

# KOPEL TREE PLANTING & RESTORATION WITH THE COMMUNITY IN PIN-SUPU FOREST RESERVE

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## **Abstract**

The Pin Supu Forest Reserve (PSFR) is a Class VI VJR protected area with an area of 4,696ha in size. The PSFR forms a vital connecting forest that makes up the world-renowned Kinabatangan Corridor of Life. The area is famous for the high biodiversity of lowland wildlife and bird species. The PSFR is significant having five out of six High Conservation Values present- based on the Malaysian HCV Toolkit 2009. The current Forest Reserve is what remains of the former commercial Class II Sungai Pin Forest Reserve. The reserve's re-gazettement in 1981, is a result of the State's broader sustainable agriculture development masterplan for eastern Sabah. The remaining forest reserve has suffered large scale degradation from forest fires during both 1983 and 1998 El-Nino droughts, with more than 42% (1,951ha) of the reserve were severely degraded forest. Forest restoration efforts were initiated in 1999 after the forest fires of 1998. Several biodiversity conservation and restoration activities have been ongoing within the PSFR over the last 20 years. The paper presents the restoration experience over the last 20 years and discusses both successes and failures of restoring forests in the floodplain forest environment. The paper discusses the level of degradation, physical and logistical challenges, previous and ongoing experimentation, and the current preferred techniques. The paper will contextualise these restoration efforts from an HCV and landscape perspective, and how valuable these activities are for long-term biodiversity conservation, alongside the ongoing participation of, and benefit to, the local community.

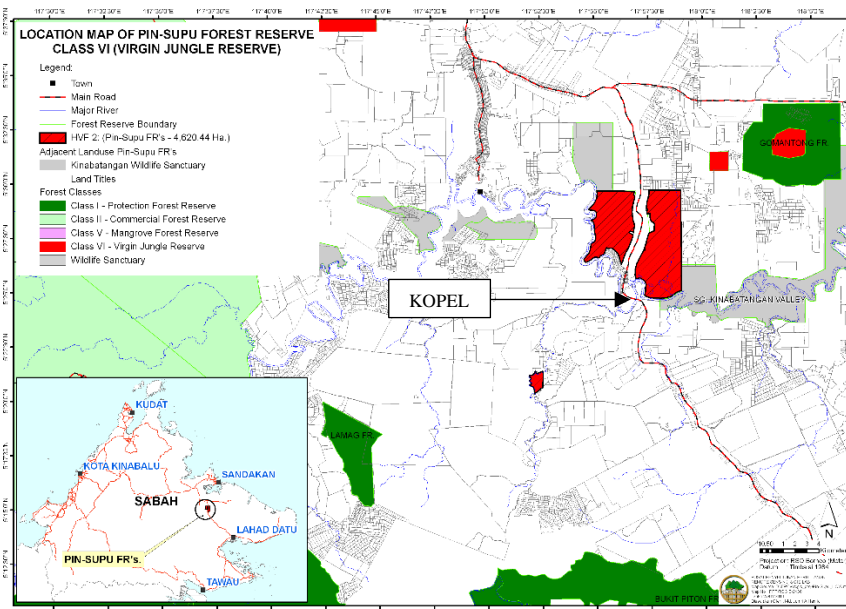
**Keywords:** Restoration, High Conservation Value (HCV), local community

## **Introduction**

KOPEL (Koperasi Pelancongan Mukim Batu Puteh Kinabatangan) is a long-established community-based organisation located in the eastern part of Sabah, within the Kinabatangan District and surrounded by Pin Supu-Forest Reserve (PSFR) (Map 1). The cooperative has been active for more than 20 years and has evolved into a unique scenario whereby the community cooperative focuses on forest conservation and restoration which generates local employment through recreation and eco-tourism activities.

Pin-Supu Forest Reserve (PSFR) covers a land of 4,696 ha and surrounds the community of Mukim Batu Puteh, which consists of four villages (Kg. Batu Puteh, Kg. Mengaris, Kg. Perpaduan and Kg. Singgah Mata) and is bisected by the Sandakan–Lahad Datu Highway (Map 1). Within the area, it contains various types of lowland forest formations, 7 oxbow lakes, a limestone karst system with more than 20 large caves and an abundance of flora and fauna. From a landscape perspective, the reserve forms an important and critical forested area that connects the larger Lower Kinabatangan floodplain ecosystems.

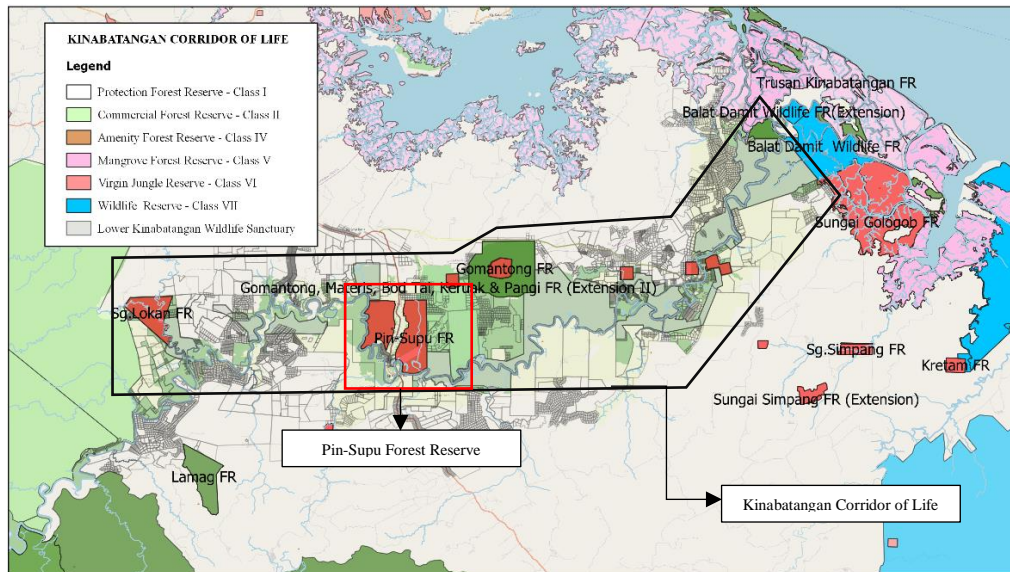
Sabah Forestry Department has recognized KOPEL as partner in the joint management of the Pin-Supu Forest Reserve (PSFR) which led to the establishment of the 1<sup>st</sup> and the 2<sup>nd</sup> Pin-Supu Forest Management Plan since 2008 until 2027. Both efforts on forest conservation and restoration are largely funded by the Sabah Forestry Department. This initiative supports sustainable forest management from a number of angles whilst creating jobs locally and raising awareness and appreciation of the surrounding forest reserve.



Map 1: Location map of KOPEL and Pin-Supu Forest Reserve

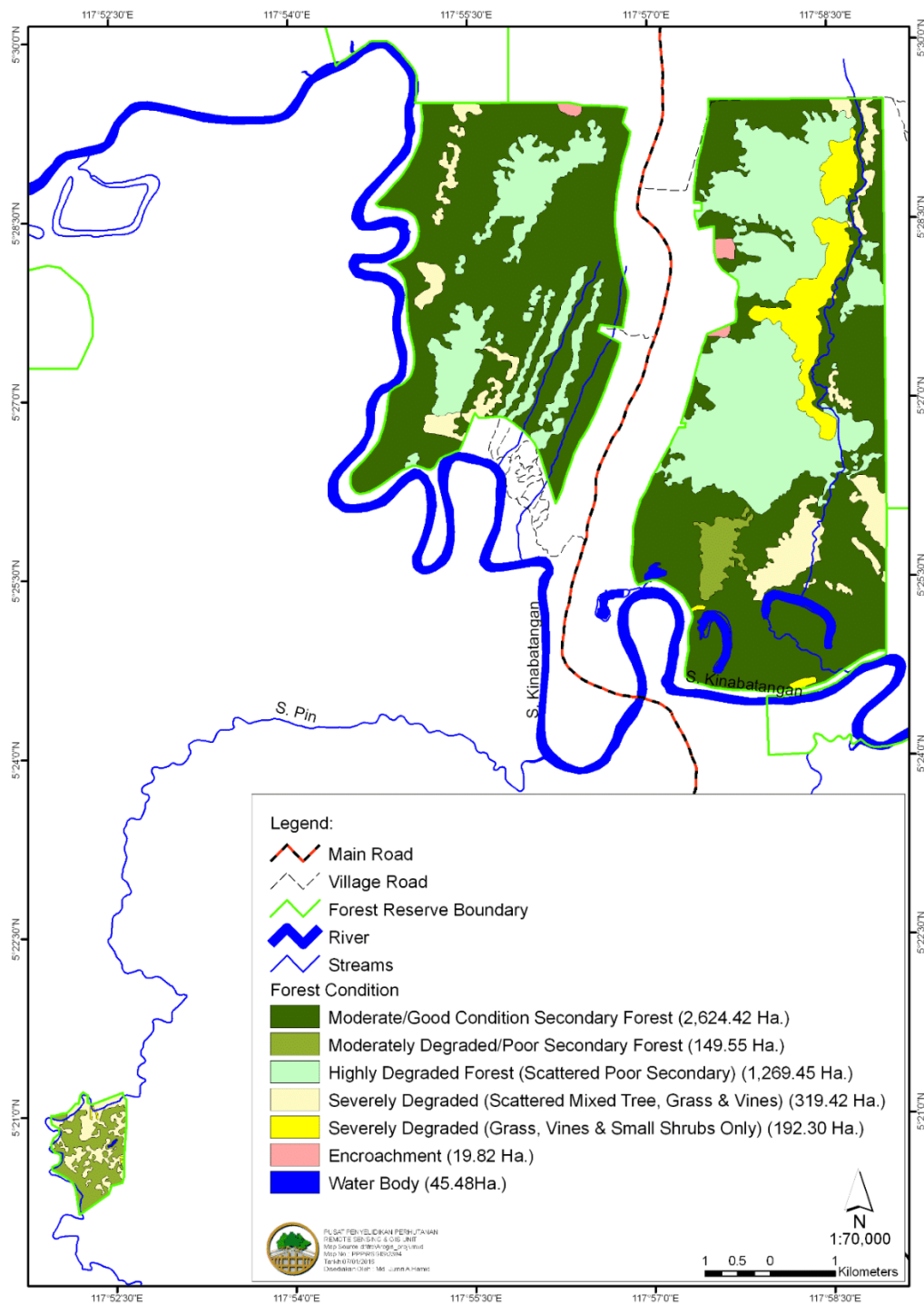
## The Restoration Imperative

PSFR is an area of High Conservation Value (HCV) located in the middle of Kinabatangan Corridor of Life that connects Lot 7 and Lot 8 the Lower Kinabatangan Wildlife Sanctuary (Map 2). The PSFR is significant having five out of six High Conservation Values present- based on the Malaysian HCV Toolkit 2009. At the landscape level, PSFR forms an important link as the ecological network of the Kinabatangan floodplain ecosystems that conserve biodiversity and provide sustainable use of natural resources. The reserve provides functional ecological connectivity that supports the movement of both biotic processes (animal movement, plant propagation, genetic exchange) and abiotic processes (water, energy, materials) which can be species or process specific. Up to 40% of Lower Kinabatangan's Forests are degraded.



*Map 2: Pin-Supu Forest Reserve located in the centre of Kinabatangan Corridor of Life*

The PSFR used to be a production forest in the past. Its timber resource was exploited up to the early 1980s before it became a protected area in 1984. Unfortunately, a number of forest fire events and illegal logging in the early 1990s have greatly reduced the quality of the forest. About 1800 ha of the reserve is degraded and covered with marsh, grass, shrub and vines vegetation (Map 3). Due to the condition of the water table, only 27 % of this degraded area may be feasible for restoration activities.



Map 3: Degraded area in Pin-Supu Forest Reserve





*Figure 1: Degraded forest is characterized by open canopy, fewer trees (often no seed-bearing mother trees) and incursion of weed species such as climbing vines*

## **The Community**

The involvement of the community dates back to 1996, with the idea to get involved in tourism in the area around Batu Puteh Kinabatangan. The community has participated in a program called MESCOT (Model of Ecological Sustainable Community Organisation Tourism) Initiative funded by the WWF Norway in 1997.



*Figure 2: KOPEL's Annual Grand Meeting with the local communities.*

The idea behind the community involvement revolves around 3 principal tenets (reasons):

- a) Create economic value for the local community from keeping the forest intact (non-extractive economy).
- b) Move beyond awareness on forest conservation or forestry law, i.e., to create a sense of appreciation and value for the forest, or in other words, create a “sense of place”, a “sense of ownership”, and “duty of care”.
- c) Move beyond passive non-involvement to active participation in Forest Conservation.

Restoration work began with the key community interest group helping Sabah Forestry Department combat forest fires in February to April 1998 caused by the El-Niño Drought between 1997-1998. The fires raised awareness on how dire the situation was in PSFR. The aftermath of the forest fire, the damage and degradation of the forest can be seen not only in PSFR but all along the Kinabatangan Corridor of Life. Before that, most people were only interested with features, for example the wildlife, but no one at that time was looking at the condition or health of the forest.



*Figure 3: Aftermath of forest fire in Pin Supu-Forest Reserve*

KOPEL began work to restore the degraded forests at several sites in PSFR in 1999. The forest restoration work is incorporated in the tourism activities. The core business is tourism, but KOPEL's Core Product is actually “Conservation Work”. More than 70% of KOPEL's tourists are students and volunteers, and the main reason they stay at KOPEL is to contribute to the Forest Restoration Program in PSFR. In KOPEL's case, the tourism and restoration work contribute to employment and conservation outcomes. KOPEL works at the interface of sustainable forest management, and there is a beneficial overlap between Community Based Tourism and Community Forestry which has worked to the advantage of forest management and the community.





Figure 4: More than 70% tourists are students and volunteers that came to KOPEL for conservation work.

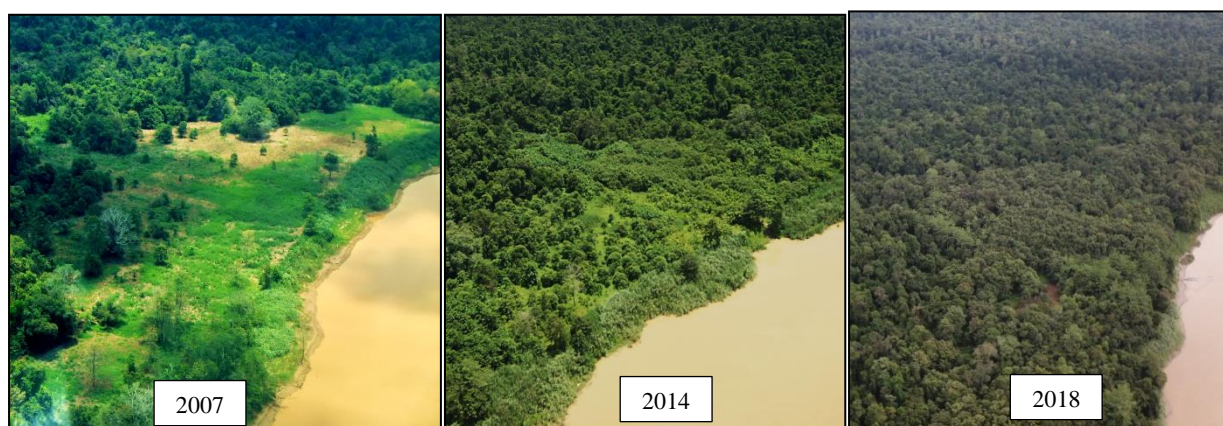
## The Restoration Work

Initially the work was concentrated mainly on tree planting, but it fails due to the species choice because the sites were often flooded throughout the year. Maintenance of the planted trees was another major challenge, because of the rapid growth of vines, climbing bamboo and grasses on these sites. Silviculture treatment by means of removing all the vines and grasses, the natural regeneration respond well with the treatment. In many cases the naturally regenerating trees were healthier and faster growing than the planted trees.



Figure 5: The local community conducting silviculture treatment and site clearance at the restoration site.

KOPEL then experimented at the other sites, on different species selection, sapling sizes and spacing. The climax species planted often have small crown, hence grow better at closer spacing. A trial plot with 1m x 1m spacing showed exceptionally good results. This plot only needed maintenance for one year because after that the trees have formed a closed canopy. Currently, KOPEL's ideal spacing is 2m x 2m for restoration work in PSFR. The key species planted are *Nauclea sp*, *Mallotus muticus*, *Colona serratifolia* and *Octomeles sumatrana*.



*Figure 6: Before and after at one of the restoration sites in PSFR*

There is a lot to learn about forest ecology and plant ecology in the Kinabatangan, and the focus is on trying to understand why the natural regeneration is slow. KOPEL's work is at best trying to enhance the natural regeneration process with interventions such as vine clearing and/or tree planting.

## **The Restoration Outcomes**

KOPEL has restored more than 364 ha of forest since it began this work in 1999 partnering with several agencies (Table 1). Overall, this translates to 410,902 trees planted in the last 20 over years. The collection fees from tourists for Sabah Forestry Department in 2019 (the financial year before COVID19 stopped tourism generally) is a staggering amount of RM63,166.00 for the State Government of Sabah.

*Table 1: Restoration records between 1999 to 2021*

<b>Partner Organisation</b>	<b>Total Tree Planted</b>	<b>Area Ha</b>	<b>Species Planted</b>
Discovery Channel (1999-2000)	6,250	15 ha	11
RICOH (Japan) (2001-2003)	6,364	16 ha	15
AAF & AF (2006-2008)	43,723	7 ha	11
International School Brunei	10,000	1 ha	13
American Forest 2009	51,594	6 ha	13
American Forest 2010	40,000	5 ha	12
Sabah Forest Department 2009	20,000	50 ha	23
Sabah Forest Department 2010	40,000	100 ha	12
Sabah Wildlife Department 2011	6,240	30 ha	7
International School Brunei 2011	60,000	15 ha	5
Bring the Elephant Home 2013	20,000	4 ha	8
Bring the Elephant Home 2014	20,000	4 ha	7
Nestle Malaysia 2014	8,000	3 ha	7
Sabah Forest Department 2015	20,000	47 ha	12
KOPEL Bhd CBT Volunteers 2016	7,610	4 ha	7
Sabah Forestry Department 2017	6,081	8 ha	2



KOPEL Bhd CBT Volunteers 2017	5,835	6 ha	12
Sabah Forestry Department 2018	4,004	3 ha	3
KOPEL Bhd CBT Volunteers 2018	8,020	8 ha	12
Sabah Forestry Department 2019	1,150	16 ha	5
KOPEL Bhd CBT Volunteers 2019	6,701	4 ha	15
Sabah Forestry Department 2020	2,346	1 ha	5
KOPEL Bhd CBT Volunteers 2020	3,640	1 ha	15
KOPEL Bhd CBT Volunteers 2021	13,344	11 ha	15
<b>Totals</b>	<b>410,902</b>	<b>364 ha</b>	<b>32</b>

At the same time KOPEL has employs on average 134 people from the surrounding community including six local university graduates from the surrounding community, and this trend will likely increase in the future.

The data and experience in forest restoration are continuously reported and shared, especially with Forest Research Centre Sepilok and this work has supported and contributed to many other forest restoration initiatives in the Lower Kinabatangan area.

Forest restoration has turned out to be a major blessing for KOPEL since the COVID-19 pandemic and the downturn of tourism through funding from foundation such as Yayasan Hasanah. KOPEL has been able to continue its conservation activities, and forest restoration has already taken-over as the most important economic activity and core business.

## The Way Forward

Today KOPEL is exploring a number of new techniques, such as propagation in the swampy and waterlogged sites, planting *ficus* from marcotting and experimenting with the enrichment planting of Dipterocarps and other climax species (such as Durio Species) in the Riverine Zone. KOPEL is actively looking for support for the various scientific aspects of restoration, especially soil science, soil microbiology, hydrology etc to help make the activity more knowledge based. Five Permanent Sample Plots (PSPs) and preliminary calculations on the carbon sequestered per hectare has been established. This is a key area of interest for KOPEL on moving into the future.

## References

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