



**TITLE:  
SEMI-ANNUAL REPORT (JANUARY – JUNE 2025)**

**CONSERVATION OF COASTAL FOREST AND PEATLANDS IN GUNUNG ARONG  
FOREST RESERVE, JOHOR**



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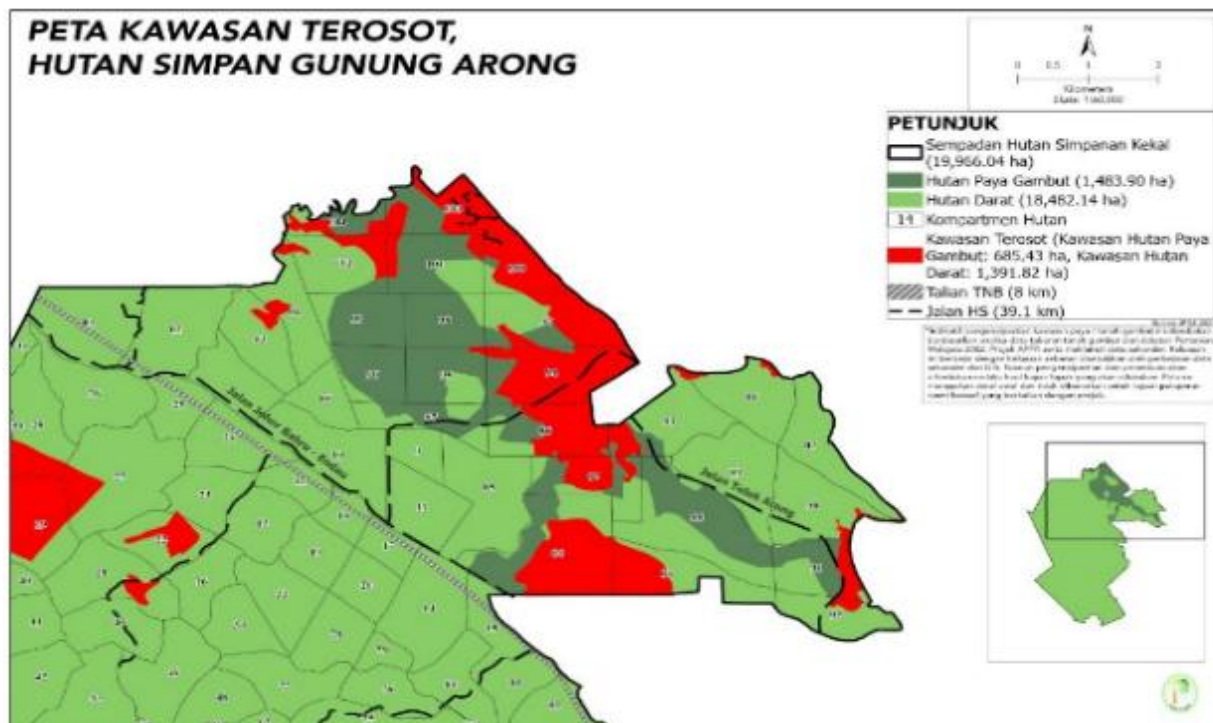
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## SEMI-ANNUAL REPORT (JANUARY - JUNE 2025) CONSERVATION OF COASTAL FOREST AND PEATLANDS IN GUNUNG ARONG FOREST RESERVE, JOHOR

### 1.0 Introduction

Since 2021, the Global Environment Centre (GEC) and TH Plantations Berhad (THP) with full support from the Johor State Forest Department (JSFD) have been implementing a rehabilitation and conservation project for coastal forests and peatlands in the Gunung Arong Forest Reserve (GAFR), Johor. The project aims to rehabilitate degraded coastal forest areas and approximately 1,500 hectares of peat swamp forest within the 4,300-hectare northeastern portion of GAFR. It is funded by THP and involves collaboration between GEC, JSFD and local stakeholders, community with completion targeted for June 2029. Now entering fourth year of the implementation, the project continues to prioritize the long-term protection and ecological restoration of lowland and peat swamp forests, covering approximately 1,500 hectares of peatland. The project emphasizes the protection and restoration of the northeastern portion of GAFR which includes lowland forests and peat swamp forests. A field assessment conducted by GEC revealed that approximately 45% ( $\pm$  685 ha) of the peat swamp forest has been degraded due to previous drainage, fires and activities such as road construction, logging, and plantation development within and near GAFR. The formation of the new local community group Komuniti Pelindung Alam Sekitar Mersing (KompAS) has played a vital role in the project's success within and near GAFR. KompAS members actively participate in hydrological management, tree planting, fire patrolling, and monitoring efforts. Their contributions not only foster local stewardship of natural resources but also strengthen grassroots support for forest conservation in the area.



**Figure 1.** Map of the degraded forest area in GAFR, highlighted in red colour. While the dark green marked the area of peat swamp forest.



This semi-annual report outlines the progress implemented between January and June 2025 building upon the first quarter report (January to March 2025) which detailed a comprehensive range of rehabilitation activities. These included fire prevention measures, wildlife monitoring, community group establishment, capacity development initiatives, degraded forest restoration activities, and outreach efforts. Throughout these six months, activities were carried out in alignment with the agreed 2025 workplan for this project. Close coordination with the JSFD and the East Johor District Forestry Officer (PHDJT) was maintained to formulate detailed and strategic plans for rehabilitation activities in GAFR that reflecting the strong collaborative commitment toward its protection and restoration. Additionally, community-led fire patrolling and monitoring initiatives were intensified to proactively prevent potential fire incidents that could jeopardize the success of the ongoing rehabilitation work.

## 2.0 Project goals and objectives

### 2.1. Project goal

To protect and rehabilitate forests and peatlands in the north-eastern portion of Gunung Arong Forest Reserve.

### 2.2. Project objectives

- i. To develop a rehabilitation and management strategy for the site using a landscape management approach and the participation of relevant stakeholders;
- ii. Rehabilitation of degraded areas through re-wetting, assisted natural regeneration and selected tree planting in priority sections of the site; and,
- iii. Support the actions of local communities and other stakeholders on sustainable land management and fire prevention in targeted areas.

## 3.0 Project implementation planning and project activities

### 3.1 Project implementation planning

In 2025, the project emphasized forest rehabilitation through tree planting, hydrological management via the development of new canal blocks to regulate water flow within the GAFR and strengthened community involvement in conservation efforts. Activities were implemented based on the structured work plan jointly agreed upon by JSFD, GEC and TH Plantations. The work plan focuses on three key components:

1. **Component 1:** Securing community support and commitment for the conservation of coastal forests and peatlands in GAFR.
2. **Component 2:** Rehabilitating and protecting degraded forest areas within GAFR.
3. **Component 3:** Enhancing Communication, Education, and Public Awareness (CEPA).

This work plan provides a clear roadmap for systematic activity execution, aligned with the project's objectives to ensure the sustainable protection and restoration of GAFR's coastal forest and peatland ecosystems. Progress updates have been reported quarterly to the District Forestry Office (Johor Timur) and TH Plantations. Table 1 below outlines the planned and ongoing activities for 2025.

**Table 1.** Work plan for the Conservation of Coastal Forest and Peatlands in Gunung Arong Forest Reserve, Johor 2025

BIL	ACTIVITY (2025)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>1</b>	<b>SECURING SUPPORT AND COMMITMENT FROM THE COMMUNITY TO ENGAGE WITH THE CONSERVATION PROJECT OF THE COASTAL FOREST AND PEATLANDS IN GUNUNG ARONG RESERVE FOREST, MERSING, JOHOR</b>												
<b>1.1</b>	<b>Empowerment on the local community involvement on the Gunung Arong Forest Reserve conservation project.</b>												
	a) Reinforce the Komuniti Pelindung Alam Sekitar Mersing (KomPAS) establishment by registering it with the Registrar of Societies (ROS) to ensure the recognition and continuity of the organization.	X	X	X	X	X	X						
	b) Enhance the community involvement in conservation projects through Community-Based Organization (CBO) initiatives and develop a strategic collaborative relationship with the Johor State Forestry Department (JSFD), TH Plantations Berhad (THP), and other relevant agencies.	X	X	X	X	X	X						
	c) Conduct regular meetings and follow-ups with the Community-Based Organisation (CBO) to monitor the project progression while providing continuous support for the implementation and capacity building aspects.				X	X	X						
<b>1.2</b>	<b>Empowered and enhance the new established Community-Based Organisation (CBO)'s capacity:</b>												
	a) Conduct comprehensive training programs to the KOMPAS group on effective nursery management and maintenance practices to ensure an efficient and effective implementation of operations.		X	X	X								
	b) Carry out continuous care and maintenance of community nursery sites, including monitor on the health of saplings and maintain the developed nursery site infrastructure.	X	X	X	X	X	X						
	c) Produce 3,000 high quality tree sapling such as Tenggek burung ( <i>Melicope lunu-ankenda</i> ), Pulau ( <i>Alstonia macrophylla</i> ) and other pioneer species for planting programme in GAFR for year 2025. An	X	X	X	X	X	X						

BIL	ACTIVITY (2025)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	intensive care conducted to determine the optimum quality of tree can be produced												
<b>2</b>	<b>REHABILITATION AND PROTECTION ON THE DEGRADED FOREST AREA IN GUNUNG ARONG FOREST RESERVE</b>												
<b>2.1</b>	<b>Patrolling and monitoring around the Gunung Arong Reserve Forest (Buffer zone)</b>												
	a) Implement continuous monitoring on the water table by collecting data using the piezometers following the standard procedure provided.	X	X	X	X	X	X						
	b) Regular update on the Fire Danger Rating System (FDRS) signboards in the field and disseminate the updated information through the communication group of the community and project stakeholder group.	X	X	X	X	X	X						
	c) Implement continuous fire monitoring and patrolling around the GAFR and adjacent areas for fire prevention and control. Also to ensure the early action can be taken to control the accident from happened.	X	X	X	X	X	X						
	d) Implement continuous systematic wildlife monitoring through two methods: - Camera trap installation and maintenance at the strategic location - Wildlife roadkill documentation at the adjacent area of GAFR.	X	X	X	X	X	X						
<b>2.2</b>	<b>Tree planting activity: Second Phase 2025</b>												
	a) Organise a community-involved tree planting initiative targeting of 3 hectares of degraded site in the second part of the 2025 and contribute to the overall target of 4,600 trees planted in HSGA starting from 2024.												
	b) Conduct maintenance activities at the planting site from the first phase (2024) involving 3,000 trees to ensure the health and growth of the trees, thus securing optimum success of the rehabilitation programme.		X	X			X	X					

BIL	ACTIVITY (2025)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	c) Implement on the regular monitoring to access the growth and survival rates of the tree planted trees. Included determination on any threat or issues that need to be overcome.			X			X						
<b>2.3</b>	<b>Hydrology management</b>												
	a) Conduct a comprehensive assessment to identify on the possible canal that need to be managed for the mitigation plan of fire in the peatland area.			X	X	X							
	b) Construct an additional 5 canal blocks in FC 86, FC84 and FC 83 to enhance hydrology management.												
	c) Construct 2 canal blocks at Parit Sembilan, Kampung Air Papan with approval and collaboration from the Department of Irrigation and Drainage (DID).			X									
	d) Conduct a schedule monitoring and continuous maintenance on the installed canal blocks.	X	X	X									
<b>2.4</b>	<b>Update the map of peatland area in GAFR</b>		X	X									
<b>2.5</b>	<b>Update the fire potential forecast around the GAFR to the relevant WhatsApp group</b>	X	X	X	X	X	X						
<b>3</b>	<b>COMMUNICATION, EDUCATION AND PUBLIC AWARENESS</b>												
<b>3.1</b>	Organise a fire prevention programme in collaboration with local communities and agencies including the Mersing District Office, East Johor Forestry District Office, Fire and Rescue Department and other relevant stakeholders.												
<b>3.2</b>	Organise a peatland forest awareness programme with the local community, stakeholder and students from school and other educational institution.												
<b>3.3</b>	Coordinate a tree planting activity involving TH Plantations Berhad volunteers, students and relevant stakeholders.												



BIL	ACTIVITY (2025)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
4.	<b>PROVISION OF OTHER NECESSARY TECHNICAL SERVICES WITH JSFD</b>												
	a) Prepare a technical study report based on the Gunung Arong Forest Reserve Scientific Expedition 2024 and present it at the GAFR Scientific Expedition Seminar.					X							
	b) Contribute to the organization of the Gunung Arong Challenge 2025 to ensure the success of the program.												
	c) Provide support for the development of TER in Teluk Arong, HSGA including contribute to carbon and climate change-related initiatives to ensure sustainable development in line with conservation objectives.												

**Note:** The proposed work plan is subject to changes from time to time based on the need for local coordination, the level of support and involvement of stakeholders, current weather and environmental conditions as well as other relevant factors to ensure flexibility in implementation within a dynamic environment while maintaining the achievement of the programme's main objectives.

- **X=** Marks the activities that have been carried out in this reporting period.
- **Green highlight =** Indicates the proposed work plan according to the timeline.



### 3.2 Project activities

During the period from January to June 2025, a total of 10 major activities were completed, comprising aspects of community development, engagement with stakeholders, wildlife assessment, planting site monitoring with maintenance and continuous patrolling and monitoring of the fire risk in GAFR. The 10 main project activities conducted from January to June 2025 are as follows:

1. Engagement with the Johor State Forestry Department (JSFD), East Johor District Forestry Office (PHDJT), Mersing District Office, Department of Irrigation and Drainage (DID) of Mersing and the Komuniti Pelindung Alam Sekitar (KomPAS) group.
2. Coordination and monitoring visit by TH Plantations at Gunung Arong Forest Reserve
3. Continuation of the wildlife monitoring and fauna roadkill monitoring in GAFR.
4. Monitoring of water table readings in Gunung Arong Forest Reserve (using piezometers) from January to June 2025.
5. Canal block/check dam construction and maintenance.
6. KomPAS nursery management.
7. Planted tree monitoring and site maintenance at Forest Compartment (FC) 103, GAFR
8. Peatland fire monitoring and management at GAFR.
9. Abstract development for the 2025 Forest Biodiversity Scientific Expedition Seminar-Convention.
10. Focus Group Discussion (FGD) for the Johor State Forest Management Plan 2026–2035.

#### 4.0 Summary of the progress on the rehabilitation activities carried out in GAFR from January to June 2025

##### 4.1 Engagement with the Johor State Forestry Department (JSFD), East Johor District Forestry Office (PHDJT), Mersing District Office, Department of Irrigation and Drainage (DID) of Mersing and the Komuniti Pelindung Alam Sekitar (KompAS) group

Between January and June 2025, a total of 18 engagement sessions were conducted with key stakeholders, including the PHDJT, JSFD, TH Plantations and other relevant agencies such as the Department of Irrigation and Drainage (DID) Mersing and the Mersing District Office along with KompAS.

The meetings promoted a participatory and transparent planning process, enabling government agencies, GEC, TH Plantations and the local community to build a common understanding of the project's direction, scope, and priorities for 2025. The synergy between KompAS's local ecological knowledge, GEC's technical guidance, and institutional support from relevant agencies contributed to a more holistic and practical forest management approach. This ongoing collaboration not only strengthened trust among stakeholders but also reinforced local ownership of the rehabilitation programme, creating a strong foundation for the long-term success and resilience of forest restoration efforts in GAFR. A summary of key meetings is provided in **Table 2**. These engagements are essential for keeping the project on track and serve as a platform for updating relevant agencies on project milestones. The full list of meetings with government agencies, stakeholders, and the community can be found in **Attachment 1**.



**Figure 2.** A project coordination meeting conducted with Johor Timur District Forestry Officer, Mr. Mohd Reydzuan Bin Yong, together with the KompAS community early in this year.



**Figure 3.** A meeting with the Mersing District Officer conducted to inform him of the current progress and upcoming plans for the GAFR conservation project.

**Table 2.** List of the key meetings conducted with key agencies and the community in during the January to June 2025 period.

No.	Date (2025)	Agency / Stakeholder / community	Results / Remarks
<b>Government agencies</b>			
1.	16 <sup>th</sup> January	Johor Timur District Forestry Officer (PHDJT) & KomPAS community	<ul style="list-style-type: none"> <li>A coordination meeting with Johor Timur District Forestry Officer and KomPAS community at Gunung Arong Conservation Field Office (GEC Mersing) was held for the formal introduction of KomPAS, including its vision, mission, objectives, and future plans.</li> <li>Other matters that were discussed including the proposed fire prevention site in GAFR (FC 84 &amp; 85), which was reviewed with the DFO.</li> <li>Upcoming plans for tree planting, canal block installation, and wildlife monitoring were discussed.</li> <li>A request was made for agency support in fire prevention measures to ensure zero fire incidents in Mersing and for planning a fire prevention roadshow in collaboration with local authorities.</li> </ul>
2.	14 <sup>th</sup> March	Johor State Forestry Department (JPNJ) Johor Timur District Forestry Officer (PHDJT)	<ul style="list-style-type: none"> <li>A meeting was held at the Balairaya Kampung Sawah Dato' regarding the degraded mangrove area at Kampung Tenglu Laut, also highlighting the on-going tree planting activities at FC103 Gunung Arong Forest Reserve (GAFR) and canal block installation planning.</li> </ul>

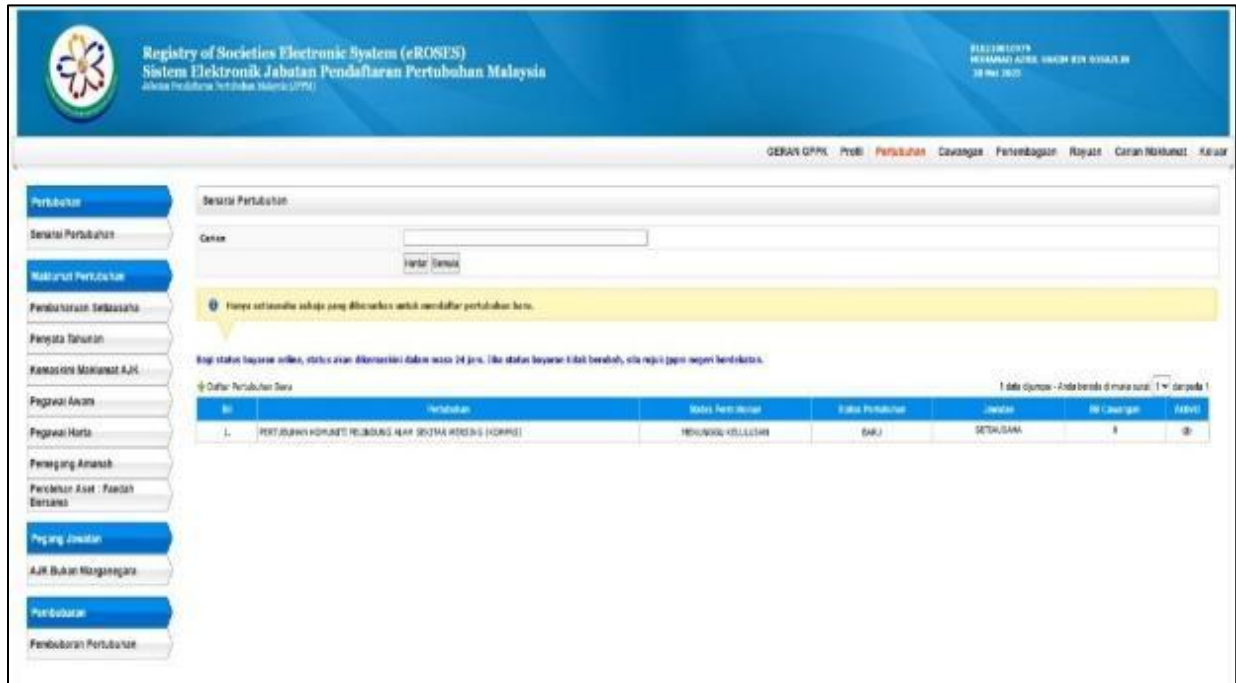
No.	Date (2025)	Agency / Stakeholder / community	Results / Remarks
		Mersing Department of Irrigation and Drainage (DID) KomPAS community	<ul style="list-style-type: none"> <li>The progress of activities undertaken for the conservation project for coastal forests and peatlands in the Gunung Arong Forest Reserve (GAFR) was presented to the attendees aiming to enhance their confidence and secure support for the project.</li> </ul>
3.	14 <sup>th</sup> April	East Johor District Forestry Officer (PHDJT) TH Plantations Berhad	<ul style="list-style-type: none"> <li>In conjunction with THP's three-day monitoring visit to their project site in the Gunung Arong Forest Reserve and its surrounding areas, a progress meeting was held together with East Johor District Forestry Officer (PHDJT) and TH Plantations at the East Johor District Forestry Office.</li> </ul>
4.	28 <sup>th</sup> May	Mersing District Office	<ul style="list-style-type: none"> <li>An update meeting with Tuan Haji Jamil Hasni bin Abdullah, Mersing District Officer, was held regarding planting progress at FC 103 (GAFR) and the planned peatland awareness tour for the year.</li> </ul>
<b>Community group</b>			
1..	11 <sup>th</sup> January	Komuniti Pelindung Alam Sekitar Mersing (KomPAS)	<ul style="list-style-type: none"> <li>A coordination meeting was held at Balairaya Kampung Sawah Dato' with the KomPAS community to discuss the 2025 work plan.</li> <li>Key topics included establishing a distinct identity for KomPAS, an upcoming meeting with the newly appointed District Forest Officer (DFO) of Johor Timur, a review of tree planting initiatives for 2025 and the completion of 2024 activities, as well as preparations for the peatland rehabilitation awareness roadshow, scheduled from July to October 2025.</li> <li>The meeting outlined a preliminary plan for additional canal block construction with community participation.</li> </ul>
2.	17 <sup>th</sup> February		<ul style="list-style-type: none"> <li>A meeting was held at Gunung Arong Conservation Field Office (GEC Mersing) to discuss financial matters (nursery facilities and costs).</li> <li>The meeting covered initiatives to enhance local knowledge on seedling planting, and proposed a community ID card for those involved in tree planting and seed collection.</li> </ul>

No.	Date (2025)	Agency / Stakeholder / community	Results / Remarks
			<ul style="list-style-type: none"> <li>Attendees were updated on correspondence with DID regarding canal block installation and discussions with the Mersing DO on roadshow planning</li> </ul>
3.	6 <sup>th</sup> June		A coordination meeting was held to confirm the continuation of planting activities in July, safety precautions for patrollers and field team, and organizational management updates.



**Figure 4.** Liaison meeting with the KomPAS community on issues that arose during the project implementation at GAFR.

The community group is making continued progress with notable success in the effective delegation of tasks among its members and active participation in project activities. In a significant step forward, KomPAS is now awaiting official approval for registration under the Registrar of Societies (ROS) as shown in **Figure 5**. This reflects the group's strong commitment to formalising its structure and expanding its impact. The registration will mark an important milestone towards establishing the first community-based organisation (CBO) in Mersing dedicated to addressing local environmental issues through grassroots action and long-term collaboration.



**Figure 5.** The KompAS community has registered their organisation under ROS and is currently waiting for official approval.

#### 4.2 Coordination and Monitoring Visit by TH Plantations at Gunung Arong Forest Reserve

A three-day coordination meeting and site visit from 14–16 April 2025 brought together TH Plantations, JSFD, GEC and KompAS at Gunung Arong Forest Reserve. The first day of the visit featured a coordination meeting at the East Johor District Forestry Office where GEC presented the Coastal Forest and Peatland Conservation Programme’s progress update from January–March 2025 and the implementation plan for the remainder of the year. TH Plantations officers then visited GEC’s Mersing field office to inspect fire management equipment, the Fire Danger Rating System (FDRS), and fire risk marker signage.

On the second and third days, the team conducted field monitoring and documentation activities under the project. TH Plantations officers visited the KompAS-managed community nursery in Kampung Teriang, where they interviewed nursery caretaker En. Hafiz and engaged with community members. They also visited FC 103, GAFR to monitor planted trees and participated in a symbolic tree planting. Technical activities under the project included wildlife monitoring, peat sampling and ecological monitoring such record of the rare *Betta tussya* fish was also showcased during the visit. The visit concluded with a Hari Raya celebration at Kampung Air Papan’s community hall, attended by the DFO Johor Timur, TH Plantations officers, KompAS members and GEC staff that further strengthening partnerships and shared commitment to conservation efforts at GAFR. The detailed report is provided in **Attachment 2**.



**Figure 6.** The visit by TH Plantations Berhad representatives to the project site and the meeting conducted with PHDJT and the KomPAS community from 14 -16 April 2025

#### 4.3 Continuation of the wildlife monitoring and fauna roadkill in GAFR

Wildlife monitoring in Gunung Arong Forest Reserve (GAFR) continued through two main approaches, the installation of camera traps and patrolling for roadkill detection. The camera traps were installed at the same locations as the previous year to ensure consistency in monitoring. However, the number of active camera traps was reduced from three to two due to one unit becoming non-functional and requiring maintenance. The faulty camera was replaced during the second quarter of the year.

During the first half of 2025, camera trap data recorded a total of seven species compared to 11 species during the same period in 2024. The species detected included the Southern pig-tailed macaque (*Macaca nemestrina*), Long-tailed macaque (*Macaca fascicularis*), Brown spiny rat (*Maxomys rajah*), Malayan porcupine (*Hystrix brachyura*), wild boar (*Sus scrofa*), water monitor lizard (*Varanus salvator*), and Common tree shrew (*Tupaia glis*) as updated in **Table 3**. The decline in species richness may be attributed to several factors, including changes in wildlife movement patterns due to seasonal variations, prolonged rainfall and unpredictable weather conditions in Mersing as well as natural fluctuations in habitat use within the monitoring areas.

**Table 3.** Species captured by the camera traps from January to June 2025. (Q1 = January – March, Q2 = April – June)

No	Family	Common name	Species	Q1	Q2	Total	IUCN status
1	Tupaiidae	Common tree shrew	<i>Tupaia glis</i>	1		1	LC
2	Cercopithecidae	Long-tailed macaque	<i>Macaca fascicularis</i>	1		1	EN
3	Muridae	Rajah/Brown Spiny rat	<i>Maxomys rajah</i>	1	1	2	VU
4	Suidae	Eurasian wild pig	<i>Sus scrofa</i>	1		1	LC
5	Cercopithecidae	Southern pig-tailed macaque	<i>Macaca nemestrina</i>		1	1	EN

6	Hystricidae	Malayan porcupine	<i>Hystrix brachyura</i>	1	1	LC
7	Varanidae	Asian water monitor lizard	<i>Varanus salvator</i>	1	1	LC

Note: LC – Least Concern; NT – Near Threatened, VU- Vulnerable; EN – Endangered

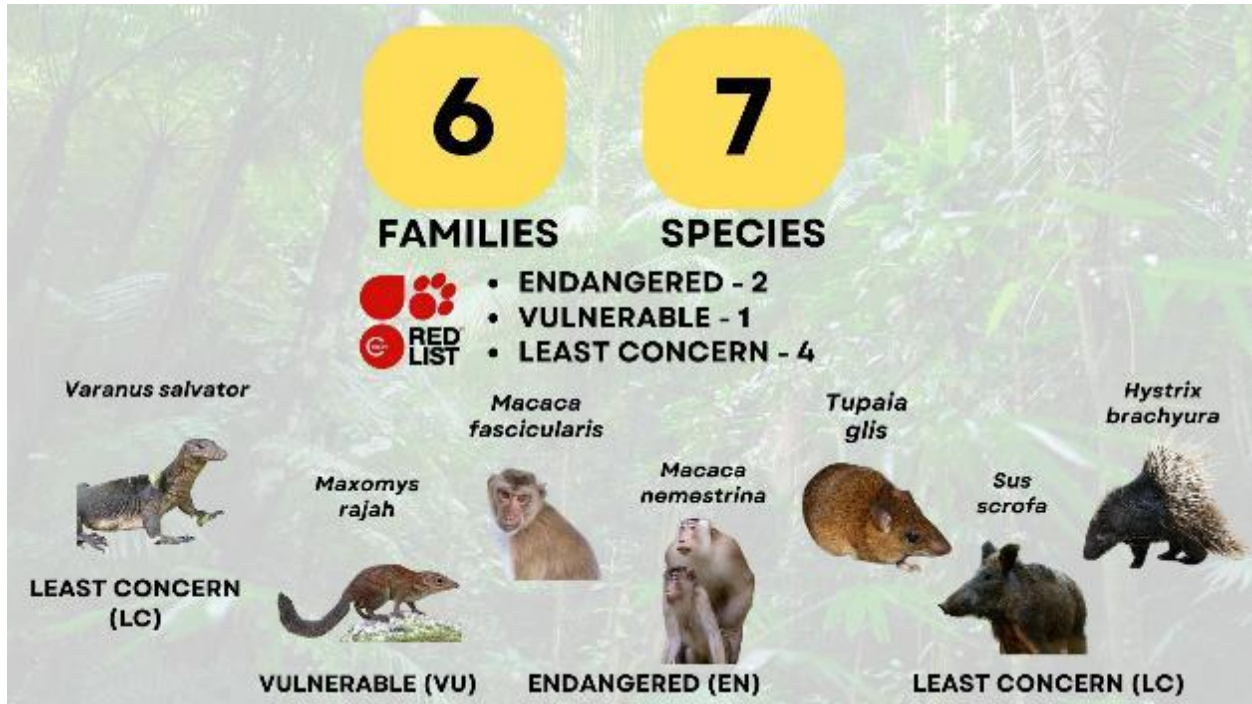


Figure 7: Summary infographic of species captured by camera traps (January–June 2025)



Figure 8. Monitoring and retrieving camera traps data.

Roadkill monitoring during the first half of 2025 recorded fewer incidents with 24 cases compared to 38 during the same period in 2024 as stated in **Table 4**. The number of species involved was also lower, with only eight species recorded this year compared to 15 species last year. Notably, one of the incidents involved the death of an endangered species the Malayan tapir (*Tapirus indicus*). This reduction in roadkill incidents reflects encouraging progress in protecting wildlife

along roads near the GAFFR. It highlights the positive impact of ongoing awareness efforts, monitoring, and collaboration aimed at safeguarding animals from road-related threats.

**Table 4.** Records of wildlife roadkill incidents from January to June 2025

No	Species	Common name	Local name	No. of individuals					
				Jan	Feb	Mar	Apr	May	June
<b>Months</b>									
<b>Reptiles</b>									
1	<i>Cuora amboinensis</i>	Malayan Box Terrapin	Kura-kura katup	1	1				
2	<i>Varanus salvator</i>	Asian Water Monitor Lizard	Biawak air	1			2		
3	<i>Naja sumatrana</i>	Spitting Cobra	Ular senduk sembur					1	1
4	<i>Python reticulatus</i>	Reticulated Phyton	Ular sawa batik						1
<b>Mammals</b>									
5	<i>Macaca Fascicularis</i>	Long-Tailed Macaque	Kera ekor panjang		1			2	
6	<i>Tapirus indicus</i>	Malayan Tapir	Tapir			1			
7	<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	Musang pandan			2	2	3	1
<b>Birds</b>									
8	<i>Centropus bengalensis</i>	Lesser Coucal	Ruak-ruak		1			3	
<b>Total incidents per month</b>				<b>2</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>9</b>	<b>3</b>
<b>Total incidents recorded</b>				<b>24</b>					

Possible factors contributing to the decline in species recorded through camera traps and the lower number of wildlife roadkill incidents include climatic influences. The year 2024 was marked by the *El Niño* phenomenon which typically leads to drier conditions. While such conditions can limit water and food availability, they may also drive wildlife to move more actively across larger areas in search of resources, increasing the likelihood of detection by camera traps and exposure to road risks. In contrast, the weather in 2025 has been more stable with improved availability of water and food, animals may have remained in more concealed or resource-rich areas, reducing their movement across monitored zones and lowering detection and roadkill rates.

The comprehensive wildlife monitoring report can be found in **Attachment 3**.

#### **4.4 Monitoring of water table reading in Gunung Arong Forest Reserve (using piezometers) from January to June 2025**

The KomPAS patroller team consistently monitored 11 installed piezometers across GAFFR and its surrounding areas. Regular monitoring of groundwater levels is critical for early fire prevention, especially in peatland ecosystems. Peat soils, made up of partially decomposed organic layers, retain moisture under normal conditions but become highly flammable when the water table drops

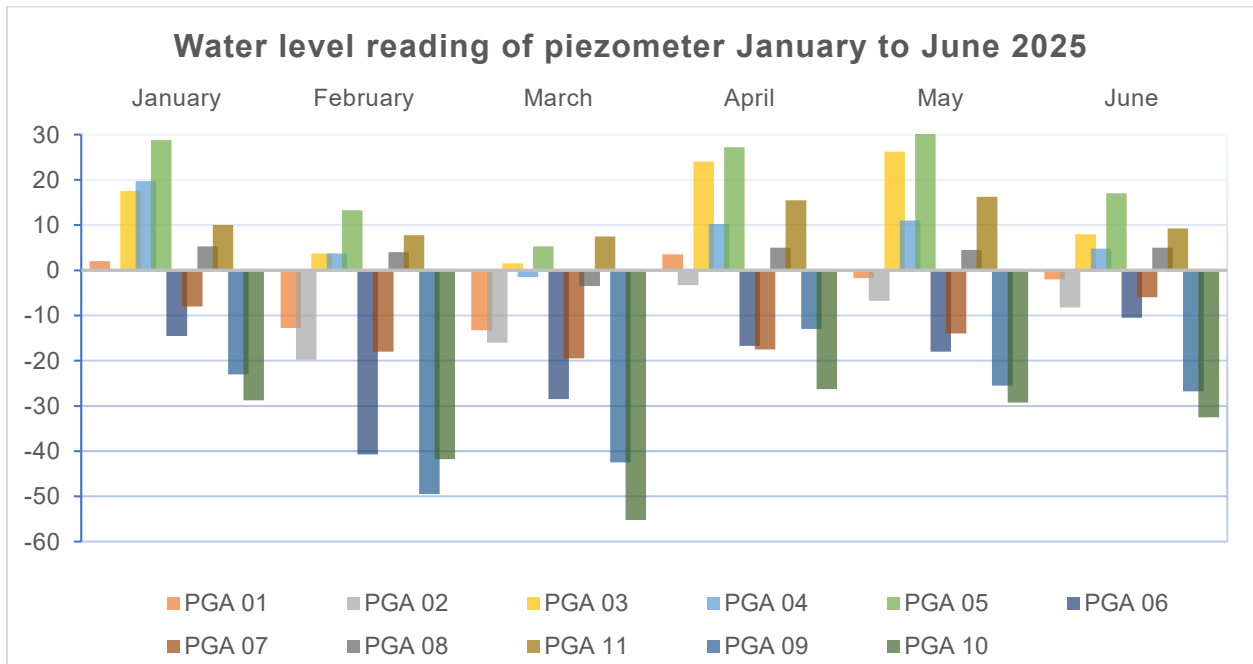
during prolonged dry periods. Maintaining optimal groundwater levels helps reduce the risk of peat fire ignition and spread.

A declining water table can signal the onset of dry conditions allowing timely intervention and mitigation. Water levels were measured four times per week. The weekly average readings were compiled and shared with relevant stakeholders including the East Johor District Forestry Office (PHDJT) and local community members through dedicated WhatsApp groups. This collaborative and transparent data-sharing approach ensures that all parties stay informed and are ready to respond quickly to any concerning trends. The **Table 5** and the graph below summarise the average piezometer readings recorded at GAFR from January to June 2025.

**Table 5.** Average water table readings using piezometers from January to June 2025 at GAFR and adjacent areas.

Date (2025)	January	February	March	April	May	June	Average	Location
Piezometer	Water level (cm)							
PGA 01	2.0	-12.8	-13.3	3.5	-1.8	-2.0	-6.0	Adjacent area of FC 83
PGA 02	-0.3	-19.8	-16.0	-3.3	-6.8	-8.3	-9.0	
PGA 03	17.5	3.8	1.5	24.0	26.3	8.0	5.7	FC 103
PGA 04	19.8	3.8	-1.5	10.3	11.0	4.8	5.5	
PGA 05	28.8	13.3	5.3	27.3	30.8	17.0	11.8	
PGA 06	-14.5	-40.8	-28.5	-16.8	-18.0	-10.5	-20.9	Adjacent area of FC 84
PGA 07	-8.0	-18.0	-19.5	-17.5	-14.0	-6.0	-11.4	
PGA 08	5.3	4.0	-3.5	5.0	4.5	5.0	1.4	
PGA 11	10.0	7.8	7.5	15.5	16.3	9.3	6.3	
PGA 09	-23.0	-49.5	-42.5	-13.0	-25.5	-26.8	-28.8	Palm oil plantation area
PGA 10	-28.8	-41.8	-55.3	-26.3	-29.3	-32.5	-31.4	

**Note:** The negative symbol (-) indicates that the water level is below the soil surface; PGA (Piezometer Gunung Arong) indicates the codes of piezometers installed in GAFR and adjacent areas.

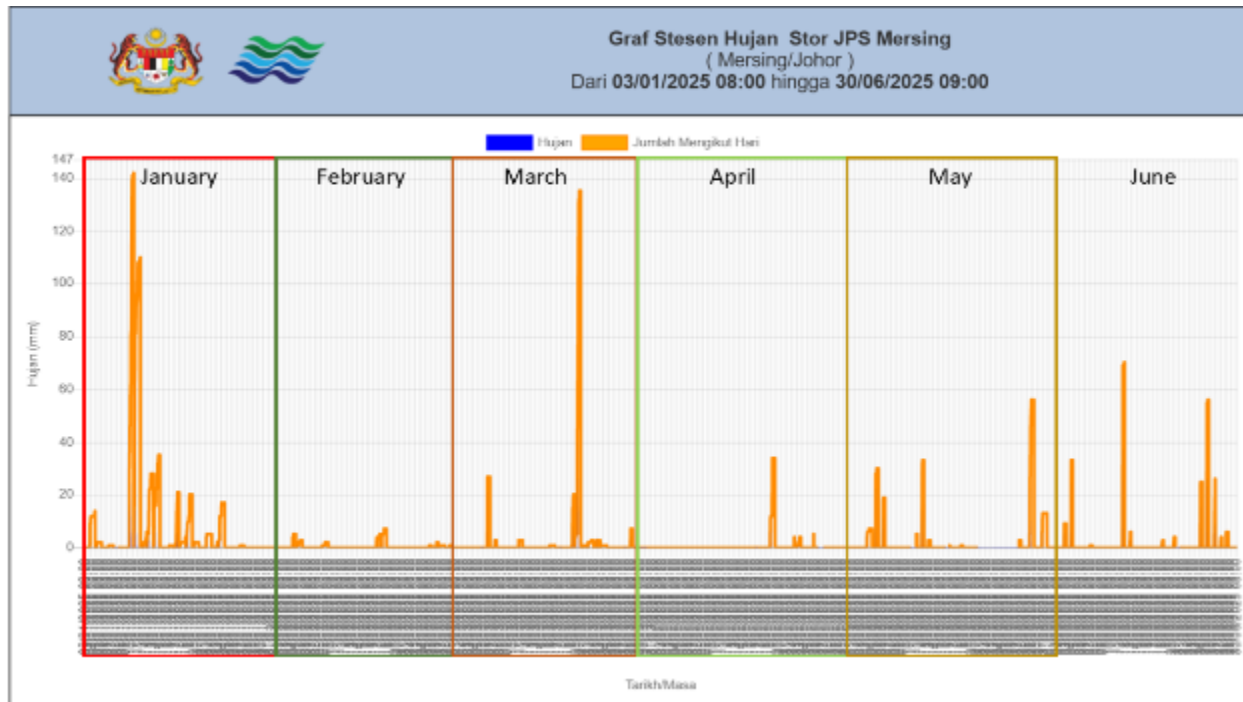


**Figure 9.** Average water level readings from each piezometer from January to June 2025

Belowground water table monitoring data from January to June 2025 shows a significant improvement compared to the same period in 2024. The average water table reading across all monitored locations for the first half of 2024 was  $-14.9$  cm, indicating generally low water levels and dry conditions. In contrast, the 2025 water level average improved to  $-5.3$  cm, reflecting a significant rise in belowground water levels and concurrent reduction in fire risk.

This positive trend is largely influenced by two main factors which are the climate recovery and hydrological management. The El-Niño phenomenon in 2024, led to to the prolonged dry conditions with limited rainfall and increased evaporation and caused the decreasing of water level. According to the APEC Climate Center (2024) and Malaysia’s Meteorological Department, El Niño’s impact extended into mid 2024, reducing soil moisture and lowering water tables.

As can be observed from the precipitation pattern recorded by Department of Irrigation and Drainage (DID) in Mersing, Johor (Figure 10), the amount of rainfall recorded is significantly higher compared to last year indicating the end of the El-Niño phenomenon. In early 2025, the rainfall resumed at normal levels of 140 mm The temperature trend for this year remains stable with minor difference of 1-2 °C where no heat spike was detected (source: *Mersing Weather, Average Temperature (Malaysia) - Weather Spark*).



**Figure 10.** The rainfall distribution in Mersing, Johor for January to June 2025, retrieved from <https://publicinfobanjir.water.gov.my/>, Department of Irrigation and Drainage Malaysia

The second impact comes from the hydrological intervention through the check dam installation at the main Parit Sembilan canal, which effectively regulates water flow into the peat areas of FC 83, FC 84 and the oil palm plantation area. The average water level increased from  $-20.4$  cm (2024) to  $-12.5$  cm (2025) after the check dam installation. This improvement clearly reflects the effectiveness of the check dam in managing peatland hydrology and mitigating fire risks in these vulnerable zones. These findings emphasise the combined role of natural climatic recovery and targeted hydrological management in improving groundwater retention within the GAFR landscape.



**Figure 11.** The local patroller team continues to actively monitor and record the underground water level at the piezometers installed in GAFR and the adjacent area.

#### 4.5 Canal block/check dam installation and maintenance at Parit Sembilan, Mersing

The installation of two canal blocks/check dams at Parit Sembilan, Kampung Air Papan was successfully completed with approval and collaboration from the Department of Irrigation and Drainage (DID). The works were carried out at Parit Tadahan, Parit Sembilan, Mersing. Despite facing weather-related challenges, including periods of heavy rainfall that temporarily delayed progress, the project advanced steadily. Key activities included geobag preparation and relocation, installation of HDPE pipes for water regulation, and reinforcement of the structures using wooden stakes to ensure long-term stability.



**Figure 12.** Two canal blocks constructed at Parit Sembilan, Air Papan, Mersing, Johor.



**Figure 13:** Before and after the check construction of check dams and their effectiveness in raising the water level at the forest reserve site

These check dams play a vital role in peatland hydrological management by:

- Maintaining optimal peat moisture levels
- Preventing over-drainage and land degradation
- Reducing fire risk during dry seasons
- Preserving the ecosystem's carbon storage capacity
- Supporting biodiversity within surrounding forest areas

- Safeguarding water resources for domestic, agricultural, and community use





This successful project underscores the strength of collaboration between the GEC, TH Plantations, government agencies including DID Mersing and PHDJT/JPNJ, and the KomPAS community. It stands as a testament to the shared commitment toward sustainable peatland conservation and long-term water management in the region.

In addition, two existing canal blocks adjacent to Forest Compartment 84, Gunung Arong Forest Reserve (CB-1 and CB-2) have been maintained by the local community, KomPAS as shown in Table 6. These structures sustained minor damage due to the monsoon season and flooding events, which are common in the Mersing region. KomPAS community involvement in the ongoing maintenance and reinforcement of these canal blocks is crucial to ensuring their long-term functionality, especially during the Northeast Monsoon period when water pressure and erosion risks are at their peak. Overall, the construction of new structures and the proactive maintenance of existing ones reflect a comprehensive approach to peatland water management with both institutional support and community-based stewardship playing key roles.



**Figure 14.** Location map and canal block maintenance by the KomPAS community.

**Table 6.** Summary of canal block maintenance activities and conditions

No	Canal blocks	Condition	
		Before	After
1.	CB-1 N 02°32'02.18", E 103°47'15.32"		
		<ul style="list-style-type: none"> <li>• Erosion has occurred under the canal block which prevent water from being contained properly.</li> <li>• The condition of the canal block remains solid but the maintenance is needed to close the waterway under the canal block.</li> </ul>	
2.	CB-2 N 02°32'04.13", E 103°47'18.31"		
		<ul style="list-style-type: none"> <li>• The sand bags were eroded due to strong currents and need to be replaced.</li> <li>• Replacement of sand bags and reinforcement of the structure.</li> </ul>	

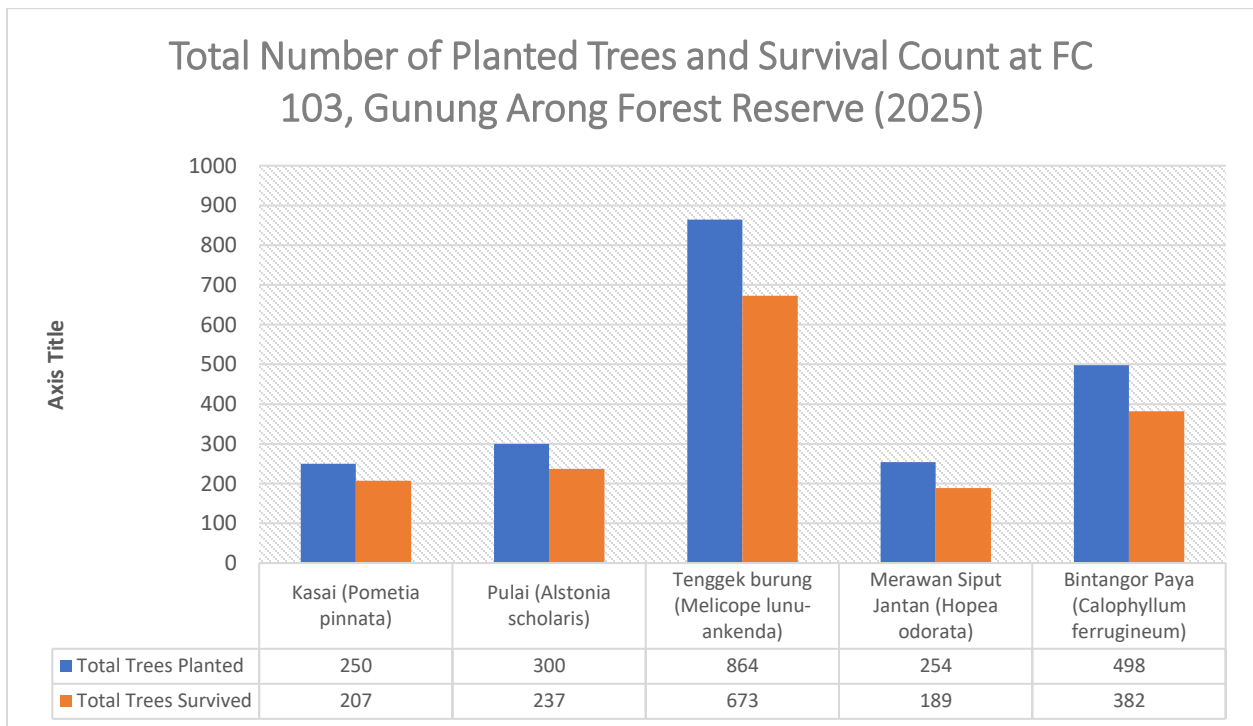
#### 4.6 Planted tree monitoring, tree census and site maintenance at Forest Compartment 103, GAFR

In the first quarter of 2025, the KomPAS community successfully completed the planting of 2,814 trees at Forest Compartment 103, GAFR. Site maintenance and a tree census, including a survival count, was conducted to determine the latest survival status of the planted trees. The assessment found that 2,096 trees survived resulting in a survival rate of 74.5%.

Based on the tree survival data in Table 7 and the graph, it was found that many of the planted trees are adapting well to site conditions despite the mortality rate of approximately 25.5%. Some trees that initially appeared dead are now sprouting new shoots, indicating positive physiological responses and potential for recovery with proper maintenance. These findings provide valuable insights for improving reforestation strategies, particularly in species selection, site-specific planting, and maintenance planning.

**Table 7.** Summary of tree survival monitoring at Forest Compartment 103, GAFR (2025)

No.	Tree Species	Total Trees Planted	Total Trees Survived	Survival (%)
1	Kasai ( <i>Pometia pinnata</i> )	648	348	54%
2	Pulai ( <i>Alstonia scholaris</i> )	250	207	82%
3	Tenggek burung ( <i>Melicope lunu-ankenda</i> )	300	237	79%
4	Merawan Siput Jantan ( <i>Hopea odorata</i> )	864	673	78%
5	Bintangor Paya ( <i>Calophyllum ferrugineum</i> )	254	189	74%
6	Keruing Neram ( <i>Dipterocarpus oblongifolius</i> )	498	382	77%
	<b>TOTAL</b>	<b>2,814</b>	<b>2,096</b>	<b>74.5%</b>



**Figure 15:** graph showing the total number of planted trees and survival count at FC 103, Gunung Arong Forest Reserve (2025)

Satellite image analysis reveals that forest degradation in the compartment began around 2012 as shown in Figure 16. Based on the community report, the degradation is likely linked to sand mining activities that took place in the area. The prolonged disturbance, combined with exposure to high temperatures and encroachment, has severely impaired the site's natural regeneration capacity. In tropical regions, it can take 10 to 30 years or longer for a degraded site to naturally recover into a functioning forest ecosystem, depending on the severity of disturbance and surrounding ecological conditions. This prolonged recovery timeline may explain the relatively low survival rates currently observed at the reforestation site.



**Figure 16.** The satellite image for the FC 103, the right side shows in the site in August 2012 and the left shows the degradation impacting 2013

Despite challenges such as unpredictable weather and site variability, the survival rate reflects the resilience of the trees and underscores the importance of targeted interventions in areas with lower survival, such as replanting or enhancing soil and protection measures. Regular monitoring and census activities remain crucial for detecting early signs of stress, such as yellowing leaves or pest damage, enabling timely corrective actions to improve survival rates. The continued involvement of the local community in both planting and monitoring is essential for the programme's long-term success, as it leverages local knowledge and fosters commitment to adaptive, sustainable management.

Site maintenance and replacement planting are scheduled for July 2025, with the goal of increasing the survival rate to above 85%. A detailed report on the tree survival monitoring can be found in **Attachment 4**.



**Figure 17.** Tree planting activity executed by the KomPAS community at FC 103, GAFR.



**Figure 18:** Monitoring and condition of the planted trees in FC103, GAFR

#### **4.7 Community KomPAS nursery management**

As part of the ongoing peatland restoration efforts in Gunung Arong Forest Reserve (GAFR), the Komuniti Pelindung Alam Sekitar (KomPAS) has successfully managed a community-based nursery, which currently accommodates 3,000 tree saplings. These saplings are being nurtured in preparation for the next phase of the reforestation programme, which is tentatively scheduled to begin in July 2025, subject to favourable weather conditions. The selection of tree species for this phase was made strategically, based on survival rates and growth performance observed during the initial planting activities. Only species with high adaptability to local soil, hydrology, and microclimatic conditions were chosen to ensure better survival and long-term ecological success.

Ongoing care and management of the nursery are being actively carried out by the KomPAS community team, with regular inspections to ensure sapling health, prevent disease, and promote uniform growth. Daily tasks include pest and disease monitoring, and maintenance of the nursery facility. The proactive involvement of the KomPAS team demonstrates a strong commitment to long-term environmental care and resilience-building in the region.



**Figure 19.** Tree monitoring and nursery maintenance undertaken to ensure the saplings survival.

#### 4.8 Peatland fire monitoring and management at GAFR

On 4<sup>th</sup> March 2025, a peatland fire was reported in Forest Compartments 83 and 84, GAFR affecting about 15 hectares. The fire was first detected early in the morning by a forestry contractor and local patrollers at FC 94, who spotted smoke from the forest. It is suspected that the fire was triggered by illegal encroachment and hunting activities, ongoing challenges in the area. Dry weather made the forest more vulnerable, but residual moisture in the peat helped slow the spread. Emergency actions included site monitoring, field surveys, access clearing, and an on-site coordination meeting at FC 83 with the Johor Timur District Forestry Officer, Mersing Fire Department, GEC, and others. GEC provided technical support to identify high-risk zones, assess fire impacts, and plan control measures.



**Figure 20.** A rapid discussion with the relevant agencies for fire control action and aerial observation of the fire-affected area.



**Figure 21.** The forest rangers of the East Johor Forestry District together with GEC team carried out the fire extinguishing activities in the burnt area.

As a follow-up, an assessment report was submitted to the Johor State Forestry Department, and a joint site visit with JSFD was conducted on the 3<sup>rd</sup> June 2025 at FC 84, FC 85, and FC 94. The visit aimed to identify locations for piezometer and canal block installation to support water table regulation. The visit was led by the JSFD Assistant Director, Encik Mohd Fariz Bin Abd. Rhani with contractors and technical teams assessing access, soil conditions, and logistics. The Endau District Forest Ranger provided advisory input to ensure compliance with forestry regulations.

This integrated effort combines emergency fire response with hydrological restoration to reduce future fire risk. The project aims to stabilise groundwater levels, provide early warnings, and promote nature-based solutions to support the forest's resilience.



**Figure 22.** Site visit and monitoring with JSFD Assistant Director and PHDJT representatives.

#### 4.9 Abstract development for the 2025 Forest Biodiversity Scientific Expedition Seminar-Convention.

Two scientific abstracts were developed for presentation at the 2025 Forest Biodiversity Scientific Expedition Seminar-Convention based on key findings from the 2024 Gunung Arong Forest Reserve Scientific Expedition. These abstracts aim to support targeted conservation strategies and strengthen GAFR's positioning as a priority site for long-term biodiversity protection.

**Table 8.** Overview of abstracts submitted for the 2025 Forest Biodiversity Scientific Expedition Seminar-Convention

No.	Abstract Title	Key Highlights	Conservation Importance
1.	<b>Ecological Significance and Distribution of Durian Paya (<i>Durio carinatus</i>) in the Freshwater Swamp Forest of Gunung Arong Forest Reserve</b>	- Discovery of <i>Durio carinatus</i> , a Near Threatened species- Presence confirmed in acidic, waterlogged, nutrient-poor peat soils	- Informs species-specific conservation efforts  - Provides guidance for restoration planning

		- New insights into its ecological adaptability and distribution in Peninsular Malaysia	
2.	<b>An Ecological Assessment of the Wetland Ecosystem in Gunung Arong Forest Reserve Reveals Unique Resources and Critically Endangered Species that Require Urgent Conservation Strategies</b>	<ul style="list-style-type: none"> <li>- Confirmation of three wetland types: deep peat swamp forest, freshwater swamp forest with alluvial substrate and seasonal ponding, and mangrove ecosystems</li> <li>- Identification of rare habitats and critically endangered species</li> </ul>	<ul style="list-style-type: none"> <li>- Supports the case for urgent and targeted conservation action</li> <li>- Highlights GAFR's ecological significance</li> </ul>

These abstracts not only reflect the scientific value of the expedition but also provide a solid foundation for collaboration with JSFD and other stakeholders. The submitted abstracts can be referred to in **Attachment 5**.

#### 4.10 Focus Group Discussion (FGD) for the Johor State Forest Management Plan 2026–2035.

On the 26<sup>th</sup> May 2025, the Johor State Forestry Department (JSFD), in collaboration with Uni-Technologies Sdn Bhd (UTSB), organised a Focus Group Discussion (FGD) as part of the preparatory phase for the Johor State Forest Management Plan (Rancangan Pengurusan Hutan) 2026–2035. The session gathered 50 participants representing a diverse range of stakeholders, including government agencies, government-linked companies (GLCs), private sector entities, and non-governmental organisations (NGOs).

GEC played a key role in contributing technical expertise on community-based forest conservation, peatland fire prevention, and sustainable forest hydrology management. Drawing from its long-standing field experience in Johor and across Malaysia, GEC provided valuable insights on integrating ecological restoration and community participation into the forest management framework. This FGD served to collect critical primary data that will form the foundation for a more integrated, sustainable, and inclusive forest management strategy under the upcoming Forest Management Plan. GEC's inputs, alongside those from other stakeholders, support the development of a forest governance model that addresses ecological integrity, climate resilience, and socio-economic sustainability, while fostering stronger inter-agency and cross-sector collaboration in Johor state's forest management moving forward.



**Figure 23.** Focus Group Discussion Session (FDG) for the Johor State Forest Management Plan (Forest Management Plan – RPH) 2026–2035 held in Johor Bharu.

## 5.0 Challenges and problems encountered during the project implementation period (January – June 2025)

### i. Weather Factors and Implications for GAFR

The first half of 2025 presented significant environmental and logistical challenges that impacted tree planting and maintenance activities at GAFR. The northeast monsoon in January damaged access routes to planting sites such as FC103, GAFR while unpredictable weather patterns continued to hamper field operations in the following months. Although GEC led efforts to repair access roads, the onset of hot and dry conditions in the second quarter introduced new difficulties.

Prolonged dry spells led to soil moisture depletion, stressing newly planted saplings and slowing their early growth and establishment. Mortality rates were particularly high for species planted in exposed areas. The dry conditions also made routine maintenance tasks, such as grass trimming and tree checking, more difficult and time-consuming for KomPAS members. Further compounding the situation, a bee nest discovered near the active planting site resulted in one member being stung, creating safety concerns and limiting volunteer activity in that area. Mitigation measures implemented and planned include:

- Flexible scheduling of maintenance based on weather forecasts to avoid extreme conditions.
- Application of fertiliser to enhance nutrient availability for surviving saplings.
- Delegation of tree monitoring to three community members to ensure consistency and effectiveness.
- Pre-check routines by GEC to ensure work areas are safe, particularly from threats like bee nests.
- Provision of first aid supplies on-site as a precaution.

### ii. Community spirit, manpower and commitment

In early 2025, KomPAS faced a significant challenge in sustaining community participation and manpower for its forest rehabilitation work. While 12 members were previously active, several began to withdraw due to personal commitments and life priorities, leaving only a few dedicated individuals to manage the tasks. Among them, senior citizens emerged as the most consistent and active participants. This shift disrupted team morale and delayed the completion of key activities, especially during the critical tree planting phase. In response, the group held internal discussions to reassess roles and responsibilities. Members were reassigned based on availability and strengths, which temporarily stabilised operations and improved coordination. Despite these efforts, KomPAS remains in a transitional phase and is actively seeking new members who are interested and able to commit to supporting long-term rehabilitation work.

### iii. Peatland fire

In March 2025, a major challenge was a peatland fire outbreak in FC 83 and FC 84 of the Gunung Arong Forest Reserve (GAFR). The fire burnt approximately 15 hectares of peatland and was first detected by a planting contractor near FC 94 who noticed smoke rising from the forest. Following detection, intensive ground monitoring and firefighting were carried out in collaboration with the East Johor District Forestry Office (PHDJT). The fire took about one week to fully extinguish, relying mainly on manual techniques and favourable weather conditions. Limited access to the



compartments created logistical challenges, while the dry season and low rainfall resulted in highly flammable conditions that prolonged the fire.

Residual subsurface moisture in the peat helped limit the vertical spread of the fire into deeper layers. This was aided by the canal blocks installed near FC 83 and FC 84 which helped retain water in the peat soil. In response, a site assessment was conducted to identify long-term mitigation strategies. The installation of additional piezometers and canal blocks was proposed to regulate the water table and reduce the risk of future fires in the area.

## 6.0 Pictorial report of the project activities implemented from January to June 2025



**Figure 24.** KomPAS patroller group undergoing for fire monitoring and patrolling routines at GAFR



**Figure 25.** Series of coordination meetings with the East Johor District Forestry Officer (PHDJT)



**Figure 26.** Regular meetings conducted with the KompAS community members



**Figure 27.** Rehabilitation site signboard installation



**Figure 28.** TH Plantations Berhad delegates meeting with the District Forestry Office at the East Johor District Forestry Office (PHDJT)



**Figure 29.** TH Plantations Berhad delegates visiting the Gunung Arong Conservation Field Office



Figure 30. The THP and PHDJT delegates visiting the community nursery and planting site.



Figure 31. Explanation on the peat swamp forest ecosystem, fire risk marker, demonstration on camera trap setup and the tree planting explanation given at the site during the THP visit



**Figure 32.** Visit to the Fire Danger Rating System (FDRS) signage and canal block area. A rapid survey on fish in the peat swamp forest was also conducted



**Figure 33.** Camera trap check and data retrieval routine



**Figure 34.** Canal block maintenance undertaken by the KomPAS members



**Figure 35.** Planting site maintenance by the KomPAS members at FC 103



**Figure 36.** Check dam construction undertaken together with the KomPAS members



**Figure 37.** Tree survival count and monitoring conducted at FC 103



**Figure 38.** Nursery monitoring and maintenance undertaken to ensure healthy saplings growth



**Figure 39.** Regular monitoring of the fire incident that occurred at FC 83 and 84



**Figure 40.** Assessment on the canal area and post monitoring after the peatland fire incident



**Figure 41.** Follow up visit to the fire area for assessment with Johor State Forestry Department (JSFD)



**Figure 42.** Discussion on the suitability of the area for canal block construction at FC94 together with the JSFD representatives.



**Figure 43.** Meeting held with Tuan Haji Jamil Hasni bin Abdullah, Mersing District Officer to update him on the project progress.



**Figure 44.** Focus Group Discussion (FDG) on the Johor State Forest Management Plan (Forest Management Plan – RPH) 2026–2035

## 7.0 Conclusion

During the first half of 2025, conservation efforts for the coastal forest and peatlands in Gunung Arong Forest Reserve (GAFR) made steady progress despite environmental and community engagement challenges. A key achievement was the improvement in groundwater conditions, with average water table readings rising from  $-14.9$  cm in 2024 to  $-5.3$  cm in 2025. This positive change was driven by increased rainfall in early 2025 and the installation of canal blocks, particularly near high-risk fire zones in FC83 and FC84.

A peatland fire in March that burned approximately 15 hectares. The fire was difficult to contain due to limited site access and prolonged dry conditions but was brought under control within a week through coordinated action by JSFD, PHDJT, GEC, and local patrollers. The incident led to further fire risk assessments and the proposal for additional piezometers and canal blocks to strengthen long-term hydrological control.

The tree planting activity at FC103, GAFR was successfully undertaken and recorded a 74.5% survival rate from the 2,814 trees planted. The team has planned targeted maintenance and replacement planting to improve outcomes, with the goal of achieving at least 85% survival by the end of 2025. Tree planting activities were delayed by unpredictable weather and logistical challenges, including flooding in January and subsequent high temperatures that affected sapling survival. Declining community participation added to these difficulties, as several KomPAS members faced personal constraints, leaving mostly senior citizens to manage fieldwork. Despite this, the community nursery remained productive, with 3,000 saplings ready for the next planting phase. In response, efforts were made to restructure team roles, improve task delegation, and recruit new members. Moving forward, the focus will be on strengthening community engagement, expanding adaptive fire prevention infrastructure, and enhancing field resilience to climate variability to ensure the continuity and success of peatland restoration in GAFR.



## 8.0 Acknowledgement

Special thanks and appreciation to the Johor State Forestry Department, Mersing District Office, East Johor Forestry Office and the Department of Irrigation and Drainage of Mersing. We are also deeply grateful to our funder, TH Plantations Berhad and to the project community members from Kampung Tenglu Batu 6, Kampung Penyabong, Kampung Air Papan, Kampung Teriang and Kampung Semaloi, Mersing. We also extend our gratitude to all other stakeholders and agencies that have consistently supported the progress of this project. We hope for continued support in the second half of 2025



**List of attachments:**

1. **Attachment 1:** List of meeting with JSFD and community groups and other stakeholders.
2. **Attachment 2:** TH Plantations Berhad coordination visit to the project site in Gunung Arong Forest Reserve
3. **Attachment 3:** Wildlife and roadkill monitoring at Gunung Arong Forest Reserve
4. **Attachment 4:** Tree Census and Survival Count Report at Gunung Arong Forest Reserve, Mersing, Johor
5. **Attachment 5:** Abstracts developed for the 2025 Forest Biodiversity Scientific Expedition Seminar-Convention.