water levels and groundwater table elevation by constructing canal blocks at every ± 50 cm water level difference. 4. Managing water systems to maintain groundwater table levels (TMAT) by constructing canal blocks (canal blocking/dams) as needed, either without or with overflow channels (spillways).	accordance with eco-hydrological principles. 3. Regulation of water management to maintain groundwater table levels (TMAT) through the construction of canal blocks (canal blocking/dams) as needed, either without overflow channels (spillways) or with spillways. 4. Regulation of outlet/river normalization within concession areas and/or community lands. For the Management of Peat Dome Peak Areas: 1. The designation of areas as Peat Ecosystem Protection Function Zones (FLEG), managed in accordance with protected area practices and prohibited from being re-cultivated after harvesting under PBPH operations. 2. The presence of canal networks constructed following eco-hydrological principles. 3. Regulation of water level and groundwater table level management through the construction of canal blocks at each ± 50 cm water level difference. 4. Regulation of water management to maintain groundwater table levels (TMAT) through the construction of canal blocks (canal blocking/dams), with or without overflow channels (spillways), as needed.	Procedures for Measuring Groundwater Levels at Peat Ecosystem Compliance Points							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			5. Managing areas allocated as Peat Ecosystem Protection Function Zones (FLEG) at the peat dome peak in the same manner as other protected areas.	5. The existence of designated areas as Peat Ecosystem Protection Function Zones (FLEG) at peat dome peaks, managed under protected area management practices. Data Analysis: Tabulation of observation data.								
		Degradation of soil quality and reduction in soil fertility	1. Land clearing is conducted in blocks of approximately 25–30 hectares, with land preparation involving slashing, cutting, felling, and cleaning. 2. Immediate planting of the area after harvesting: from the handover of harvested areas to the initiation of planting activities within ≤ 14 days. 3. Fertilization activities are carried out using macro fertilizers, micro fertilizers, and organic fertilizers/biomass to meet plant micronutrient requirements. 4. Peatland consolidation is performed by identifying and avoiding “undrained” areas—areas with elevations potentially below the highest river tide levels. 5. Application of fertilizers and pesticides according to proper doses and measurements. 6. Avoiding prolonged exposure of open land.	Data Collection Method: Observation is conducted on the following: 1. Regulation of land clearing conducted in blocks of approximately 25–30 hectares, and land preparation activities involving slashing, cutting, felling, and land clearing. 2. Regulation of immediate planting of the area after harvesting: from the handover of harvested areas to the commencement of planting activities within ≤ 14 days. 3. Regulation of fertilization activities using macro fertilizers, micro fertilizers, and organic fertilizers/biomass to meet the plants’ micronutrient requirements. 4. Regulation of peatland consolidation by considering and avoiding areas with “undrained” potential—areas with elevation below the highest river tide levels. 5. Regulation of the use of fertilizers and pesticides in accordance with appropriate	1. Percentage of vegetation and soil damage. 2. Physical, biological, and chemical properties of the soil are maintained and support optimal plant growth							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				dosages and measurements. 6. Regulation to avoid prolonged periods of exposed/open land. 7. Conducting vegetation analysis. 8. Soil sampling through the creation of soil profile/pedon pits. Data Analysis: 1. Tabulation and processing of data using calculations of the Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index. 2. Physical, chemical, and mineral soil analysis including texture, bulk density, porosity, permeability, and soil pH. Results are compared against the threshold criteria for soil degradation based on Minister of Environment Regulation No. 7 of 2006 or any future applicable regulations.								
		Increase in traffic generation	1. Staggering timber transport trips to avoid conveying. 2. Installing road signs as needed to prevent accidents. 3. Conducting routine vehicle inspections in accordance with SOPs to ensure operational safety. 4. Placing warning signs (e.g. flashing lights or PBPH activity signage) within the PBPH area.	Data Collection Method: Observation is carried out on the following aspects: 1. Regulation of timber transport trips to prevent conveying. 2. Presence of road signs installed as needed to prevent accidents. 3. Availability of documentation on routine vehicle inspections according to SOPs to avoid operational breakdowns. 4. Presence of signage (e.g.	Minimize the occurrence of traffic disruption							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			5. Assigning personnel to manage traffic within the PBPH permit zone. 6. Mobilizing heavy vehicles outside peak traffic hours (morning: 06:00–09:00 WIB; evening: 16:00–19:00 WIB), preferably during nighttime. 7. Implementing all recommendations outlined in the traffic study document.	flashing lights, PBPH activity signs) within PBPH project areas. 5. Availability of personnel to manage traffic within the PBPH permit area. 6. Regulation of heavy timber vehicle mobilization outside of peak traffic hours (morning: 06:00–09:00 WIB; evening: 16:00–19:00 WIB), with preference for nighttime operation. 7. Implementation of all recommendations stated in the traffic assessment document. Data Analysis: Tabulation of observation data.								
11	Residential development and settlement activities	The production of solid waste and household effluents	1. Processing organic waste into compost. 2. Managing non-organic household waste through the principles of reuse, reduce, and recycle. Waste reduction efforts can be carried out through the following measures: 1. Using durable materials or goods. 2. Reducing the use of single-use items. 3. Minimizing purchases of non-essential items. 4. Maintaining and repairing clothing, toys, tools, and household appliances rather than replacing them with new ones. 5. Reusing plastic bags up to five times for shopping.	Monitoring Method: Monitoring is conducted through observation of the following aspects: 1. Regulation of organic waste processing into compost. 2. Regulation of non-organic household waste processing through reuse, reduce, and recycle (3R) practices. Waste reduction is encouraged through: 1. Regulation on the use of durable materials or goods. 2. Regulation on reducing the use of single-use items. 3. Regulation on minimizing purchases of non-essential goods. 4. Regulation on maintaining and repairing clothing, toys, tools, and household equipment instead of	1. The volume of solid waste/domestic waste is per day. 2. The average quantity of domestic solid waste generated is kg/day.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			6. Using baskets or reusable bags that can be used repeatedly.	replacing them with new items. 5. Regulation on reusing plastic bags up to five times for shopping. 6. Regulation on the use of reusable baskets or shopping bags. 7. Provision of technical training for settlement residents. 8. Provision of public infrastructure support for domestic solid waste management. Data Analysis: Tabulation of observation data.								
		domestic liquid waste generation	Construction of a septic tank consists of a collection chamber and a percolation chamber, connected by PVC piping, with consideration of the following: 1. Does not contaminate drinking water sources in the surrounding area, whether from surface water or groundwater. 2. Does not pollute the soil surface. 3. Prevents the spread of hookworms on the ground surface. 4. Prevents the breeding of flies and other insects. 5. Does not emit disturbing odors. 6. Constructed simply using materials that are affordable and readily available. 7. Maintains a minimum distance of 10 meters	Monitoring Method: Monitoring is conducted through observation of the following: Construction of a septic tank consisting of a collection chamber and an infiltration chamber, connected by PVC piping, while ensuring the following: 1. Regulation to prevent contamination of drinking water sources in the surrounding area, including both surface water and groundwater. 2. Regulation to prevent soil surface contamination. 3. Regulation to avoid the spread of hookworms on the soil surface. 4. Regulation to prevent the breeding of flies and other insects. 5. Regulation to avoid disturbing odors. 6. Regulation that construction	1. Presence of a domestic liquid waste management system/infrastructure. 2. Cleanliness of the housing and residential area is well maintained.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			between the water source and the septic tank's percolation chamber.	should be simple and use materials that are affordable and easily accessible. 7. Regulation that the minimum distance between the water source and the infiltration chamber should be 10 meters. 8. Provision of technical training for residents of housing and settlement areas. 9. Provision of public infrastructure support for domestic liquid waste management. Data Analysis: Tabulation of observation data.								
12	Commercial Activities	The production of solid waste and household effluents	1. Processing organic waste into compost. 2. Managing non-organic waste from commercial activities through reuse, reduce, and recycle practices. Waste reduction can be achieved through the following measures: 1. Reducing the use of single-use items. 2. Reusing plastic bags up to five times for shopping. 3. Using baskets or reusable bags that can be used multiple times 1.	Monitoring Method: Monitoring is conducted through observation of the following: 1. Regulation of organic waste processing into compost. 2. Regulation of non-organic commercial waste management through reuse, reduce, and recycle (3R) practices. Waste reduction is achieved through: 1. Regulation on reusing plastic bags up to five times for shopping. 2. Regulation on the use of baskets or reusable shopping bags. 3. Provision of technical guidance to commercial business actors. Data Analysis: Tabulation of observation data.	1. The volume of solid/domestic waste is per day. 2. The average amount of domestic solid waste generated is kg/day.							
13	Estate	Increased runoff	1. Replanting in open areas	Data Collection Method:	The amount of							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
	Operations	rate, erosion, and sedimentation	such as post-harvest land, former plantation transport roads, former harvest collection areas, and around the base camp, using fast-growing species, local species, and fruit trees. 2. Land opened for the base camp or harvest collection areas should have a slope of less than 15%. 3. Constructing road alignments with a maximum slope of 10%. 4. Normalizing drainage channels that have experienced sedimentation, narrowing, or blockage. 5. Conducting routine maintenance of drainage channels. 6. Constructing and directing runoff water and creating water infiltration zones. 7. Harvesting must not exceed the RKT (Annual Work Plan) target in approved blocks. 8. Logging is prohibited in protected areas (riverbanks, germplasm zones, slopes of 40%, wildlife corridors, seed gardens, permanent sample plots, springs, and buffer zones/HL). 9. Constructing or repairing bridges and culverts where roads intersect with streams or tributaries.	Observation is carried out on the following aspects: 1. Regulation of replanting in open areas such as post-harvest land, former plantation transport roads, former harvest collection sites, and areas around the base camp, using fast-growing, local, and fruit-bearing species. 2. Regulation of land selected for base camps and harvest collection points, ensuring slope is less than 15%. 3. Existence of road alignments with a maximum slope of 10%. 4. Regulation of drainage channel normalization where sedimentation, narrowing, or blockages have occurred. 5. Regulation of routine maintenance of drainage channels. 6. Presence and regulation of runoff water management and creation of water infiltration areas. 7. Regulation that harvesting must not exceed the RKT (Annual Work Plan) targets for approved blocks. 8. Regulation of prohibition against logging in protected areas (e.g., riverbanks, germplasm zones, slopes over 40%, wildlife pockets, seed gardens, permanent sample plots, water springs, and buffer zones/HL). 9. Presence and regulation of the construction or repair of	erosion and sedimentation that occurs can be controlled throughout the HGU (Right to Cultivate) Plantation area.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				bridges and culverts at road intersections with drainage channels or tributaries. Data Analysis: Tabulation and processing of observation data.								
		Decline in water quality	Technological Approach: 1. Immediately compacting and hardening the surface of newly opened road alignments. 2. Constructing drainage ditches on both sides of the road to channel water flow, ensuring that runoff entering water bodies (canals/ rivers) is relatively clear. 3. Preserving vegetation on both sides of the opened road to help retain soil particles carried by surface runoff during rainfall. 4. Protecting riparian buffer zones (riverbank areas).	Monitoring Method: Monitoring is conducted through observation of the following: 1. Regulation of road surface compaction and hardening on newly opened alignments. 2. Presence of drainage ditches on both sides of the road as water flow channels. 3. Presence of vegetation along both sides of the opened road. 4. Regulation of the preservation of riparian buffer zones. 5. Sampling and measurement of river water quality parameters—TDS, TSS, BOD, and COD—using methods based on SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019, or subsequent applicable standards, in collaboration with laboratories registered with the Ministry responsible for environmental and forestry affairs Data Analysis: Measurement results are compared against water quality standards listed in Appendix VI of Government	Controlled levels of TDS, TSS, BOD, and COD parameters in accordance with river water quality standards or similar, as specified in Appendix VI of Government Regulation No. 22 of 2021 concerning the Implementation of Environmental Protection and Management							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				Regulation No. 22 of 2021 concerning the Implementation of Environmental Protection and Management								
		Vegetation damage	- Reducing excessive forest clearing and selecting non-productive areas for the development of harvest collection points, base camps, and similar facilities. - Implementing good forest stewardship practices. - Designating protected areas for endangered vegetation/flora species. - Establishing conservation zones and prohibiting logging in the following areas: riverbanks, germplasm reserves, slopes over 40%, wildlife habitat pockets, seed gardens, permanent sample plots, water springs, and buffer zones (HL).	Data Collection Method: Observations are conducted on the following: - Regulation to minimize excessive forest clearing, prioritizing the use of non-productive areas for harvest collection sites, base camps, and similar infrastructure. - Inspection of the implementation of proper forest stewardship practices. - Presence of designated protection areas for endangered vegetation/flora species. - Existence of conservation areas with logging prohibition zones, including: riverbanks, germplasm reserves, slopes over 40%, wildlife corridors, seed gardens, permanent sample plots, springs, and buffer zones (HL). - Regulation of the demarcation and maintenance of conservation area boundaries (KPPN and KPSL), including upkeep of trail markings and boundary lines. - Presence of signage indicating KPPN, KPSL, riverbanks, buffer zones of Protected Forests, and other conservation zones. If protected trees are found within planned plantation or	The percentage of decline in the abundance and diversity of vegetation species across the entire plantation concession (HGU) area can be minimized							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				livelihood crop areas, they must not be cut and must be clearly marked with signage. 7. Presence of forest security posts in areas vulnerable to theft or encroachment, as part of prevention and response efforts. 8. Regulation of training and education for production unit workers to ensure proper practices, minimizing damage to residual stands. 9. Regulation of community outreach for residents within or surrounding the plantation concession (HGU) area on the importance of conservation zones. Data Analysis: Tabulation and processing of observation results.								
		Decline in ambient air quality caused by generator (genset) emissions	1. Regular maintenance of power generators (gensets). 2. Routine emissions testing for power generator equipment. 3. Limiting the operational lifespan of power generators. 4. Requiring workers/residents to use personal protective equipment such as masks. 5. Implementing greening and tree planting to maximally reduce air pollution within the licensed PBPH area. 6. Establishing buffer zones. 7. Conducting land	Data Collection Method: Observation is conducted on the following: 1. Availability of documentation on the routine maintenance of power generators (gensets). 2. Availability of documentation on periodic emissions testing of power generator equipment. 3. Regulation of the operational age limit of power generators. 4. Regulation requiring workers/residents to wear personal protective equipment such as masks. 5. Existence of greening and tree planting outcomes that	Air emission quality complies with the standards set out in Minister of Environment and Forestry Regulation Number 11 of 2021 concerning Emission Standards for Internal Combustion Engines							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			rehabilitation	effectively reduce air pollution within the licensed PBPH area. 6. Presence of a buffer zone. 7. Presence of rehabilitated vegetation. Data Analysis: Tabulation and processing of observation results.								
		Decline in ambient air quality due to elevated particulate (dust) concentrations	1. Washing vehicle tires each time they exit the plantation concession site (HGU). 2. Regular cleaning and watering of roads used by plantation vehicles, preferably between 09:00 and 15:00 WIB daily. 3. Regulating traffic flow of plantation vehicles entering and exiting the site, conducted by designated personnel/workers/operators. 4. Regulating the operational schedule of plantation vehicles. 5. Providing covers for trucks transporting plantation products. 6. Using vehicles that meet administrative roadworthiness requirements	Data Collection Method: Observation is conducted on the following aspects: 1. Regulation of vehicle tire washing upon each exit from the plantation concession site (HGU). 2. Regulation of regular road cleaning and watering along roads traversed by plantation vehicles, preferably between 09:00 and 15:00 WIB daily. 3. Regulation of traffic flow for vehicle entry and exit at the plantation site, managed by designated personnel/workers/operators. 4. Regulation of operating hours for plantation vehicles. 5. Regulation on the use of covers for trucks transporting plantation products. 6. Regulation on the use of administratively roadworthy vehicles. 7. Measurement of TSP, PM10, and PM2.5 levels in accordance with SNI 19-7119.6-2005, SNI 7119.14:2016, SNI 7119.15:2016, or applicable future standards, in	1. TSP below the standard quality threshold of 230 micrograms per m3 for 24-hour measurement time 2. PM10 below the standard quality threshold of 75 micrograms per m3 for 24-hour measurement time 3. PM 2.5 below the standard quality threshold of 55 micrograms per m3 for 24-hour measurement time 4. Referring to Appendix VII of PP Number 22 of 2021							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				collaboration with laboratories registered with the Ministry responsible for environmental and forestry affair Data Analysis: Tabulation of observation data and measurement results, compared against the air quality standards for TSP, PM10, and PM2.5 as outlined in Appendix VII of Government Regulation No. 22 of 2021 or its subsequent updates								
		Decline in the quality of groundwater level hydrological conditions	1. Conducting a topographic land survey as the basis for planning and designing the canal network, roads, and the arrangement of plantation blocks. 2. Constructing canal networks in accordance with eco-hydro principles. 3. Managing water systems to maintain the groundwater table level (TMAT) by constructing canal blockings (dams) as needed, either without spillways or with spillways. 4. Normalizing outlets/ rivers located within the concession area and/or surrounding community areas. Management of the Peat Dome Area includes the following: 1. The area is designated as a Peat Ecosystem Protected Function Zone (FLEG) and managed in accordance	Data Collection Method: Observation is conducted on the following: 1. Regulation of topographic land surveys as the basis for planning and designing the canal network, roads, and plantation block layout. 2. Existence of canal networks developed according to eco-hydro principles. 3. Regulation of water management practices to maintain the groundwater table level (TMAT) by constructing canal blockings (dams) as needed, either with or without spillways. 4. Regulation of outlet/ river normalization within the concession and/or community areas. Management of Peat Dome Areas involves the following: 1. Existence of areas designated as <i>Peat Ecosystem Protected Function Zones (FLEG)</i>, managed as conservation	The groundwater table level (TMAT) at the compliance monitoring points meets the requirements in accordance with Minister of Environment and Forestry Regulation No. P.15/MENLHK/SE TJEN/KUM.1/2/20 17 concerning Procedures for Measuring Groundwater Levels at Peat Ecosystem Compliance Points							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			with protected area principles, where re-cultivation after harvesting is prohibited for plantation activities. 2. Construction of canal networks following eco-hydro principles. 3. Regulation of water levels and groundwater tables by constructing canal blockings at every ±50 cm difference in water level. 4. Water system management to maintain groundwater table levels (TMAT) through the construction of canal blockings (dams) as needed, either without spillways or with spillways. 5. Areas designated as FLEG at the peat dome summit are managed in accordance with protected area management guidelines	areas where re-cultivation is prohibited after harvesting for PBPH operations. 2. Presence of canal networks constructed in accordance with eco-hydro principles. 3. Regulation of water level and groundwater table level by constructing canal blockings at every ±50 cm elevation change. 4. Regulation of water management to maintain the groundwater table level (TMAT) by building canal blockings (dams) as needed, with or without spillways. 5. Existence of peat dome areas allocated as FLEG, managed in accordance with protected area conservation practices. Data Analysis: Tabulation of observation data.								
		Degradation of soil quality and nutrient content	1. Land clearing is conducted in blocks of approximately 25–30 hectares, and site preparation includes slashing, felling, toppling, and clearing activities. 2. Immediate planting of the area after harvesting: from the handover of the harvested area to the commencement of planting activities should not exceed 14 days. 3. Fertilization using macro, micro, and organic/biomass fertilizers to meet the micronutrient needs of the crops.	Data Collection Method: Observations are conducted on the following: 1. Regulation of land clearing in blocks of approximately ±25–30 hectares, with land preparation activities including slashing, cutting, felling, and clearing. 2. Regulation of immediate planting following harvesting: from the handover of harvested areas to the commencement of planting must occur within ≤ 14 days. 3. Regulation of fertilization practices using macro,	1. Percentage of the amount of vegetation and soil damage 2. The physical, biological and chemical properties of the soil are maintained and support optimal plant growth.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			4. Peat consolidation is conducted by considering and avoiding areas with potential to become "undrained," i.e., areas with elevations that may fall below the highest tidal level of the river. 5. Use of fertilizers and pesticides in accordance with precise dosages and application rates. 6. Avoiding prolonged periods of land exposure	micro, and organic/biomass fertilizers to fulfill plant micronutrient requirements. 4. Regulation of peatland consolidation by considering and avoiding areas with "undrained" potential—areas with elevation potentially below the highest river tidal level. 5. Regulation of fertilizer and pesticide use in accordance with proper dosages and application rates. 6. Regulation to avoid prolonged exposure of bare land. 7. Implementation of vegetation analysis. 8. Soil sampling through the creation of profile/pedon pits. Data Analysis: 1. Tabulation and processing of data using calculations of the Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index. 2. Physical, chemical, and mineralogical soil analysis, including texture, bulk density, porosity, permeability, and soil pH. The results are compared against soil degradation quality standards as stipulated in Minister of Environment Regulation No. 7 of 2006 or its subsequent amendments.								
		Increased traffic load originating from the area	1. Regulating the movement of plantation product	Data Collection Method: Observation is conducted on the following:	Minimizing disruptions to traffic flow							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			transport vehicles to avoid conveying. 2. Installing road signs as needed to prevent accidents. 3. Conducting periodic vehicle inspections in accordance with SOPs to prevent operational failures. 4. Providing signage (e.g., flashing lights, activity warning signs) within the plantation concession (HGU) area. 5. Deploying personnel to manage traffic within the licensed plantation area. 6. Scheduling the mobilization of heavy vehicles transporting plantation products outside peak traffic hours (i.e., morning 06:00–09:00 WIB and evening 16:00–19:00 WIB), preferably at night. 7. Implementing all recommendations outlined in the traffic study report.	1. Regulation of transport movements for plantation products to avoid conveying. 2. Presence of road signs as needed to prevent accidents. 3. Availability of documentation from periodic vehicle inspections in accordance with SOPs to ensure no operational failures. 4. Presence of signage (e.g., flashing lights, warning signs for plantation activities) within the HGU plantation area. 5. Presence of personnel assigned to regulate traffic at the licensed HGU plantation site. 6. Regulation of heavy vehicle mobilization for transporting plantation products outside peak traffic hours (morning: 06:00–09:00 WIB; evening: 16:00–19:00 WIB), preferably during nighttime. 7. Implementation of all recommendations outlined in the traffic study report.								
14	Subsistence farming activities	Vegetation damage	Technological approaches include: 1. Minimizing open areas without vegetation. 2. Conducting land clearing in stages according to the planned activities. 3. Relocating protected flora located around the designated site.	Data Collection Method: Observation is conducted on the following: 1. Regulation to minimize open areas without vegetation. 2. Regulation of phased land clearing in accordance with the planned activities. 3. Regulation of relocation procedures for protected flora located around the	Percentage of vegetation damage (understory plants, seedlings, saplings, poles, trees)							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			4. Implementing revegetation using plant species that match the local soil and climate conditions in open areas, such as MPTS (Multi-Purpose Tree Species) and grasses (cover crops). 5. Greening the activity area using plant species that serve as a food source for wildlife. 6. Prohibiting hunting, animal capture, and the collection of protected flora	designated site. 4. Existence of revegetation using plant species suited to local soil and climate conditions in open areas, including Multi-Purpose Tree Species (MPTS) and grasses (cover crops). 5. Existence of greening activities using plant species that serve as wildlife food sources. 6. Existence of prohibitions against hunting, capturing wildlife, and collecting protected flora. 7. Implementation of vegetation analysis using the transect method. Data Analysis: Tabulation and processing of data using the Dominance Index, Shannon-Wiener Diversity Index, and Evenness Index								
		Decline in water quality	Technological approaches include: 1. Controlling erosion through technical and vegetative methods—for example, planting trees perpendicular to water flow, along contour lines, or in open areas prone to erosion. 2. Continuing erosion and sedimentation management practices implemented during the post-land preparation phase	Monitoring Method: Observation is conducted on the following: 1. Erosion control through technical and vegetative measures—for example, planting trees perpendicular to water flow, along contours, or in erosion-prone open areas. 2. Continuation of erosion and sedimentation control measures implemented during the post-land preparation phase. 3. Measurement of river water quality parameters including TDS, TSS, BOD, and COD using the following SNI	Controlled levels of TDS, TSS, BOD, and COD parameters in accordance with river water quality standards or equivalent, as specified in Appendix VI of Government Regulation No. 22 of 2021 on the Implementation of Environmental Protection and Management							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				methods: SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019, or any subsequent standards, in collaboration with laboratories registered with The Ministry responsible for environmental and forestry affairs Data Analysis: Measurement results are compared against the water quality standards stipulated in Appendix VI of Government Regulation No. 22 of 2021 on the Implementation of Environmental Protection and Management.								
		Increase in the rate of runoff, erosion, and sedimentation	1. Application of vegetative soil conservation techniques: agroforestry, including alley cropping, strip cropping, grass strips, crop residue rows, cover crops, and planting pattern practices such as crop rotation, intercropping, and relay cropping. 2. Application of soil conservation techniques through technical methods: • Contour tillage • Ridge formation • Terracing • Water channelling 3. Application of mechanical soil conservation techniques: • Land preparation using terracing systems • Contour bund systems	Data Collection Method: Observation is conducted on the following: 1. Regulation of the application of vegetative soil conservation techniques: agroforestry, including alley cropping, strip cropping, grass strips, crop residue rows, cover crops, and cropping patterns such as crop rotation, intercropping, and relay cropping. 2. Regulation of the application of technical soil conservation methods: • Contour tillage • Ridge building • Terracing • Water channels 3. Regulation of the application of mechanical soil conservation methods:	The rate of erosion and sedimentation in the prepared land area can be controlled							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
			- Stone line systems - Stone bench terracing systems - Diversion channel systems - Final drainage outlet systems	- Land preparation using terracing systems - Contour bund systems - Stone line systems - Stone bench terrace systems - Diversion channel systems - Final drainage outlet systems 4. Monitoring of visual indicators such as the presence or absence of erosion and whether water infiltration and percolation into the soil occur rapidly (within less than 30 minutes). Data Analysis: Tabulation and processing of observation data.								
		Decline in soil quality and fertility	1. Land preparation is conducted through slashing, cutting, felling, and land clearing activities. 2. Immediate planting of the area after harvesting: from the handover of the harvested area to the start of planting activities must occur within ≤ 14 days. 3. Fertilization is carried out using macro, micro, and organic/biomass fertilizers to meet the micronutrient requirements of the crops. 4. Fertilizers and pesticides are applied in accordance with the correct dosages and application rates. 5. Prolonged land exposure is avoided	Data Collection Method: Observation is conducted on the following: 1. Land preparation activities, including slashing, cutting, felling, and land clearing. 2. Immediate planting of areas after harvesting: from the handover of the harvested area to the commencement of planting must occur within ≤ 14 days. 3. Fertilization using macro, micro, and organic/biomass fertilizers to meet the micronutrient needs of the crops. 4. Application of fertilizers and pesticides in accordance with proper dosages and application rates. 5. Avoidance of prolonged exposure of open land.	1. Percentage of vegetation and soil damage. 2. The physical, biological, and chemical properties of the soil are maintained and remain supportive of optimal plant growth.							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				Data Analysis: Tabulation and processing of observation data								
15	Freshwater aquaculture activities	Decline in water quality (Eutrophication)	1. Planting hydroponic crops around floating net cage (KJA) units to reduce phosphorus and nitrogen levels in the water. 2. Utilizing double-net KJA technology and stocking fish outside of the KJA units. 3. Regulating fish stocking density to ensure uniform growth in accordance with the biological characteristics and species of the fish. 4. Managing environmental quality through regular regulation and circulation of water in freshwater aquaculture systems.	Monitoring Method: Observation is conducted on the following: 1. Planting hydroponic crops around floating net cage (KJA) units to reduce phosphorus and nitrogen concentrations in the water. 2. Utilization of double-net KJA technology and stocking of fish outside the KJA units. 3. Regulation of fish stocking density to ensure uniform growth based on the biological traits and species of the fish. 4. Routine environmental quality management, including the regulation and circulation of water within freshwater aquaculture systems. 5. Sampling and measurement of river water quality parameters—TDS, TSS, BOD, COD—using SNI 6989.27:2019, SNI 6989.3:2019, SNI 6989.72:2009, SNI 6989.73:2009, SNI 6989.73:2019, or any future applicable standards, in collaboration with laboratories registered with The Ministry responsible for environmental and forestry affairs Data Analysis: Measurement results are compared against the water quality standards outlined	Water quality parameters, including TDS, TSS, BOD, and COD, comply with river water quality standards or equivalent, as stipulated in Appendix VI of Government Regulation No. 22 of 2021 on the Implementation of Environmental Management							

No.	Source of Impact	Types of Environmental Impacts	Criteria for Assessing Standard Implementation			Categories of Standard Performance Assessment					Score	Notes
			Environmental Management Standards	Environmental Monitoring Standards	Success in standard implementation (Compliance with Quality Standards/ Other relevant criteria)	1	2	3	4	5		
				in Appendix VI of Government Regulation No. 22 of 2021 on the Implementation of Environmental Protection and Management.								
TOTAL SCORE												



Minutes of Meeting (MoM) Project Progress
ITTO PD 712/13 Rev.3 (F) Enhancing the Implementation
of Landscape Management of Giam Siak Kecil-Bukit Batu
Biosphere Reserve (GSK-BR) in Riau Province of Sumatra
Island, Indonesia



Date and Time : May 28, 2028, 13:00 AM
Location : Conference Room / Microsoft Teams
Attendees : Soomin Lee (Project Officer), Dodi Sumardi (EA), Dyah Puspasari, Uus Danu Kusumah, Tian Partiani, dan Abiyyu Muhammad Haris

Agenda :

1. Current status of project implementation
2. The GSK-BR Management Coordination Agency of Riau Province
3. Construction of demonstration plots
4. Other items

1. Opening

The Meeting began with an opening by the Director of Center of Socio Economic of Forest Community Development. He said that the project is currently managed by the center for socio-economic forest community development as the executing agency, with the following team: Dyah Puspasari as project coordinator, Tian Partiani, Abiyyu M Haris, and Uus Danu Kusumah.

2. Presentation of Project Implementation Progress by Project Coordinator

There are 3 Output (15 activities) with measurable indicators or expected outcomes from the project element in phase I. For the first output, 87% of the expected results were achieved, and the second output achieved 94% and the third output achieved 62%. Of the 15 planned activities, 9 have been completed (Activity 1.1; 1.2; 1.3; 1.5; 2.2; 2.3, 2.4; 3.1 and 3.2) and 6 are in progress (Activity 1.4; 1.8; 2.1; 3.3; 3.4, and 3.7).

Progress of Activity 2.1:

- a. Discussion with stakeholders on strategies to make the coordinating board functioning well (2023-2024)
- b. EA has sent a letter to Bappeda and Sinar Mas Forestry regarding the Request for Input on the Draft Decision on the Establishment of the Operational Task Force for Coordination of the Management of the Giam Siak Kecil – Bukit Batu Biosphere Reserve Landscape (June 2024)
- c. Discussion with Bappeda (May 2, 2025), and received information that the Draft Decree of the Coordinating Body has been completed with the Chairperson of the Steering Committee being the Governor of Riau and the Chairperson of the Implementation being the Head of Bappeda. The Draft Decision Letter will be processed immediately to be submitted to the new Governor of Riau (period 2025-2030)

- d. Submission of draft decree to the Governor by Bappeda for consultation and approval (as soon as possible)
- e. Socialization meeting of the new decree of the coordinating board (as soon as possible)

Progress of Construction of demonstration plots (Activity 3.3 and 3.4):

- a. Discussed with prospective forest farmer groups to explore product and training needs
- b. Drafting ToR for the development of demonstration plots in 2 locations, namely:
- c. Beringin Village, Bengkalis Regency, close to Wildlife reserve Giak Siak Kecil.
- d. Temiang Village, Bengkalis Regency, close to Wildlife reserve Bukit Batu
- e. Discussed with potential subcontractors regarding the demonstration plot plan and training plan and ask them to propose detailed activities and budget.

Products to be developed in Beringin Village are Honey Bees and Floating rice. The objectives from this activity are:

- a. Developing a demonstration plot for cultivating Apis mellifera honey bees at the Adventure Honey Bees KTH
- b. Increasing productivity and product quality including packaging
- c. Controlling pests (monkeys, bears, birds, etc.) for the demonstration plot for cultivating Apis mellifera honey bees at the Adventure Honey Bees KTH
- d. Facilitating cooperation in utilizing private sector (industrial forest plantation) land to place honey bee hives so that land rental costs can be reduced
- e. Increasing marketing by facilitating cooperation in initiating product acceptance agreements, registration and issuance of Business Identification Numbers (NIB), certification of household industry food (P-IRT), halal certification for Apis mellifera honey bee cultivation products at the Adventure Honey Bees KTH
- f. Building a demonstration plot for cultivating floating rice (at least 1 demonstration plot location), if possible, it can be intercropped, for example with fish

Products to be developed in Temiang Village are Red ginger and Rainfed rice. The objectives of this activities are:

- a. Building a semi-permanent/permanent production house to support various production activities of the Makmur Jaya Women Farmers Group (KTWMJ) such as red ginger, Liberica coffee, Eco print, sewing batik. Production house: size 6x7 m, divided into 2 rooms, there is a bathroom, there is an air shelter
- b. Developing/improving a red ginger cultivation demonstration plot at KTH Wanita Makmur Jaya
- c. Increasing productivity and product quality including packaging
- d. Increasing marketing by facilitating cooperation on initiating product acceptance agreements, registration and issuance of Business Identification Numbers (NIB)
- e. Building a rain-fed rice cultivation demonstration plot (2-3 hectares), if possible, it can be intercropped with other agricultural crops

Progress of Activity 1.4:

- a. Preparation of work plans, developing websites and database designs, and running online
- b. Implementation of website management, programming, testing, manuals
- c. Website improvement and training on user (to be implemented)

Progress of Activity 1.8:

- a. The draft proposal has been prepared
- b. The draft proposal has been discussed with the parties
- c. The final proposal will be submitted to Bappeda to be submitted to the Governor of Riau (to be implemented)

Progress of Activity 3.7

- a. 17 publications have been launched on social media and other information flow media.
- b. 2 standing banners have been produced.
- c. 1 spatial analysis result booklet has been published.
- d. 1 standard document has been prepared.
- e. Will register the Giam Siak Kecil-Bukit Batu Biosphere Reserve to the international website WNMBR
- f. will create campaign materials promoting the existence of the biosphere reserve and the results of the ITTO project.

Proposed changes to budget allocation

- a. The budget for establishing demonstration plots (activity 3.3) will increase from 5,500 USD to 15,000 USD. The funds come from the budget balance of completed activities. From 1 location to 2 two locations
- b. The budget for train villagers (activity 3.4) will increase from 4,500 USD to 10,500 USD. The funds come from the budget balance of completed activities. From 1 location to 2 two locations training.
- c. The budget Non-Activity will increase from 74,400 to 76,801. The funds come from the budget balance of completed activities. That budget for the purchase of LED TV and iPad mini to support the campaign activities on GSK-BR (Activity 3.7) and reallocation of the budget for the project coordinator to 15,480 USD which was previously reduced to 11,670 USD from the original amount of 24,000 USD.

3. Dr. Soomin Lee (Project Officer) provides input

- There are two sets of similar technical reports (e.g., activity report 1.2 and 1.5., and activity 2.3 and 2.4). It is recommended to differentiate the cover of these reports for clarity.
- To ensure that no project achievements are overlooked, all achievements, including technical reports, should be submitted separately.
- The Secretariat, including Ms. Jenifer Conje, emphasized that the functionality of the MCB under the new Governor is a indicator of this project. Therefore, any

updates on the MCB approval process are expected to be shared with the Secretariat on a monthly basis.

- The draft Governor's Decree on the Establishment of Coordination Body on the Management of Giam Siak Kecil – Bukit Batu Biosphere Reserve, which has been prepared, needs to be shared with the ITTO Secretariat.
- It should be ensured that the project is completed within the current timeline ending in September and that existing funds are used efficiently, as the project period has already been extended through a No-Objection Letter.
- If the project budget modification is required, the Secretariat will review the justifications upon submission by the Executing Agency.
- Regarding demonstration plots, the reasons for specifying certain items for each village need to be clearly and thoroughly justified. In addition, understanding the impact on the income generation and the mechanisms for community-based benefit sharing will be important for the assessment of this project later. The Secretariat expects the Executing Agency will share the detailed information on the activities related to the demonstration plots.

4. Team Commitment:

- The technical report will be revised according to Dr. Soomin's suggestion, activity report 1.2 and 1.5, and activity 2.3 and 2.4, The cover of this report will be clearly differentiated.
- The technical report submitted is activity 1.2, 1.5, 2.3 and 2.4. The document will be submitted separately
- EA will submit progress regarding the approval of MCB every month and will monitor it until signed by the Governor of Riau
- EA will send the draft Governor's Decree on the Establishment of the Coordination Body for the Management of the Giam Siak Kecil – Bukit Batu Biosphere Reserve to the ITTO Secretariat soon.
- Ensure that the project will be completed on time which is valid until September and will use existing funds efficiently
- Prepare and submit an improved demonstration plot proposal, clearly and thoroughly justifying the reasons for specifying certain items for each village's needs. The proposal will also include information on the potential impact on income generation and community-based benefit-sharing mechanisms with project interventions based on baseline data before the improvement of the demonstration plot.
- Prepare and submit the propose budget modification.