



FINAL REPORT (SEPTEMBER 2023)

CONSERVATION OF BUKIT BELATA (EXTENSION) FOREST RESERVE (BBEFR) (PHASE 1 - MARCH 2020 - SEPTEMBER 2023)



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1. Introduction

1.1 Project background

Conservation of the southeast portion of North Selangor Peat Swamp Forest (NSPSF) is the first phase of a recovery project for Prosper Capital Holdings Sdn. Bhd. or Prosper (formerly known as Prosper Palm Oil Mill Sdn. Bhd.). Prosper is a medium-sized Malaysian-owned player in the oil palm sector with a total of 10 palm oil mills and 20,000 ha of oil palm plantations in Malaysia. In 2019, Prosper adopted a “No Deforestation No Peat, No Exploitation (NDPE)” Sustainable Palm Oil Policy. Subsequently, it modified its internal procedures and initiated a process to develop a ‘recovery project’ to make a positive contribution to forest conservation. In March 2020, Prosper established a partnership with the Global Environment Centre (GEC), a Malaysian non-profit organization with more than 20 years of experience in peatland and forest conservation and restoration throughout Southeast Asia. Through this partnership, Prosper is financing a ‘Recovery Project’ in the form of a long-term conservation initiative to be undertaken by GEC in a portion of the NSPSF in Selangor State, Malaysia. NSPSF is one of the largest contiguous peat swamp forests remaining in Malaysia, covering 81,000 ha. This area is of global significance for biodiversity conservation and is very important for carbon storage and water resource management. Biodiversity includes Tapir, Malayan Sun Bear, Black Panther, False Gharial (freshwater crocodile), hornbills and 124 species of fish including six endemic species found nowhere else in the world.

The current Phase 1 of the ‘Recovery Project’ (2020-2023) is focused on Bukit Belata (Ext.) Forest Reserve (BBEFR), which covers 3,140 ha (part of NSPSF) as shown in Figure 1. The work is undertaken in the framework of the Memorandum of Understanding (MoU) between GEC and the Selangor State Government, which has facilitated joint forest conservation and rehabilitation actions in NSPSF since 2010. GEC formally notified the Selangor State Forestry Department (SSFD) in April 2020 and subsequently secured necessary approvals for surveys, and implementation of rehabilitation activities in collaboration with them. Even though the Agreement with Prosper was signed during the Malaysian Movement Control Order (MCO) period, special permission was obtained from the authorities such as SSFD and Kuala Selangor District Police Headquarters to undertake the initial work as planned. However, as a result of COVID-19 restrictions, as well as wet weather associated with the La Nina weather phenomenon, a six-month no-cost extension was granted between April to September 2023. The planned activities were all successfully completed on the period from March 2020 until

September 2023. In this final report, the progress and completion of the project activities and their impacts on the conservation of BBEFR are reported in the following sections.

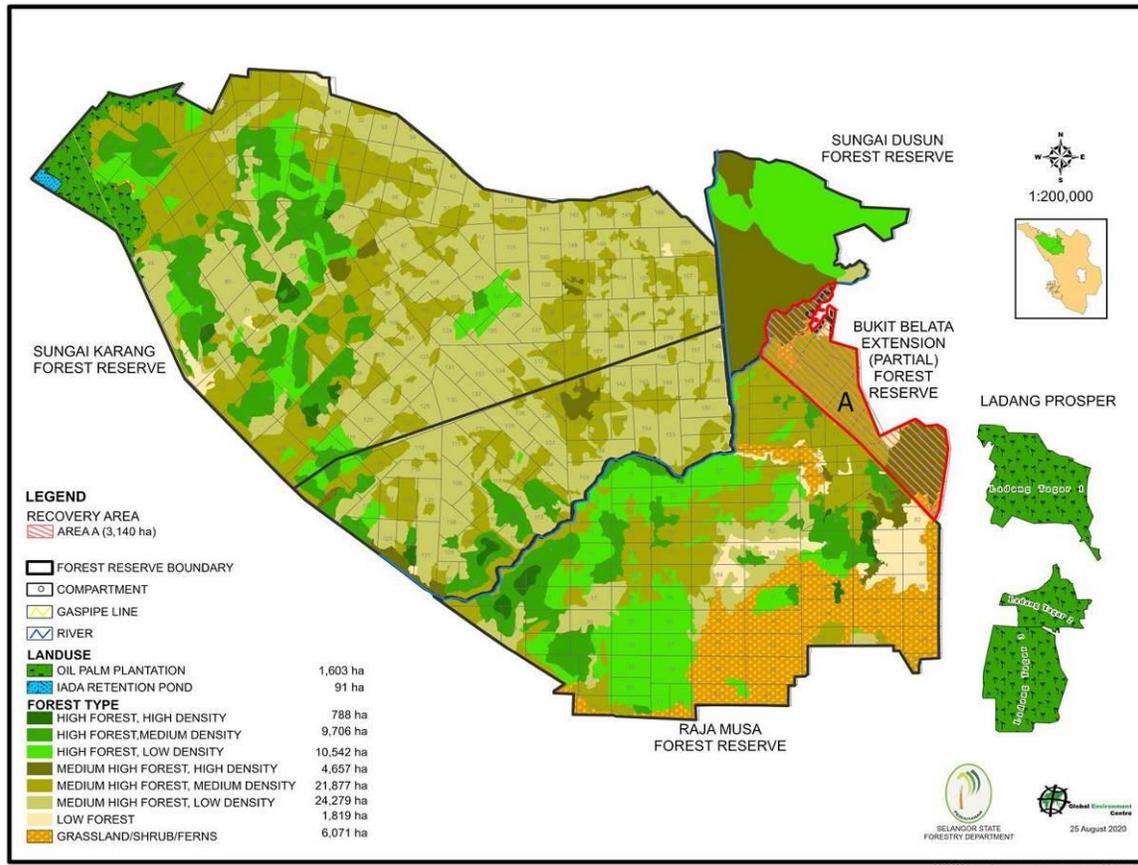


Figure 1. Map showing the location of Bukit Belata (Ext.) Forest Reserve (3,140ha) - Area A - within the NSPSF (81,304ha)

1.2 Project site

The project focuses on the long-term protection and rehabilitation of the Bukit Belata (Ext.) Forest Reserve (BBEFR), which covers an area of 3,140 ha of lowland dipterocarp and peat swamp forest, in the southeast portion of the NSPSF. This forest reserve is facing increasing challenges from drainage, fire and degradation linked to the development of small-scale plantation and agriculture along its boundary as well as encroachment and drainage within the reserve. More than 358 ha of forest and peatland have been degraded by fires and encroachment in recent years. The project site includes intact and degraded areas within the forest reserve as well as the adjacent agricultural land. The forest is still facing increasing challenges associated with forest fire, drainage issues and agricultural developments along its boundary. Therefore, the recovery project is supporting the state forestry department to monitor

and protect the intact portions of the reserve as well as manage and rehabilitate the degraded portions of the forest reserves.

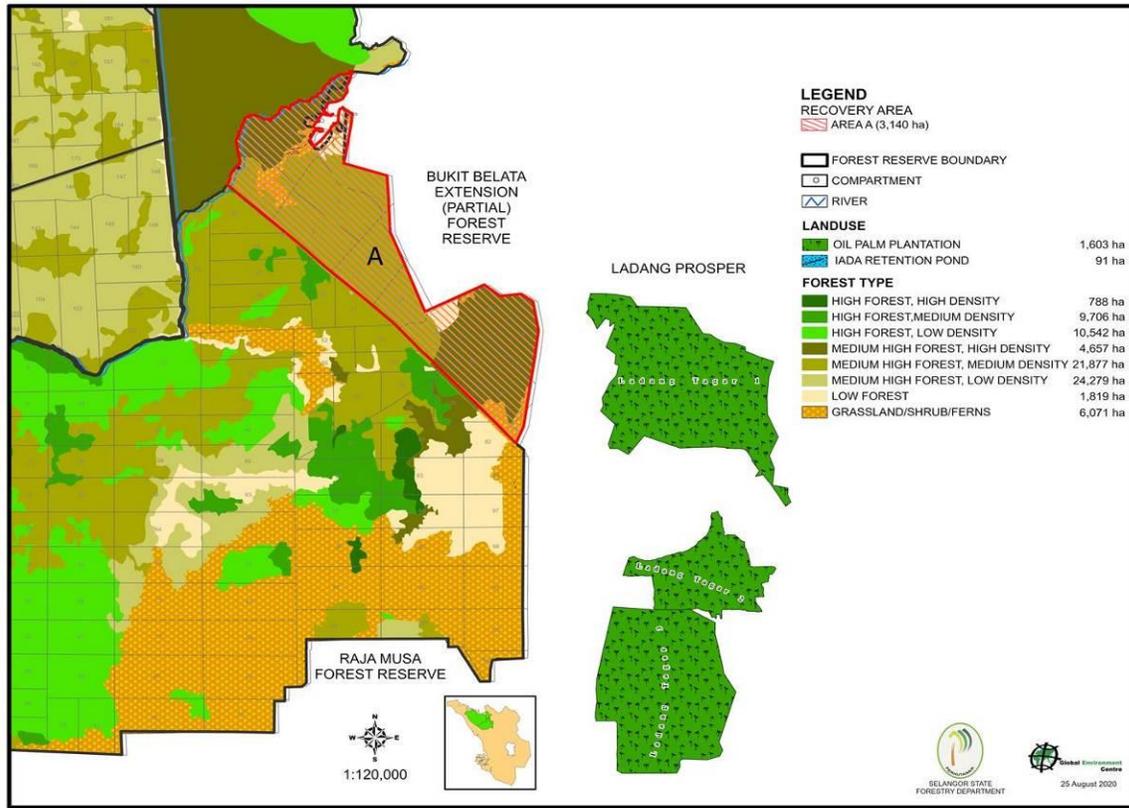


Figure 2. Map showing the recovery project site, (A) BBEFR, which covers an area of 3,140 ha of lowland dipterocarp and peat swamp forest in the southeast portion of the NSPSF and the nearby oil palm plantations managed by Prosper

The selection of the proposed site has been made for the following reasons:

- The rehabilitation site is located within 1 km of Tagar Properties Sdn Bhd, a plantation partly owned by Prosper.
- It is located within Bukit Belata (Ext.) Forest Reserve. Therefore, the rehabilitated forest will be legally protected over the long term.
- Portions of the site are degraded and are very prone to fire. The rehabilitation will prevent peatland fires and haze and reduction in greenhouse gases emissions.
- The activities can be scaled-up to include an additional adjacent portion of Raja Musa Forest Reserve in the longer term.

2. Project goals and objectives

2.1 Project goals

The primary goal of the “Conservation of Bukit Belata (Extension) Forest Reserve (BBEFR) Project” was to enhance the conservation of lowland and peat swamp forests in BBEFR, while supporting the implementation of the forest management plans and community engagement in the conservation and sustainable use of forest resources. Moreover, the project was expected to support the implementation of the Integrated Management Plan (IMP) NSPSF 2014-2023 and contribute to the Management Plan of Selangor portion of the Central Forest Spine as well as community engagement in the conservation and sustainable use of peat swamp forest resources. In the long-term it is the intention that the targeted area is specifically designated for conservation under the Selangor National Forestry Act (Adoption) (Amendment) Enactment 1985, within the zoning in the management plan 2024-2033 or specific conservation zoning (e.g. State Park or conservation area). Working closely with all key stakeholders, the project will take steps to facilitate the development of conservation and sustainable use management plan by highlighting the site-specific problems and presenting scientific evidence to the SSFD and state authorities, proposing mitigation measures, providing training, encouraging inter-sectoral coordination by assisting in the policy-making process, introducing alternative livelihood programmes for local communities and undertaking awareness raising campaigns.

2.2 Project objectives

The immediate objective of the project was to develop and implement a specific forest and peatland protection and rehabilitation programme for BBEFR with following main activities:

- a) To develop rehabilitation strategy and initiate rehabilitation measures in targeted forest areas
- b) Rehabilitation of 200 ha through rewetting and assisted natural regeneration and selected planting in priority portions of the BBEFR
- c) Support action by local community and stakeholders on peatland management and fire prevention

Ultimately, the project expects to see the remaining ecosystem in the BBEFR protected and managed in an integrated and sustainable manner for deriving both local and global benefits beyond the projects three-year life span.

3. Project activities

The project will support the community-based forest rehabilitation initiatives at BBEFR by implementing three main activities, which will contribute towards the achievement of the immediate objective as follows:

Table 1. Project activities

No.	Activities	Sub-activities
1.	To assess location and scale of degradation in the identified forest compartment areas.	1.1 Undertake appropriate assessments on key issues including fire incidents and their root causes affecting biodiversity, water management, and so on 1.2 Develop a plan for rehabilitation of the degraded peatland areas. 1.3 Monitoring of rehabilitation and wildlife including regular ground and drone surveys of the rehabilitation site plus water table and vegetation growth monitoring as well as camera traps at selected locations for wildlife. 1.4 Contribute to the review of the Integrated Management Plan of the North Selangor Peat Swamp Forest.
2.	Rehabilitation of 200 ha through rewetting and assisted natural regeneration and selected planting in priority portions of the Bukit Belata (Extension) Forest Reserve.	2.1 Canal blocking and rewetting Seedling procurement and nursery establishment; 2.2 Seedling procurement and nursery establishment. 2.3 Land preparation for rehabilitation activities (20 ha) Periodic tree planting activities with PROSPER staffs, volunteers and community groups. 2.4 Organize tree planting activities with Prosper staff, volunteers and/or community groups 2.5 Maintenance of planted trees (20 ha) – 2 years 2.6 Encouragement of natural regeneration in less degraded areas (180 ha) – 3 years
3.	Enhance the understanding of community and stakeholders on peat hydrology, sustainable management on peatland and fire prevention with local communities and landowners.	3.1 Development and distribution of information materials on fire prevention 3.2 Meetings with stakeholders, local communities and landowners to discuss on sustainable management of peatland and fire prevention measures. 3.3 Promoting the Malaysia Good Agriculture Practices (MyGAP), Malaysian Sustainable Palm Oil (MSPO) Standard and the Roundtable on Sustainable Palm Oil (RSPO) BMP Manuals for peatlands. 3.4 Training of local community on peat water management appropriate to best management practices for agriculture including crop selection

		<p>3.5 Establishment/guidance of local fire prevention and monitoring team to monitor and communicate with relevant authorities</p> <p>3.6 Boundary signage and protection past establishment</p> <p>3.7 Installation of fire danger risk warning signs at fire prone sites.</p>
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4. Summary of the project activities completion status as of September 2023

Between March 2020 – September 2023, GEC implemented the Phase 1 Recovery Project with Prosper. The project was implemented in partnership with the SSFD and Komuniti Warisan Hutan Sungai Tenggi Selatan (KWHSTS) as well as the Friends of North Selangor Peat Swamp Forest (SHGSU) to enhance efforts for fire prevention, rehabilitation and conservation of the BBEFR which covers an area of 3,140ha of lowland dipterocarp and peat swamp forest, in the south-eastern part of North Selangor Peat Swamp Forest (NSPSF). Below is the summary of the project activities as of September 2023 according to the completion status, progress reports and outputs.

Objective 1: To develop rehabilitation strategy and initiate rehabilitation measures in targeted forest areas.

Table 2. Summary of the project activities completion status as of September 2023.

Activities		Status (% completion)	Reported in	Outputs
Activity 1 - To assess location and scale of degradation in the identified forest compartment areas				
1.1	Undertake appropriate assessments on key issues including fire incidents and their root causes affecting biodiversity, water management, and so on.	Completed	<ul style="list-style-type: none"> ▪ Progress Report (PR) (March – September 2020) – Attach. 1 & 2 ▪ PR (April – November 2021) – Attach. 1 (welfare-community) ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Conducted aerial and ground surveys and developed maps and reports of project area, land use, degraded sites, fire hotspots, peat depth, canal drainage and water quality (physical properties) ▪ Conducted rapid flora (tree & non-tree), fish and insect assessments to report main dominant species
1.2	Development of rehabilitation plan	Completed	<ul style="list-style-type: none"> ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ The final draft of the rehabilitation plan for BBEFR was developed based on the initial assessments during the project implementation in the past 3 years. The draft will be provided as an input to the preparation of the new update of Integrated Management Plan for North Selangor Peat Swamp Forest 2024-2033.

Activities		Status (% completion)	Reported in	Outputs
1.3	Monitoring of rehabilitation and wildlife	Completed	<ul style="list-style-type: none"> ▪ PR (March – September 2020) – Attach. 3 & 4 ▪ PR (October 2020 – April 2021) – Attach. 1 	<ul style="list-style-type: none"> ▪ Conducted wildlife monitoring from July 2020 – March 2021 at FC 3, 4, 6, 7, 23, 24 and 25 and recorded 21 species of mammals from 13 families. ▪ Facilitated one project monitoring session and field visit to FC 25 and 38 by Prosper team 26th August 2020. ▪ Further monitoring was conducted during 2021- 2023 of the rehabilitation activities and forest recovery.
1.4	Contribute to the review and update of the Integrated Management Plan of the North Selangor Peat Swamp Forest	Completed	<ul style="list-style-type: none"> ▪ All PRs 	<ul style="list-style-type: none"> ▪ Compiled and contributed materials and information regarding the maps developed for BBEFR including degraded sites, fire hotspots, canals, flora, fish, wildlife, Community-based Organization, fire prevention and patrolling activity. ▪ All the assessments and ground work outcomes were provided to the SSFD in the form of reports and presentation notes or paper presentation for their future reference and use in the preparation of the update of the Integrated Management Plan of the North Selangor Peat Swamp Forest.

Objective 2: Rehabilitation of 200 ha through rewetting and assisted natural regeneration and selected planting in priority portions of the Bukit Belata (Extension) Forest Reserve.

Activities		Status (% completion)	Reported in	Outputs
Activity 2 - Rehabilitation of 200 ha through rewetting and assisted natural regeneration and selected planting in priority portions of the Bukit Belata (Extension) Forest Reserve				
2.1	Canal blocking and rewetting	Completed	<ul style="list-style-type: none"> ▪ PR (March – September 2020) – Attach. 5 (piezometer) ▪ PR (October 2020 – April 2021) – side ID for CB ▪ PR (December 21 – April 2022) – Attach. 1 (4 CB) ▪ PR (April – November 2022) – Attach. 1 (9 CB) 	<ul style="list-style-type: none"> ▪ Six (6) piezometers were installed at FC 3, 7 & 25 and the water table was monitored and reported since March 2021 via progress reports and stakeholder WhatsApp groups as of to date. ▪ Nine (9) units of canal blocks (large size) were constructed at FC 3 & 25.
2.2	Seedling procurement and nursery establishment	Completed	<ul style="list-style-type: none"> ▪ PR (October 2020 – April 2021) – Peer visit ▪ PR (April – November 2021) – Attach. 2 - Nursery establishment ▪ PR (April – November 2022) – Attach. 2 (Nursery operation) ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ One community nursery was established in Felda Sungai Tinggi Selatan that have raised about 1,768 trees for planting in BBEFR. ▪ Other seedlings were provided by the SHGSU nursery during the project implementation stage.
2.3	Land preparation for rehabilitation activities (20 ha)	Completed	<ul style="list-style-type: none"> ▪ PR (October 2020 – April 2021) – 6 ha planting ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Land preparation was undertaken and 16,200 trees were planted in 20 ha of degraded sites, including replacement planting.
2.4	Organise tree planting activities with Prosper staff, volunteers and community groups	Completed	<ul style="list-style-type: none"> ▪ PR (March – September 2020) – Attach. 6 ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Conducted a small-scale tree planting event with KWHSTS and Felda representatives who successfully planted 200 trees raised in the KWHSTS nursery via the sapling buy-back programme. ▪ A tree planting event was organized on 22nd June 2023 at FC 25 for the Prosper staff (7 pax) stakeholders/

Activities		Status (% completion)	Reported in	Outputs
				supply chain members (14 pax), KWHSTS (15 pax), SSFD (4 pax) and GEC (9 pax) during the 'Stakeholder Visit to Prosper recovery project site at BBEFR' with the planting of 300 Nyatoh trees (<i>Madhuca hirtiflora</i>).
2.5	Maintenance of planted trees (20 ha) - 2 years	Completed	<ul style="list-style-type: none"> ▪ PR (April – November 2021) – Attach. 3 ▪ PR (April – November 2022) – Attach. 3 ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Site maintenance in 6 ha planting site has been carried out in April – November 2021, April – November 2022 and April – September 2023.
2.6	Encouragement of natural regeneration in less degraded areas (180 ha) – 3 years	Completed	<ul style="list-style-type: none"> ▪ PR (April – November 2022) – Attach.4 ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Over the past 3 years, the rewetting, natural and assisted regeneration and fire reduction interventions have successfully rehabilitated 244 hectares of forest from grasslands to low forest.

Objective 3: Support action by local community and stakeholders on peatland management and fire prevention.

Activities		Status (% completion)	Reported in	Outputs
Activity 3 - Enhance the understanding of community and stakeholders on peat hydrology, sustainable management on peatland and fire prevention with local communities and landowners				
3.1	Development and distribution of information materials on fire prevention	Completed	<ul style="list-style-type: none"> ▪ PR (December 21 – April 2022) – Attach. 2 (DOA visit) 	<ul style="list-style-type: none"> ▪ Fire prevention initiatives on peat in NSPSF has been showcased to the stakeholders during the visit from DOA, MARDI, JMG, DOE, JPMS, JPNS and SMPPEM-Selangor SMO ▪ Developed the peat fire prevention materials and distributed.

Activities		Status (% completion)	Reported in	Outputs
3.2	Organisation of meetings with stakeholders, local communities and landowners to discuss on sustainable use of peatland, fire risk and prevention measures	Completed	<ul style="list-style-type: none"> ▪ PR (March – September 2020) – Attach. 7 (SSFD meeting) ▪ PR (October 2020 – April 2021) – stakeholder meeting and KWHSTS formation & SSFD meeting ▪ PR (December 21 – April 2022) – Attach. 2 (DOA visit) ▪ PR (April – November 2022) – Attach.5 & 6 ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Conducted more than 10 meetings with SSFD and KWHSTS for the rehabilitation of NSPSF and BBEFR, including SMPPEM meetings ▪ Three selected members of KWHSTS participated in the ‘Social Entrepreneurship Training with Community-based Organisation’ in Taiping from 19th-21st May 2023. ▪ A stakeholder visit to Prosper recovery project site at BBEFR was conducted on 22nd June 2023 to showcase the project activities implemented based on the 5R approaches (Rewetting, Revegetation, Reduction of fires, Revitalisation and Reporting). ▪ Three selected members of KWHSTS participated in the ‘Forum Pembelajaran bersama Komuniti dan Lawatan Sambil Belajar di Selangor’ from 10-13th July 2023.
3.3	Promoting the Malaysia Good Agriculture Practices (MyGAP), Malaysian Sustainable Palm Oil (MSPO) and Roundtable on Sustainable Palm Oil (RSPO) Manual	Completed	<ul style="list-style-type: none"> ▪ PR (April – November 2022) – Attach. 6 ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Conducted training on ‘Good Agricultural Practices on Peatlands and MSPO Certification’ on 22nd March 2023 in collaboration with MPOB for 24 KWHSTS members and Felda representatives – focusing on the management of peatlands for agricultural and oil palm plantation activities and the requirements of MSPO certification.
3.4	Training of local community on peat water management appropriate to best management practices for agriculture including crop	Completed	<ul style="list-style-type: none"> ▪ PR (April – November 2022) – Attach.5 & 6 ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ Organized a study visit to the agricultural zone of Johan Setia on

Activities		Status (% completion)	Reported in	Outputs
	selection			<p>21st March 2023 for KWHSTS members to showcase GAP on peatland, which covers land and water management, selection of crops based on peat depths, water tables, crop root zones and other factors for optimum yield.</p> <ul style="list-style-type: none"> ▪ The KWHSTS members were brought to the Communal Vegetable Plots at KOA Pulau Kempas to learn how the Orang Asli Temuan practise crop selection, crop alternation, site maintenance, manuring, etc. linked to organic farming and GAP.
3.5	Establishment/guidance of local fire prevention and monitoring team to monitor and communicate with relevant authorities	Completed	<ul style="list-style-type: none"> ▪ PR (October 2020 – April 2021) – Patroller appointment and monitoring work ▪ PR (April – November 2021) – Attach. 4 – Patrolling ▪ PR (December 21 – April 2022) – Attach. 3 – Patrolling ▪ PR (April – November 2022) – Attach.7 ▪ PR (December 2022 – July 2023) 	<ul style="list-style-type: none"> ▪ A patrolling team comprised of two (2) KWHSTS members was established to patrol around the buffer zones and the periphery of forest compartments along the designated routes since April 2021. ▪ The patrolling team monitored water tables, FDRS boards and assisted GEC & SSFD to detect any form of encroachment, illegal activities, wildlife hunting and peatland fires occurrences.
3.6	Boundary signage and protection past establishment	Completed	<ul style="list-style-type: none"> ▪ PR (October 2020 – April 2021) – Designing ▪ PR (April – November 2021) – Attach. 5 – Installation ▪ PR (December 21 – April 2022) – Attach. 4 – Completed ▪ PR (December 2022 – July 2023) 	<p>Installed the following signboards at</p> <ul style="list-style-type: none"> ▪ 2 units of Rehabilitation Project Signboard (1.5 m x 1.0 m) at FC 3 & 25, BBEFR ▪ 4 units of Forest Enactment Signboard (1.2 m x 1.8 m) at FC 2, 3 & 25, BBEFR; FC 82, RMFR

Activities		Status (% completion)	Reported in	Outputs
				<ul style="list-style-type: none"> ▪ 2 units of canal block signboards at FC 3 and FC 25, BBEFR ▪ 1 unit of nursery signboard at Felda Sungai Tenggi Selatan. ▪ 5 units of 'No Entry' Signboard (1.3 m x 1.0 m) at FC 2, 3 & 25, BBEFR; FC 82, RMFR ▪ 50 units of 'No Entry' Signboard (0.75 m x 0.60 m) at FC 3, 6, 10, 12, 20, 35 & 37, BBEFR; FC 82, 98 RMFR; FC 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 31, 32, 33, 125, 126 & 127, SKFR
3.7	Installation of Fire Danger Risk warning signs in fire prone sites	Completed	<ul style="list-style-type: none"> ▪ PR (October 2020 – April 2021) – Designing ▪ PR (April – November 2021) – Attach. 5 – Installation 	<ul style="list-style-type: none"> ▪ 12 units were installed at Felda Sg. Tenggi; Felda Sg. Tenggi Selatan; Felda Soeharto; FC 3, 4, 23 & 25, BBEFR; State lands adjacent to Sungai Dusun Wildlife Centre; FC 73, RMFR.

5. Summary of key impacts of the project activities on the rehabilitation and conservation of BBEFR

5.1 5R approach to rehabilitate and conserve the degraded areas of BBEFR

The most important threats to the conservation of BBEFR (that comprises 52% peat soil and balance 48% mineral soil) is the drainage of the peatlands leading to subsidence and increased fire risk. Forest and peatland fires are exacerbated by:

- Drainage canals along the forest boundary linked to agricultural activities;
- Drainage canals inside the forest reserve linked to prior log extraction as well as agricultural drainage
- Encroachment of the forest reserve for agriculture by the surrounding settlers; as well as,
- Agriculture expansion often on degraded fire-prone areas.

GEC used a 5-pronged (5R) approach to rehabilitate and conserve the degraded areas of BBEFR, which includes five cross-cutting components such as rewetting drained peatland (R1), reduction of fires and emissions (R2), revegetation of burnt or degraded and fragmented areas (R3), revitalization through livelihood development and green jobs (R4) as well as reporting and monitoring (R5) as shown in Figure 3.

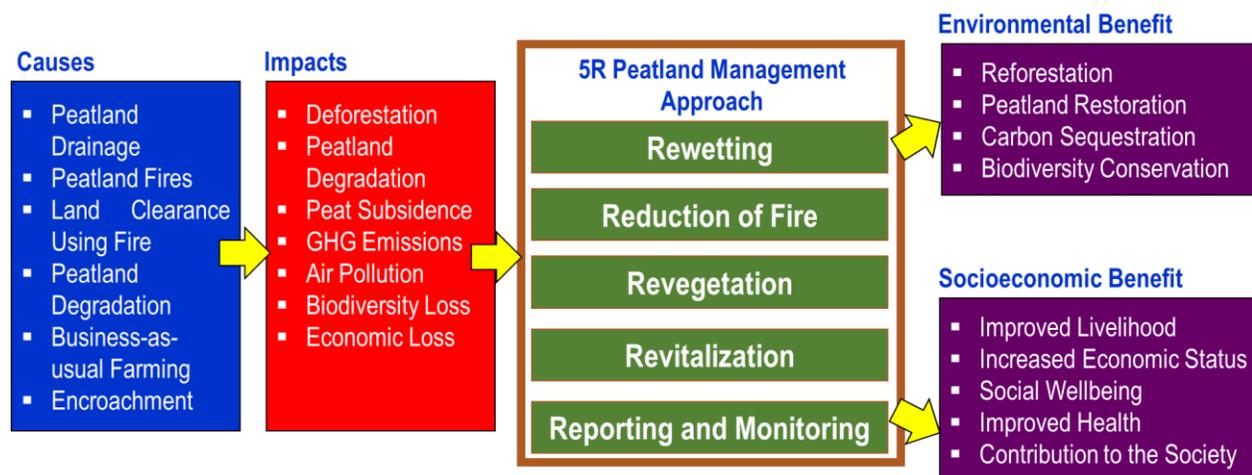


Figure 3. Conceptual diagram regarding the application of 5Rs approach in peatland restoration.

5.1.1 Rewetting (R1)

Rewetting is conducted to improve the hydrological properties of drained peatlands through building rewetting infrastructures such as canal blocks. Rewetting has the highest priority for preventing peatland degradation, fire, biodiversity loss and carbon dioxide (CO₂) emissions from peat oxidation. As outlined in the Integrated Management Plan for NSPSF 2014-2023, the northern end of BBEFR comprising FC 1, 2 and 3 is in the Management Zone R5 (Rehabilitation Zone) proposed for canal blocks. Therefore, nine (9) units of canal blocks were constructed in FC 3 (7 units) and FC 25 (2 units) as part of the peatland hydrology restoration initiative in BBEFR. These canal blocks are barrier embankments built across the existing drainage to block the passage of water coming out of the forest reserve as shown in Figure 4.

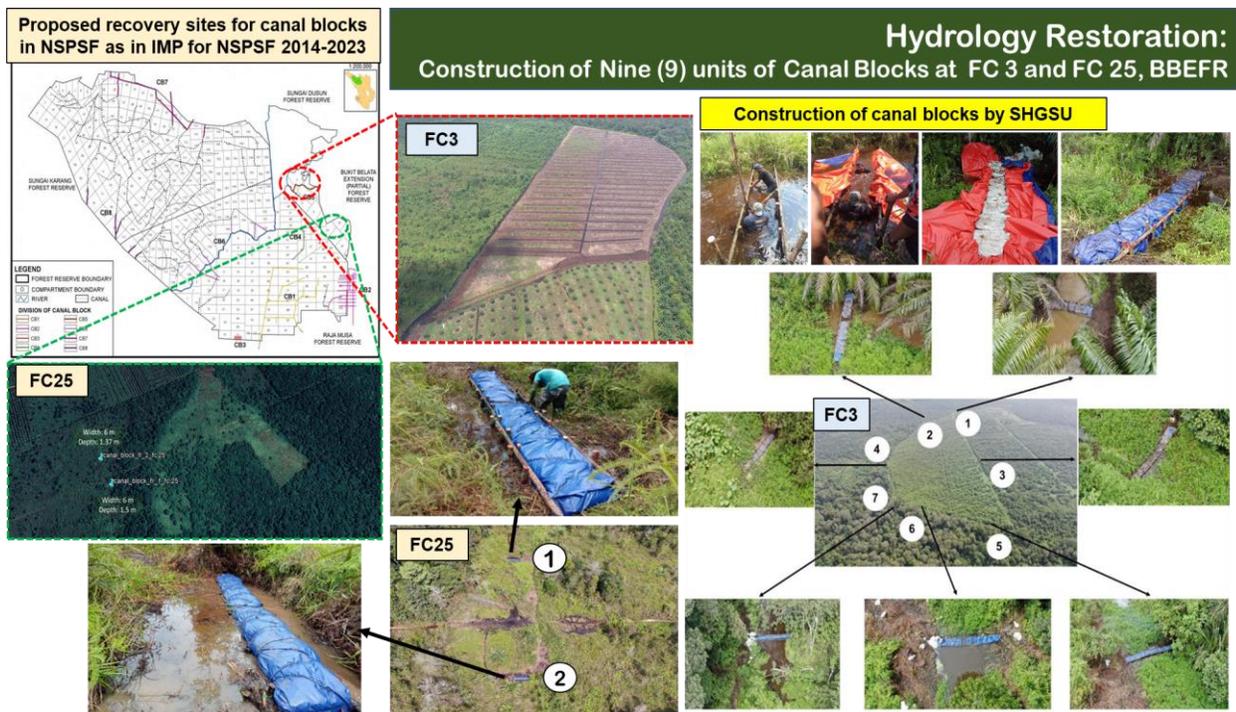


Figure 4. Construction of nine (9) units of canal blocks at FC 3 and FC 25, BBEFR.

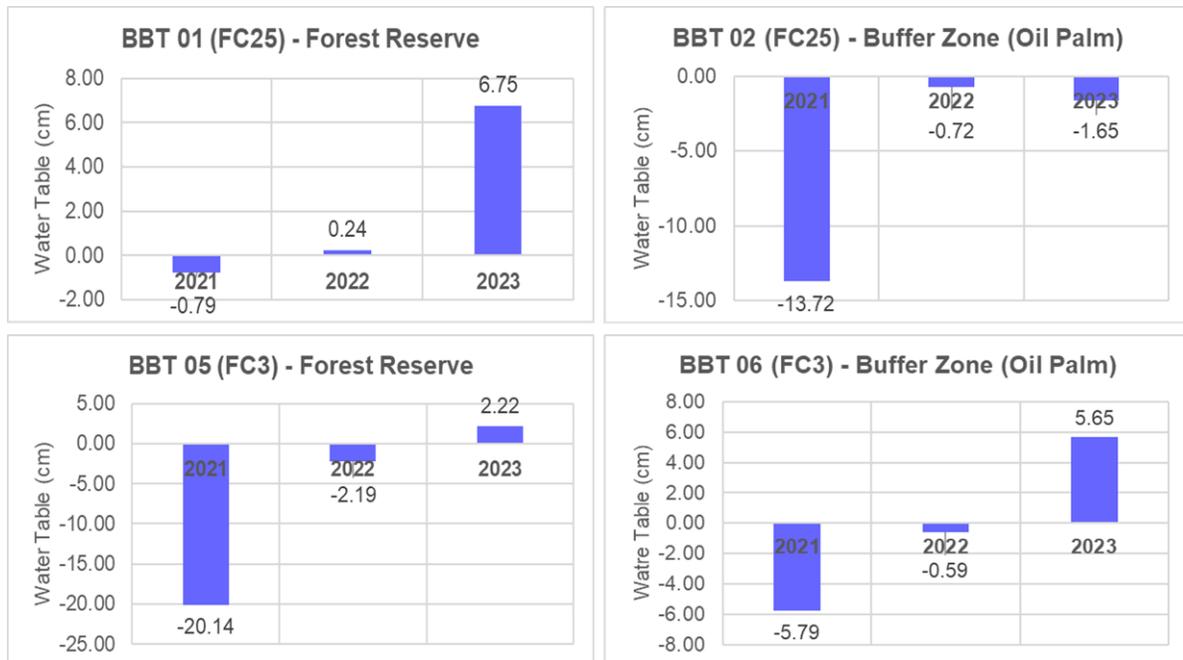


Figure 5. Annual average water table readings recorded by piezometers at FC 3 and 25 showing improved water tables due to hydrology restoration at BBEFR.

Figure 5 indicates that the annual average water table readings in both FC 3 and FC 25 are showing an increasing trend from 2021 until 2023 due to canal block construction in May 2022. The canal blocks raise the water levels and temporarily inundate the peatlands to provide possibilities for natural regeneration to take place. In addition, the planting activity in the year 2021 at FC 25 also recovered the peat's function as a water storage medium and reduced the surface area from partial drying and subsidence, especially during the dry season.

5.1.2 Reduction of Fire (R2)

During the project implementation period, community patrols and monitoring operations were carried out in degraded areas that are prone to peatland fires. Mr. Shaharuddin Bin Ismail and Mr. Ahmad Raihan Bin Razali, two members of KWHSTS from Felda Sungai Tinggi Selatan, were chosen, trained, and assigned as community patrollers. They actively participated in the forest patrols and monitoring operations at FC 3, FC 6, FC 7, FC 23, FC 24 and FC 25 of BBEFR to look for any signs of encroachment, illegal activity, animal hunting, and peatland fire occurrences. As a result of regular patrolling and monitoring activity, no fire and encroachment incidents were recorded in BBEFR since 2020.

The trained patrollers were also assigned to measure, record and report the groundwater tables using six designated piezometers (BBT01-BBT06) located at the forest compartments in

BBEFR and adjacent smallholder oil palm plantations. The water table measurements are recorded twice a week and will be analysed before being disseminated into the stakeholder's WhatsApp group every Friday of the respective week. This is to ensure that all stakeholders including the Forestry Departments, patrollers and funders are well-informed of the current situation at the restoration site and be prepared for any mitigation activities in the occasion of fires.



Figure 6. Patrolling and water table monitoring activities conducted by KWHSTS community patrollers at BBEFR and the adjacent areas.

A total of 76 units of display boards such as rehabilitation project signboards (2 units), forest enactment signboards (4 units), canal block signboards (2 units), nursery signboard (1 unit), 'no entry' signboards (55 units) and FDRS signboards (12 units) were installed at BBEFR and surrounding areas covering RMFR and SKFR. The installations are conducted with the approval of the Selangor State Forestry Department and assisted by Pejabat Hutan Sub-renj Bestari Jaya. With all the signboards completely installed at the selected forest compartments

and high-risk areas, the encroachment and illegal activities at the forest reserves and adjacent lands are prevented with regular monitoring by the KWHSTS patrollers.



Figure 7. Installation of signboards in BBEFR and adjacent areas.

5.1.3 Revegetation (R3)

Revegetation through the planting of peatland pioneer species and peat adaptive woody species aims to restore the bare peat vegetation cover and improve forest ecosystem function by promoting the availability of seedlings. GEC conducted tree planting in 20 ha of degraded areas impacted by peatland fires at FC 24 (14ha) and FC 25 (6ha) in 2021 and 2023, respectively. In FC 25, one (1) ha of degraded area comprised of peat soil and has been planted using a mound planting technique whereas the remaining five (5) ha comprised of mineral soil and planted with Tenggek Burung (*Melicope lunu-ankenda*) and Pulai (*Alstonia scholaris*) trees using conventional planting method. In FC 24, 14ha of degraded areas are planted with Tenggek Burung trees using conventional planting methods (please refer to Attachment 1). In total, about 16,200 trees have been planted in 20 ha of degraded sites, including the replacement planting.

Two field staff, who are also members of Komuniti Warisan Hutan Sungai Tenggi Selatan (KWHSTS), conducted the maintenance activities at the planting sites. Weeding activities along the planted lanes are regularly conducted to reduce the competition among the trees and other weeds such as Lalang grass that rapidly colonizing the planted site. Because of its density and high biomass, Lalang grass provides a very high fuel load, enabling peatland fires to burn faster, higher and much hotter. Therefore, the regular removal of highly flammable Lalang grass during maintenance activities is essential to minimize the risk and impact of fire at the planted sites.



Figure 8. 20ha of tree planting activity in FC 24 and FC 25, BBEFR.

Planting trees in degraded forest areas in BBEFR is of utmost importance for several reasons:

- **Carbon Sequestration:** Peat swamp forests are excellent carbon sinks. The growth of trees in these areas helps absorb and store significant amounts of carbon dioxide from the atmosphere, mitigating climate change and reducing greenhouse gas emissions.

- **Biodiversity Conservation:** These forests are home to a diverse range of plant and animal species. By restoring and replanting trees, we protect the habitats of many unique and endangered species, contributing to biodiversity conservation.
- **Water Regulation:** Peat swamp forests play a crucial role in regulating water flow. By planting trees, we can help maintain the hydrological balance, reduce the risk of flooding, and ensure a steady supply of clean water for both ecosystems and human communities.
- **Sustaining Livelihoods:** Many local communities rely on peat swamp forests for their livelihoods, including fishing, traditional medicine, and non-timber forest products as well as the main source of water supply for their agriculture activities. Restoring the degraded areas ensures the continued sustainability of these livelihoods.
- **Soil Stabilization:** The root systems of trees help stabilize the peat soil, reducing peat subsidence and preventing the release of stored carbon when the peat is disturbed or drained.
- **Recreational and Educational Value:** Restored peat swamp forests provide opportunities for ecotourism and education, raising awareness about the importance of these ecosystems and their conservation.

In summary, planting trees in degraded peat swamp forests is crucial for climate change mitigation, biodiversity preservation, water regulation, livelihood support, and maintaining the ecological integrity of these unique ecosystems in BBEFR.

5.1.4 Revitalization of local livelihoods (R4)

Revitalization is essential to provide alternative sustainable livelihood options for the local communities settled adjacent to BBEFR to reduce their dependence and resource extraction from the peatland forest. The newly-organized community-based organisation (CBO), Komuniti Warisan Hutan Sungai Tenggi Selatan (KWHSTS) was formed among others to assist in the nursery development, planting of replacement trees as well as forest/fires patrolling and monitoring of water tables in BBEFR. KWHSTS and local people have generated income from the buyback of tree seedlings and allowance earned through green jobs i.e. patrolling, tree planting and nurturing and the building of canal blocks. The KWHSTS nursery in Felda Sungai Tenggi Selatan raised about 1,768 trees comprising Tenggek Burung, Mahang, Kelat Paya and landscape trees for planting in BBEFR.



Figure 9. Community nursery of KWHSTS in Felda Sungai Tenggi Selatan has raised 1,768 trees comprising of Tenggek Burung, Mahang, Kelat Paya and landscape trees for planting in BBEFR.

This also encompasses training and awareness creation activities to enhance knowledge on the importance of peatland ecosystem services as well as fostering behavioural change, a sense of ownership and environmental stewardship. Training on ‘Good Agricultural Practices on Peatlands and MSPO Certification’ in collaboration with MPOB was conducted to guide KWHSTS members on the management of peatlands for agriculture and oil palm plantation activities including site management, water management, environment-friendly practices, occupational safety and security (OSH) and social and workers’ welfare. Study visits to the agriculture zone of Johan Setia and the Communal Vegetable Plots at KOA Pulau Kempas were conducted to showcase GAP on peatland, which covers land and water management, selection of crops based on peat depths, water tables, crop root zones and other factors for optimum yield. Apart from this, forums and peer-learning tours are conducted to exchange experience and knowledge and build collaboration among the other CBOs in implementing ecosystem restoration programmes at the local level using Nature-based Solutions (NbS) strategies.



Figure 10. Community capacity development training and programmes for KWHSTS to keep them empowered, resourceful and focused on their BBEFR conservation goals and improve their local livelihood options.

5.1.5 Reporting and monitoring (R5)

The project implemented regular participatory monitoring with the regular fire patrols reporting on land clearing and fire incidents as well as on water levels. This information was synthesised and shared with the relevant agencies. The progress of project activity implementation has been monitored and reported regularly in quarterly and semi-annual progress reports from March 2020 until September 2023. Reporting and monitoring ensure continuous checking and assessment of the restoration activities, the completion of the proposed activities, enabling full involvement of the community as well as the success of the rehabilitation and conservation of BBEFR. The reports that comprised the progress, completion and reporting of each activity are presented in Table 2.

5.2 The impacts of the project activities on the rehabilitation and conservation of BBEFR

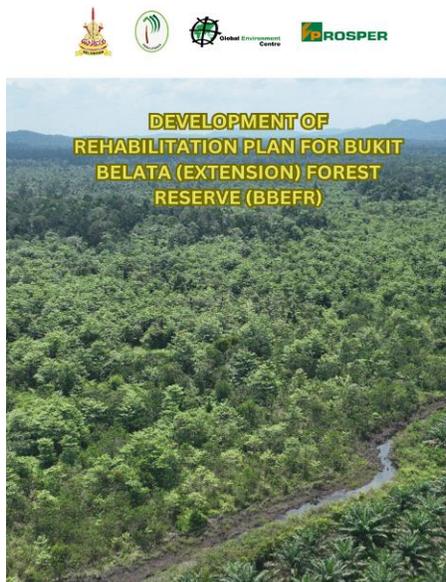
5.2.1 Development of Rehabilitation Plan for BBEFR

GEC has completed a final draft of the Rehabilitation Plan for BBEFR. The plan has been developed based on initial assessments of the BBEFR and the implementation of the project in the past three years. GEC completed the following assessments to provide baseline data for BBEFR's rehabilitation plan and activities.

Table 3. Assessments to provide baseline data for BBEFR’s rehabilitation plan.

No.	Assessments	Findings
1	Land use, drainage canal and boundary assessment using ground and aerial surveys	A land use, canal drainage and boundary map was prepared in 2020, indicating 358 hectares of degraded area caused by forest fires, land clearing for agriculture and previous logging activities. The map showed 31.93 km of canals draining the peat forest causing drying of peat and higher risk of fires.
2	Peat depth assessment	Peat depth map was prepared in 2020 as a baseline for planning – particularly for rewetting and fire prevention activities
3	Hotspots assessment from 2012 – 2022 using satellite images	Hotspot map indicating fire prone areas in BBEFR
4	Water quality assessments at the perimeter canals	Higher pH indicative of human/ anthropogenic activity as the source of the deterioration of water quality for peat forest
5	Rapid flora survey at the forest boundary	Indicative of conservation value of forest and baseline for monitoring
6	Fish assessment in the canals at the forest boundary	Indicative of conservation value of forest and baseline for monitoring
7	Invertebrates (insect) assessment	Indicative of conservation value of forest and baseline for monitoring
8	Analysis of wildlife with camera traps	Indicative of conservation value of forest and baseline for monitoring. Critically endangered (Panther), endangered (tapir, southern pig-tailed macaque) and vulnerable (long tailed macaque, sun bear, great argus) species were found.
9	Forest boundary demarcation survey	Areas degraded by encroachment were identified. Sections of the boundary that were unclear, were marked with signage.
10	Community Survey	Community survey was undertaken. The Felda settlers of Felda Sungai Tenggi Selatan was approached, trained and established as KWHSTS to participate in the conservation of BBEFR.

The assessments provide a strong knowledge-based foundation for the project to plan and conduct activities surrounding rewetting, rehabilitation and addressing reduction of fires. The assessments further formed the baseline information needed for future monitoring and a section of the Development of Rehabilitation Plan for BBEFR. Additionally, the assessments were conducted in collaboration with Selangor State Forestry Department (SSFD). It is therefore inclusive of the state agency involved in BBEFR.



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<small>This is the first draft of the rehabilitation plan and is not reviewed by OEC's Director and SFPD. Please do not make any reference to this document.</small>		3

Figure 11. The draft of the rehabilitation plan for BBEFR was developed based on the initial assessments of the BBEFR and will be integrated into the Integrated Management Plan for North Selangor Peat Swamp Forest 2024-2033 which will be prepared in Q4 2023-Q4 2024.

5.2.2 Rehabilitation of 244 ha through rewetting, natural regeneration and selected planting in priority portions of the BBEFR.

The land use and boundary assessment indicated that there was 358ha of degraded area located in BBEFR caused by fires, encroachment and agriculture expansion. The key project areas for rewetting, natural and assisted regeneration include 20ha that have been cleared and drained for agriculture purposes in FC 3 and another 20ha of previously burnt area in FC 24 & 25. In the degraded area in FC 3, seven canal blocks were built for rewetting the drained and cleared area to assist the natural regeneration process. Natural regeneration in FC 3 is mainly attributed to hydrology restoration and fire prevention activities. The seed bank in the peat layer has not been burnt and is still intact for germination. Moreover, the degraded area is in close proximity to good forest for seed dispersal.



Figure 12. Natural regeneration in 20ha of FC 3 within three years.

Tree replanting was implemented in 1ha of mineral soil and 19ha of peat soil in FC24 (14ha) and FC25 (6ha). The planning was conducted in two phases in 2021 and 2023. In total, about 16,200 trees have been planted including the replacement planting with a survival rate of 70%. Maintenance activities include tree census to record the mortality rate of seedlings and trees, replacement of dead trees, fertilizer application to encourage growth and weeding of the planted lanes to reduce the competition. In addition, 2 canal blocks were built in FC 25, close to the rehabilitation site, to allow for rewetting and natural regeneration of the area and other degraded sites. In collaboration with SSFD and co-funding through GEC, rewetting and natural regeneration were also implemented in FC 37 and FC 38. Figure 13 and Table 4 both indicate the progress of the rehabilitation after interventions in three regions namely FC 3 and FC 25 which is directly under the Prosper Recovery project and FC 37 and FC 38, conducted in collaboration with SSFD. In three years, 244ha of low forest was restored from grassland.

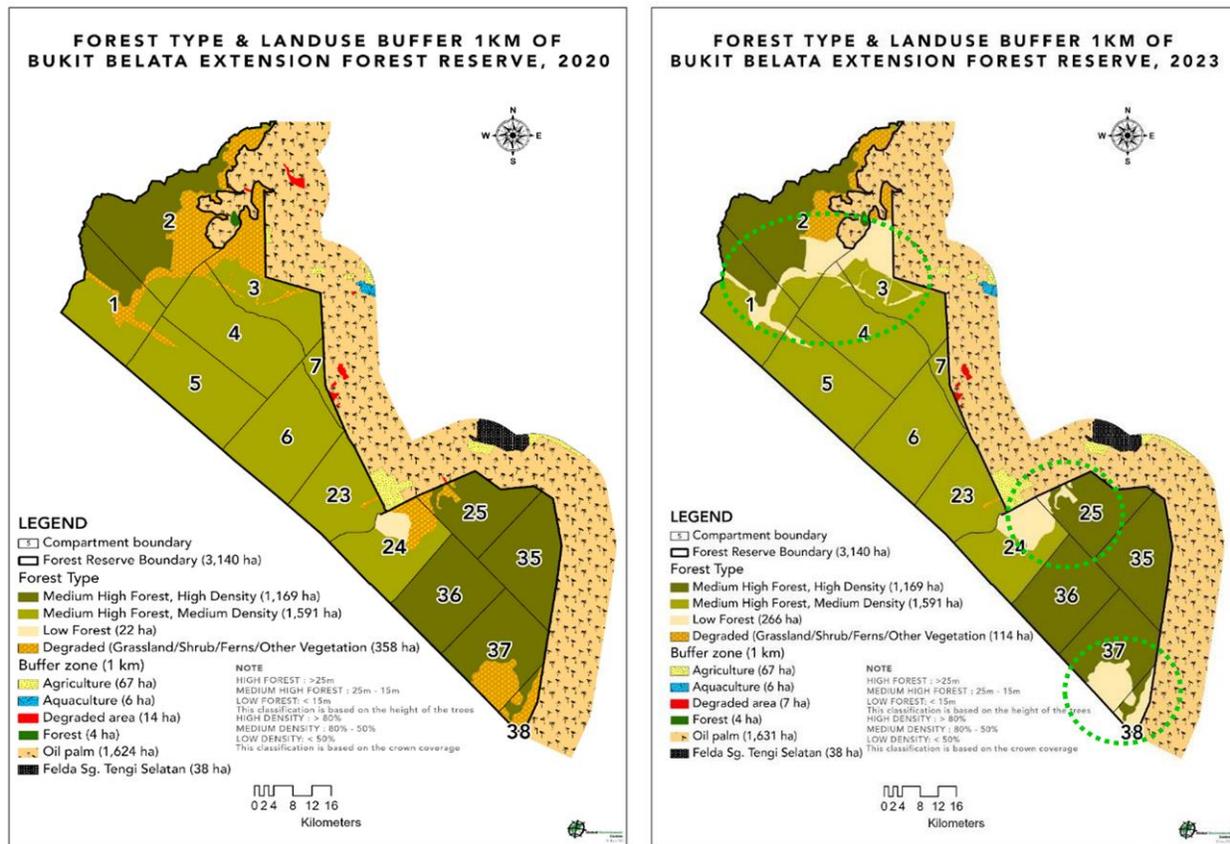


Figure 13. Changes in the vegetation type throughout project implementation period [before (2020) and after (2023)] - 244 ha.

Table 4. Progress of rehabilitation activities in terms of changes in the vegetation type after intervention.

Vegetation Type	Area (ha)		Changes (ha)
	2020	2023	
Medium High Forest (High Density)	1,169 (37%)	1,169 (37%)	-
Medium High Forest (Medium Density)	1,591 (51%)	1,591 (51%)	-
Low Forest	22 (1%)	266 (8%)	+244
Grassland/ Shrub/ Ferns	358 (11%)	114 (4%)	-244
Total (ha)	3,140	3,140	
Difference (ha)		244	

In FC 3 and FC 25, the rewetting, revegetation, natural regeneration and fire prevention activities had far-reaching impact which resulted in the natural regeneration of the other nearby forest compartments as shown in Figure 14.

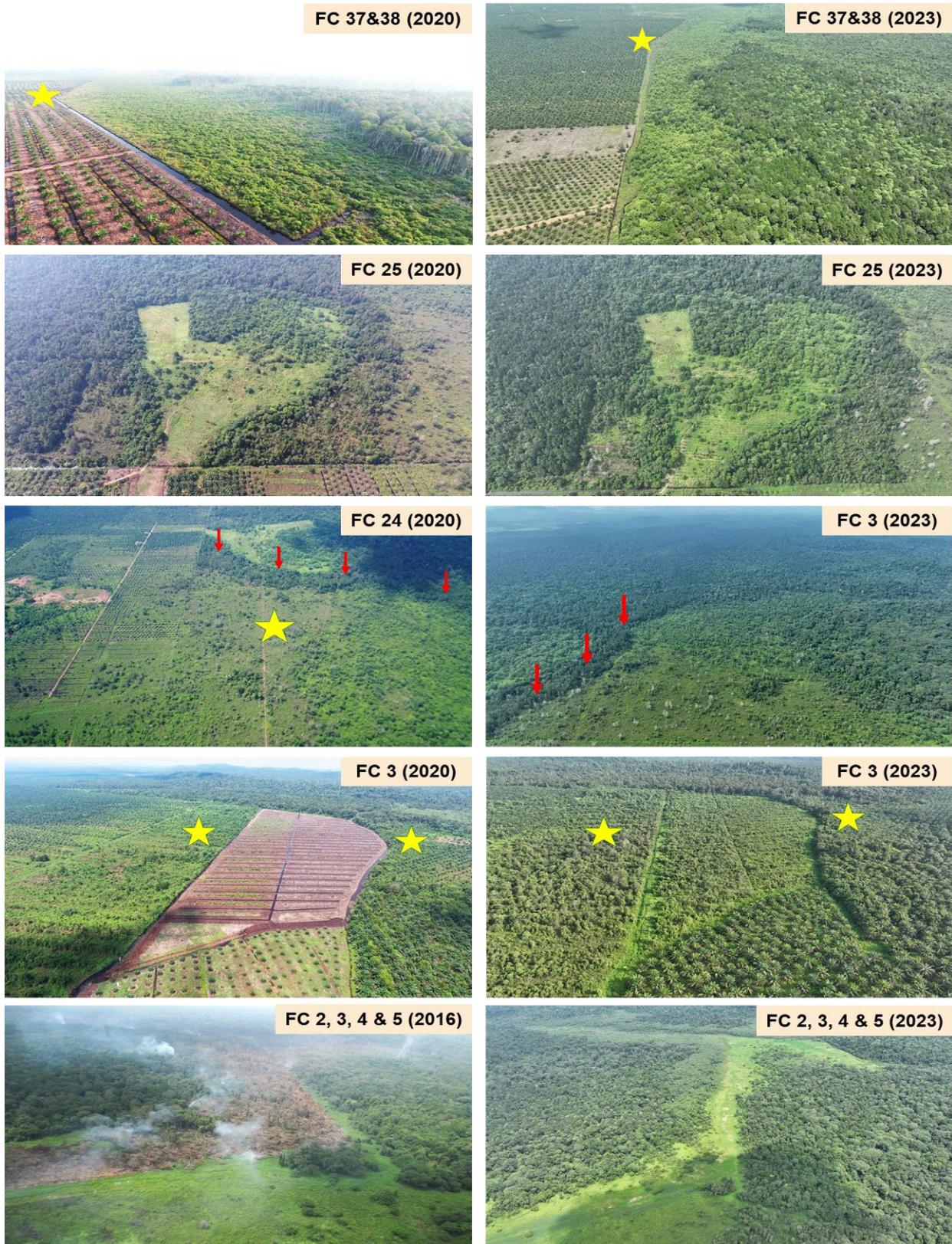


Figure 14. Forest recovery took place in FC 2, 3, 4, 5, 24, 25, 37 and 38 due to planting, rewetting and fire prevention activities.

5.2.3 Reduction of fires/hotspots in correlation with the reduction of degraded areas in BBEFR over the last three years.

A fire hotspot assessment utilizing satellite imagery from 2012-2022 provided a map indicating the fire-prone areas in BBEFR. To reduce the risk of fires in high-risk areas, piezometers were installed each in the fire prone forest compartments of FC 3, FC 7 and FC 25 and in the oil palm buffer zone to monitor water tables. The construction of canal blocks in FC 3 and FC 25 helps raise water tables within the peat forest. Since the construction of the canal blocks, water tables have not been more than 30cm below the ground surface (higher than the threshold for enhanced fire risk of 40cm drainage). KWHSTS patrollers were trained to patrol four times a week at the fire-prone areas and boundaries to detect any encroachment or other illegal activities. Fire Danger Risk System signboards were installed and updated four times a week around fire-prone areas and at the Felda settlements to provide an early warning system on the risk of fires. In addition, no entry sign boards with legal warnings have been placed along the boundary of BBEFR. The signboards help deter encroachment and other illegal activities in BBEFR. As a result, Figure 14 and Table 5 indicate the reduction of hotspots and correlating reduction of degraded areas in BBEFR over the last three years.

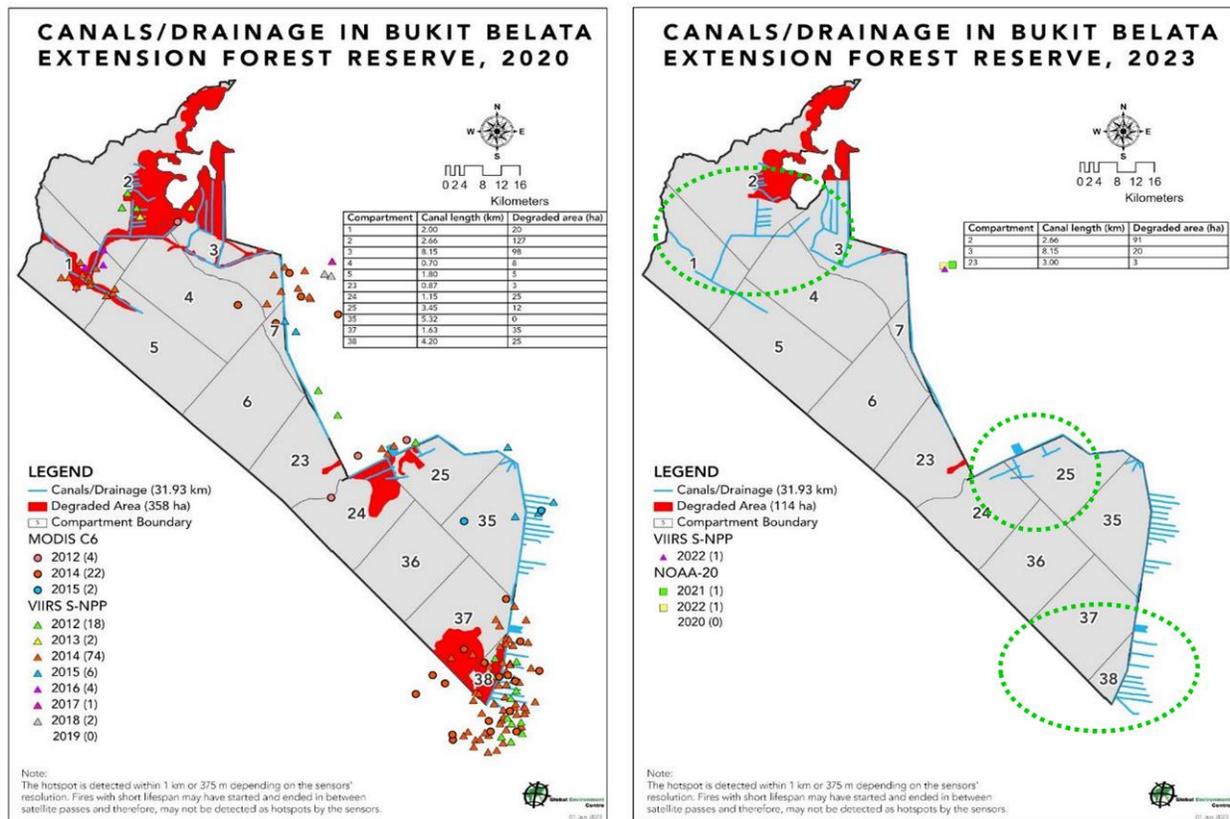


Figure 14. Reduction of hotspots (2021-2018 vs 2020-2022 and degraded areas (2020 versus 2023) throughout project implementation

Table 5. Reduction of degraded areas from 2020 to 2023 - 244 ha.

FC	Degraded Area (ha)	
	2020	2023
1	20	0
2	127	91
3	98	20
4	8	0
5	5	0
23	3	3
24	25	0
25	12	0
35	0	0
37	35	0
38	25	0
Total (ha)	358	114
Difference (ha)	244	

5.2.4 “Review of Project Achievements” by MYTransform to the Prosper recovery project site in BBEFR and Felda Sungai Tenggi Selatan.

A “Review of Project Achievements” was conducted by MYTransform, an independent external assessor appointed by Prosper to evaluate the Prosper recovery project’s impact in BBEFR. The findings of the evaluation report highlight that the rehabilitation and conservation of BBEFR by GEC in the past 3 years has delivered all the targeted results indicated in its proposal. The project has also met the necessary conservation and forest-based community development requirements for a Recovery Plan in line with the crucial recovery parameters. Therefore, Prosper’s continued support for the project as part of its Recovery Plan is encouraged. Furthermore, the report also suggested that the expansion of the present BBEFR project to the adjoining Raja Musa Forest Reserve as an addition to the conservation efforts of NSPSF.



Figure 15. Site visits and meetings with project stakeholders for the “Review of Project Achievements” by MYTransform to the Prosper recovery project sites and Felda Sungai Tenggi Selatan.

6. Challenges during the project implementation

The followings were the challenges faced during the project implementation period at BBEFR:

- a) Movement Control Orders (MCO) from 18 March 2020 until 18 October 2021 (1 year and 7 months) restricted outdoor activities, physical meetings and ground activities (monitoring, site visits, etc.) due to the COVID-19 outbreak. However, the project activities have been implemented virtually and remotely via telecommunications or conducted in a in line with specified standard operating procedures (SOPs) with permits from the local police stations, the Ministry of International Trade and Industry (MITI) and the Ministry of Energy and Natural Resources (KeTSA).
- b) Irregular and often unpredictable weather patterns such as hot and dry period during the southwest monsoon season led to stunted growth of planted trees and higher mortality. High water tables due to unseasonal and high rainfall rain associated with the La Nina event (2020-2023) and transitional monsoon and northeast monsoon season caused water stress to the planted trees and postponement of some planting activities.
- c) Hot and dry period from July until September 2022 led to stunted growth of seedlings in the KWHSTS nursery. The extended hot weather during the dry season, especially from July until September 2022, caused the saplings in the nursery to have stunted growth whereas some died due to surrounding heat. The KWHSTS has taken the initiative to place a canvas to ensure shade and soil moisture in order to increase the survival rate of saplings in the nursery.
- d) The quick spread and dominance of Lalang grass in the planted site at FC 25, BBEFR. Since FC 25, BBEFR is a peatland fire-affected area, the Lalang grass grew very rapidly and dominated this area (especially the mineral soil areas) after each maintenance activity. The overgrown Lalang grass tends to compete with the planted trees and limit their acquisition of adequate nutrients for enhanced growth. This slows down the growth of trees and continuous regular maintenance of the planted site is indeed necessary even after the completion of Phase 1 of the recovery project.

7. Conclusion

In summary, the project activities have been implemented fully in alignment with the project implementation plan for 2020-2023. A six-month no-cost extension was granted between April to September 2023, to ensure the completion of the pending activities affected by the wet weather and COVID-19 pandemic restrictions. At present, the project has successfully rehabilitated 244 hectares of degraded areas (exceeding the initial target of 200ha), prioritizing sections for the protection and conservation of the rest of the forest reserve and surrounding peatlands.

Without these rehabilitation efforts, including rewetting, fire reduction and control measures, especially in anticipation of the 2023-2024 El Nino season, BBEFR would remain under significant threat. The implementation of this project (first phase) has helped establish the foundation of the rehabilitation process in degraded areas within selected forest compartments (notably in FC1, FC2, FC3, FC,4, FC 5, FC 24, FC 25, FC 37 and FC 38). However, achieving the optimal result in conservation and rehabilitation necessitates continuous monitoring and follow-up, together with further strengthening partnerships will the local community and other related stakeholders.

Furthermore, the independent external evaluation report by My Transform indicated that GEC's efforts in rehabilitating and conserving the BBEFR over the past three years have delivered the results outlined in the project proposal. The project has also met the essential criteria of conservation and forest-based community development required for a recovery plan, aligning with crucial recovery parameters. The report strongly recommended continued support from Prosper for the project as part of its Recovery Plan. Consequently, Prosper has approved a second-phase for the project for the period October 2023-October 2026 to sustain the phase 1 efforts, enhance stakeholder engagement and further involve the local community in the management of the BBEFR and adjacent forest reserves such as Raja Musa Forest Reserve.

The implemented activities in the recovery plan have not only increased awareness but have also fostered a deeper understanding among the public and local communities about the BBEFR, SKFR and RMFR as an important vital ecosystem of NSPSF and its landscape. The project has received positive and encouraging support from SSFD, local landowners, KWHSTS and other community members as well as other local authorities and Prosper's stakeholders. Effective patrolling and monitoring have also played a crucial role in preventing and controlling

fire incidents at BBEFR and NSPSF. In line with the Nature-based Solution (NbS) approach, these activities have promoted and supported life on land through sustainable forest management, rehabilitation of the degraded peat swamp forests and reducing Greenhouse Gas (GHG) emissions. This holistic approach encompasses peatland conservation, climate change mitigation, climate change adaptation, benefits to the local population, and job creation.

Attachment 1: Tree planting at 14 hectares of degraded areas in FC 24, Bukit Belata (Ext.) Forest Reserve (BBEFR)

- Activity 2** : Rehabilitation of 200 ha through rewetting and assisted natural regeneration and selected planting in priority portions of the Bukit Belata (Extension) Forest Reserve
2.3 Land preparation for rehabilitation activities (20 ha)

1. Introduction

Peat swamp forests are unique ecosystems that provide various ecosystem services and functions including fresh water supply, flood mitigation, biodiversity conservation and terrestrial carbon storage. They are comprised of three main components such as peat, water and vegetation that are interconnected and therefore any form of disturbance to any one of these components would cause huge adverse impacts to the whole ecosystem. The loss of trees in the peat swamp forests due to logging and forest fires often removes a big portion of the forest cover that not only serves as food sources and habitat for wildlife but also as a canopy cover to support the growth of high-value tree species underneath. On top of that, degraded forest areas by peatland fires usually took a longer time to regenerate naturally, as the seed bank that might be available within the peat layer could be destroyed together with the smouldering peat. As a result of this, the repetitively burnt area will be mostly covered with fire-adapted species such as Lalang grass (*Imperata cylindrica*), fern, acacia and others. Therefore, artificial tree planting activities in such degraded forest areas are imperative to restore the vegetation of the affected peat swamp forests, while supporting their natural regeneration. Such human intervention is essential for forest regeneration depending on the degree of the degradation, lack of seedbanks as destroyed by fire as well as lack of seed dispersal agents due to the longer distance between the degraded site and good forested area.

GEC proposed to conduct tree-planting activities at 20 ha of degraded areas in BBEFR with pioneer tree species. As the first phase of the implementation, about six (6) ha of degraded areas impacted by peatland fires at FC 25 was replanted from 27 January 2021 to 3 March 2021. One (1) ha of the degraded area that comprised of peat soil and five (5) ha of the degraded area that comprised of mineral soil were planted with a total of 7,300 Tenggek Burung (*Melicope lunu-ankenda*) and Pulau (*Alstonia scholaris*) trees including the replacement of dead trees during the maintenance activities. The tree planting activity at the remaining fourteen (14)

ha degraded site of FC 24, BBEFR was conducted in 2023. In total, about 16,200 trees have been planted in 20 ha of degraded sites, including the replacement planting.

2. Objectives of the activity

- To restore the degraded areas of FC 24, BBEFR destroyed by the peatland fires;
- To conduct artificial planting at the degraded areas of FC 24, BBEFR with the pioneer species to support forest regeneration, while preventing peat subsidence and peatland fires; and,
- To prepare a canopy cover from the pioneer species for the growth of high-value species underneath.

3. Summary of the implementation and progress of the proposed activity

As a rehabilitation initiative of degraded forest areas in the south-eastern part of North Selangor Peat Swamp Forest, GEC and Prosper together with KWHSTS and SHGSU members carried out planting activities in 14ha of degraded forest areas in FC 24, BBEFR. Prior to the tree planting activity, the site preparation work was carried out by the KWHSTS and SHGSU contractors by clearing the lalang grass (*Imperata cylindrica*) within the planting lanes. The exact locations to plant the trees in each lane were marked with bamboo sticks before proceeding with the tree planting. Trees were planted using a 3 X 5 m matrix by following 3 m spacing between the trees in each lane and 5 m spacing between the lanes.

A total of 8,400 Tenggek Burung (*Melicope lunu-ankenda*) trees were successfully planted at FC 24, BBEFR covering 14 ha of degraded sites. The tree planting activities are done using the normal planting method with additional mineral soil in the planting holes. The additional mineral soil in the planting holes is required to increase the nutrients and increase the adaptability as well as the survival rate of planted trees. Periodic monitoring has been conducted by GEC together with the contractor from August to September 2023 to review the progress of the work carried out. The final tree census and survival counts was completed in October 2023.

Planting trees in degraded forest areas in FC 24, BBEFR is of utmost importance for several reasons:

- **Carbon Sequestration:** Peat swamp forests are excellent carbon sinks. The growth of trees in these areas helps absorb and store significant amounts of carbon dioxide from the atmosphere, mitigating climate change and reducing greenhouse gas emissions.
- **Biodiversity Conservation:** These forests are home to a diverse range of plant and animal species. By restoring and replanting trees, we protect the habitats of many unique and endangered species, contributing to biodiversity conservation.
- **Water Regulation:** Peat swamp forests play a crucial role in regulating water flow. By planting trees, we can help maintain the hydrological balance, reduce the risk of flooding, and ensure a steady supply of clean water for both ecosystems and human communities.
- **Sustaining Livelihoods:** Many local communities rely on peat swamp forests for their livelihoods, including fishing, traditional medicine, and non-timber forest products as well as main source of water supply for their agriculture activities. Restoring the degraded areas ensures the continued sustainability of these livelihoods.
- **Soil Stabilization:** The root systems of trees help stabilize the peat soil, reducing peat subsidence and preventing the release of stored carbon when the peat is disturbed or drained.
- **Recreational and Educational Value:** Restored peat swamp forests provide opportunities for ecotourism and education, raising awareness about the importance of these ecosystems and their conservation.

In summary, planting trees in degraded peat swamp forests is crucial for climate change mitigation, biodiversity preservation, water regulation, livelihood support, and maintaining the ecological integrity of these unique ecosystems in BBEFR.

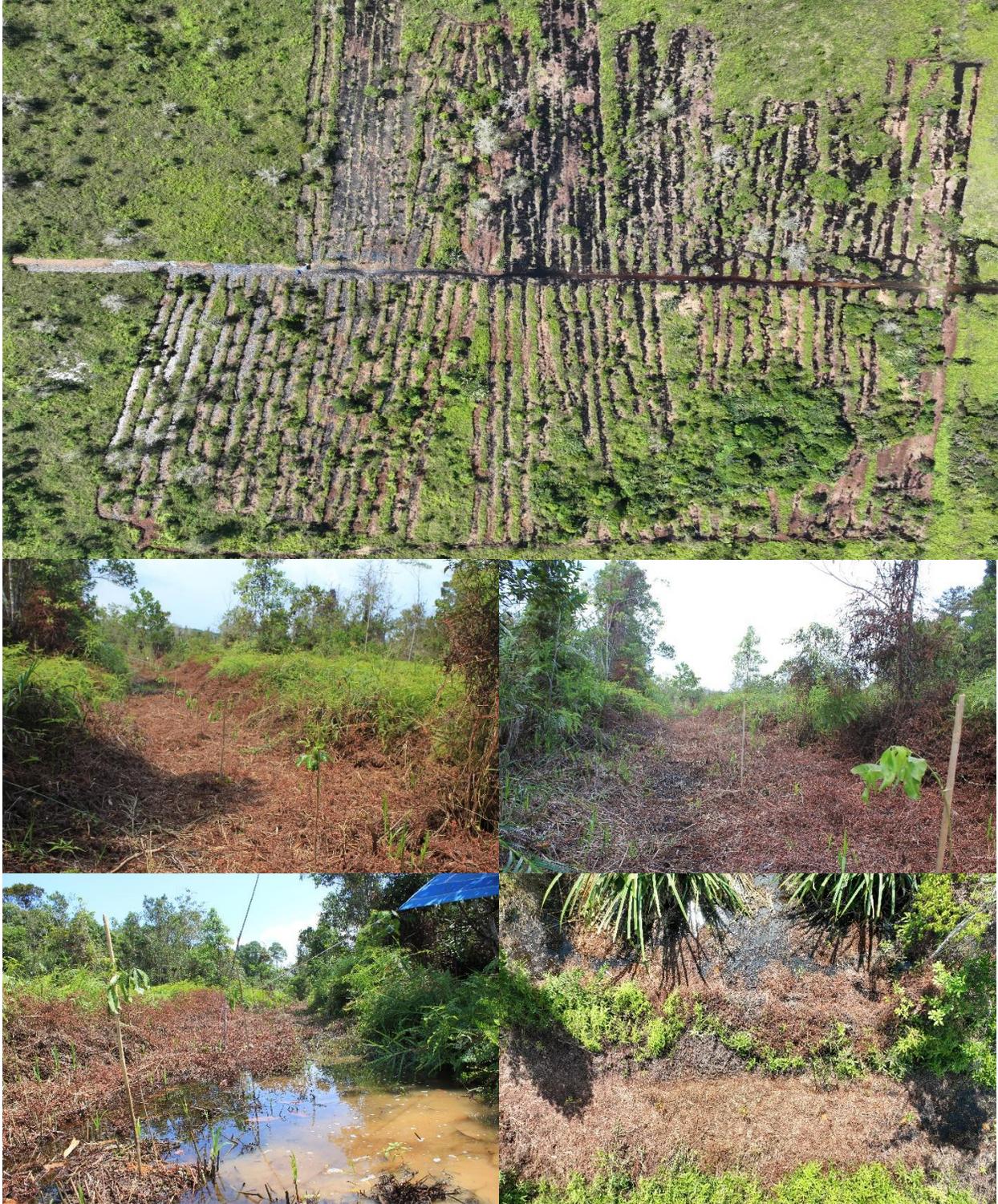


Figure 1. Aerial and ground images showing the lanes with planted trees in FC 24, BBEFR.



Figure 2: The method of tree planting: A) clearing the lanes, B) placing the bamboo sticks, C) planting the trees, D) fill up the mineral soil in the planting holes E) tying the trees to bamboo sticks to ensure the trees are not leaning and F) completed planted tree.

4. Challenges

The tree planting activity was delayed for a few weeks due to the high water level at the planting site. High water levels not only caused the workers to face a challenge during cutting the grass and cleaning and preparing the planting lanes but also affected the planting of trees. This also hindered and delayed the monitoring activities in FC 24, BBEFR. With respect to high water tables and frequent rain episodes, the final tree census and survival counts are still progressing and will be conducted in October 2023.

5. Conclusion

A total of 8,400 trees were successfully planted at FC 24, BBEFR covering 14 ha of degraded sites using a normal planting method. Heavy rain associated with the inter-monsoon season was the main challenge in implementing the planned activity on time. Despite such challenges, the tree planting activities at 14 ha of degraded site in FC 24 were accomplished with the involvement of KWHSTS and SHGSU contractors during the project implementation period in phase 1 which ended in September 2023.