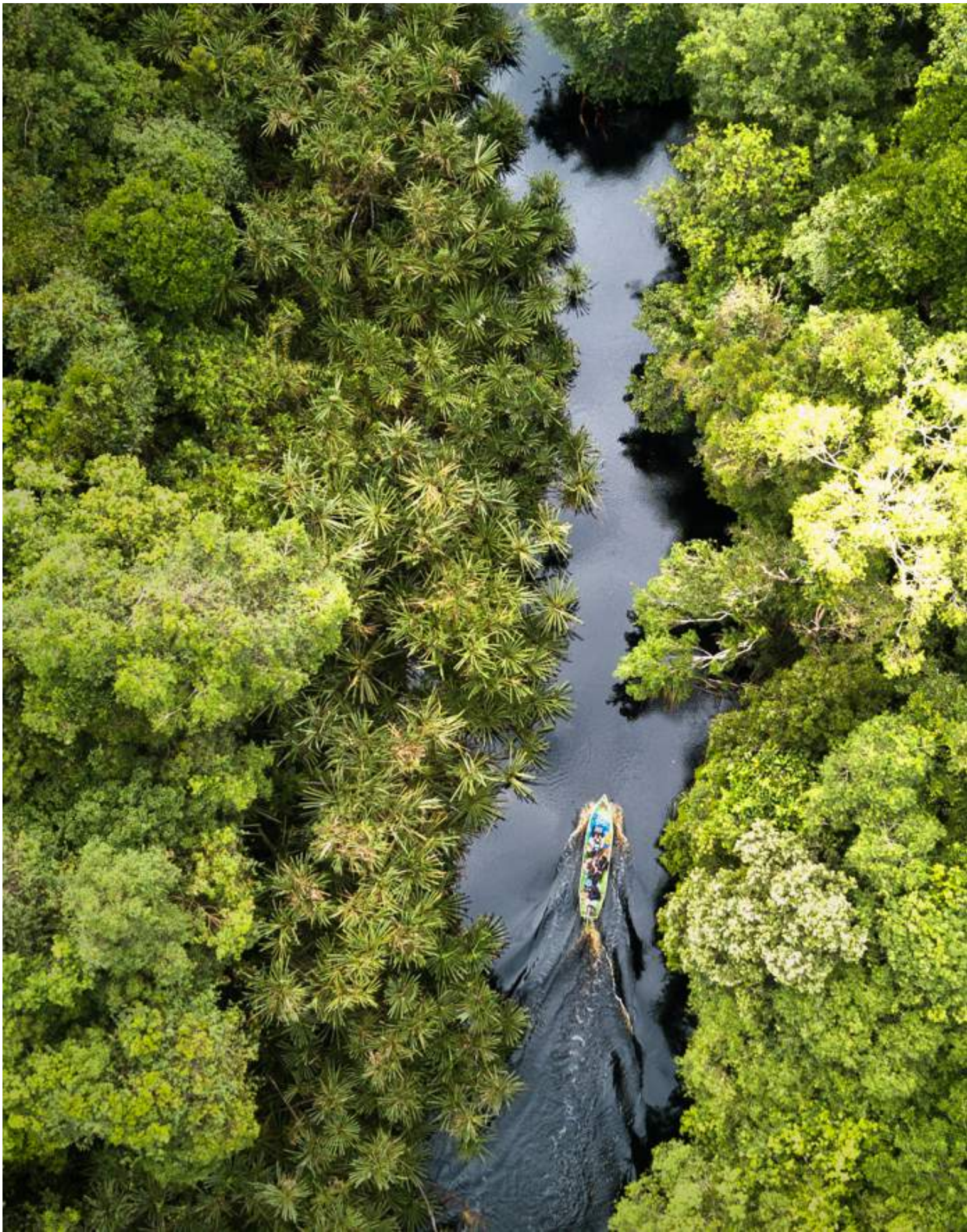


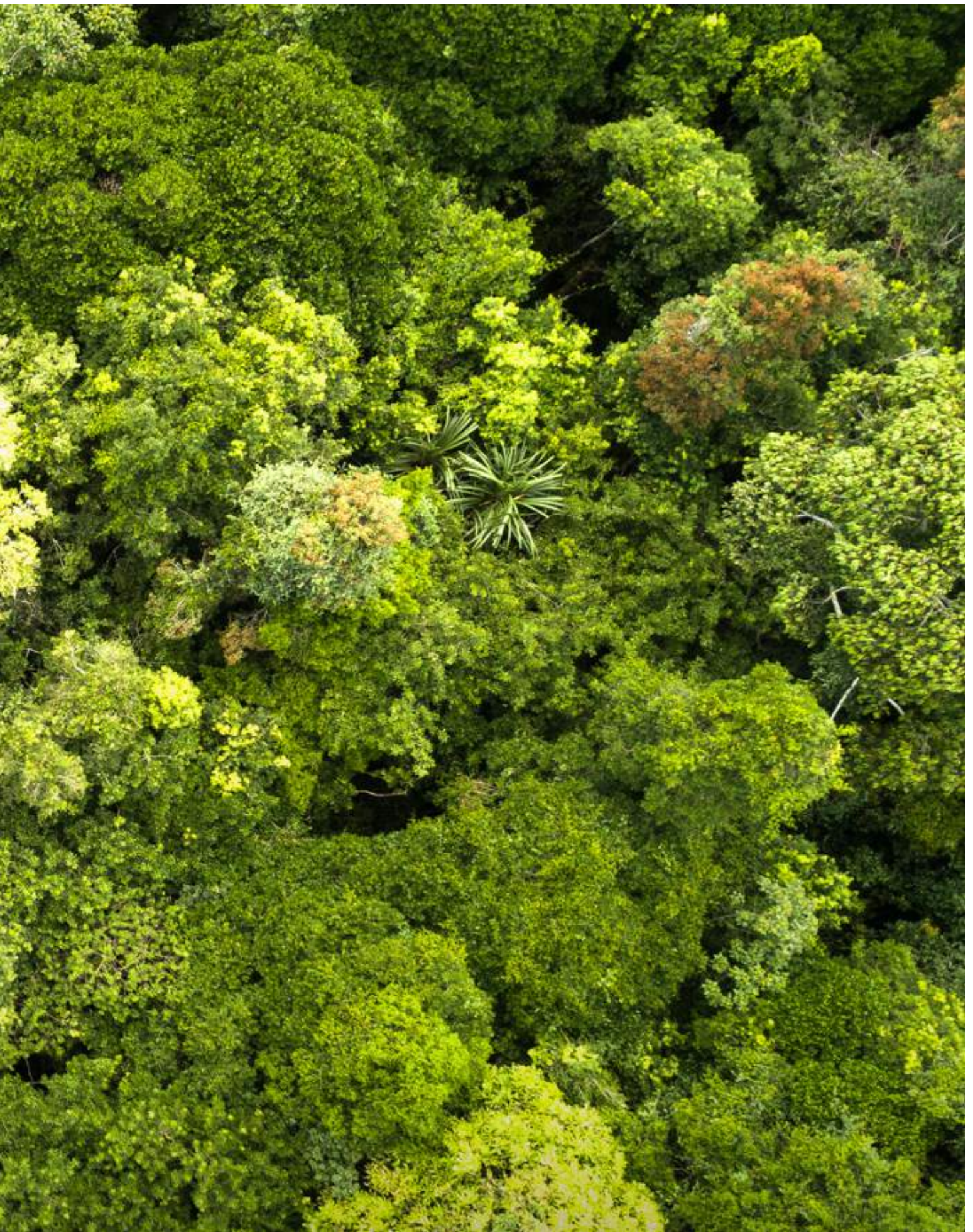


# Restorasi Ekosistem Riau

Progress Report 2019







→ The RER area on the Kampar Peninsula represents one of the last intact tropical peat forests in Sumatra and provides a home for 57 globally threatened species

# CONTENTS



## FOREWORD

4-5



## ABOUT RER

6-11

Six Years and Counting

Production-Protection Landscape Model

Partnerships

Management

Eco-Research Camp

RER Advisory Board



## BIODIVERSITY

12-19

Plant and Animal Monitoring

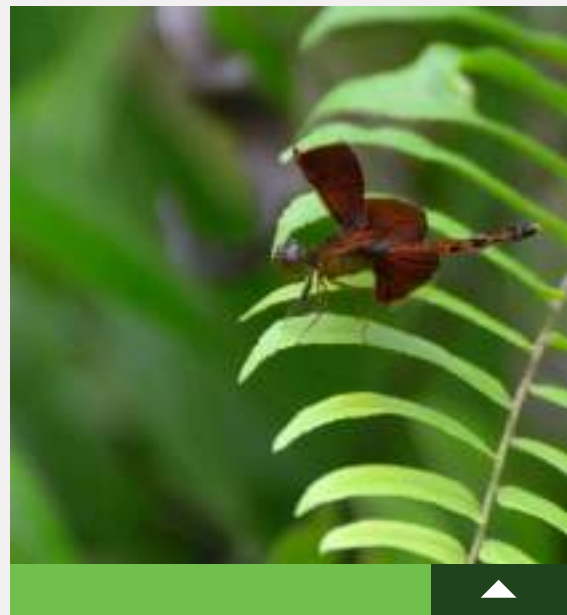
Odonata Survey

Hutan Rawa Gambut Siak-Kampar Important Bird Area

Pilot Study: Impacts of the Production-Protection Model on Native Mammal Species on the Kampar Peninsula

Sumatra Wide Tiger Survey

Case Study: Flat Headed Cat





## CLIMATE

20-27

Weather Monitoring and Fire Management

Forest Restoration

Tree Nurseries

Hydrological Restoration

Case Study: Assessing Trends in Forest Health



## COMMUNITY

28-31

Farming and Fisheries

Community Wellbeing



## OUTREACH & ENGAGEMENT

32-35

Field Visits

External Engagement

Case Study: Innovation Forum

Internship Programme

## FINANCIAL SUMMARY

36

# FOREWORD

Since our last Progress Report, calls for action on ecosystem restoration have continued to be heard around the world as governments, corporations and civil society groups redouble efforts on meeting climate targets and the achievement of the United Nations Sustainable Development Goals (SDGs).

At the same time, awareness of the gravity of the planet's environmental challenges and the need for lasting, impactful solutions that balance the needs of people and landscapes, has also grown. Forest restoration is often at the centre of these conversations.

The protection and restoration of 150,693 ha of biodiverse peat forest in eastern Sumatra continues against this backdrop. Restorasi Ekosistem Riau (RER) has continued its patient, thorough work in partnership with local communities and scientific advisors to protect fragile peat landscapes on the Kampar Peninsula and on nearby Padang Island, supporting biodiversity conservation and empowering local communities.

RER continues to stand tall as an example of what can be achieved through long-term funding and committed partnerships between business, civil society and community.

In this report, we highlight several aspects of collaboration, with emphasis on being an essential part of an integrated production-protection model as

a way to achieve environmental as well as social and economic objectives.

This model is a cornerstone of RER partner APRIL's approach to sustainable forest management, and involves the integration of productive fibre plantations on the perimeter of the forest restoration area, providing protection while also actively funding ecosystem restoration operations. The report documents how the implementation of this model has significantly reduced potential threats to the restoration landscape.

Specifically, there have been no cases of illegal logging or land encroachment recorded on the Kampar Peninsula since 2014, nor has there been any instance of fire. Our commitment to effective fire management was tested by last year's Moderate-to-Extreme Fire Danger Rating for almost six months due to low rainfall. However, there were zero hotspots or fires recorded inside the RER forest area for the sixth consecutive year.

This achievement is a product of APRIL's production-protection model which extends to active fire patrols, formal agreements with communities to not use fire, and no active land-clearing occurring in the concessions.

Our focus on biodiversity continues to be a core part of the restoration program. To date, 76 mammal species have been recorded, including



**BEY SOO KHIANG**

Chairman, Advisory Board  
Restorasi Ekosistem Riau

five of Sumatra's six cat species such as the critically endangered Sumatran Tiger, seven primates, 307 bird species, 107 species of herpetofauna and 190 species of plants.

The first insect survey in the RER area was undertaken, focusing on the Order Odonata which includes dragonflies and damselflies. Similarly, a pilot study was carried out in 2019 to investigate how mammal species respond to the interface or edge between monoculture *acacia* plantation and peat swamp forest.

Last year, RER also began work with Yayasan SINTAS (Save the Indonesian Nature and Threatened Species) to survey a large area of more than 517,000 ha on the Kampar Peninsula to support the protection of the Sumatran tiger population.

We continue to draw lessons from the work carried out by RER's field teams, particularly the importance of collaboration with nearby communities, who need to be meaningfully engaged to gain their trust and support.

Our model of community engagement treats communities as partners, where we explore pathways to development and prosperity, beyond handouts. This approach looks beyond lines on a map and considers the overall forest ecosystem, including the economic and social needs of forest communities who are supported and encouraged to use forest resources sustainably.

Perhaps most importantly, we recognise that restoration is a long-term commitment requiring consistent access to financial resources, professional capabilities and scientific expertise. The opening of a unique peatland research facility, the Eco-Research Camp, later this year is a measure of our commitment, and will provide an operational base and field office for our teams, stakeholders, researchers and eco-tourists to better understand unique peat forest biodiversity and the production-protection landscape model.

This report and the progress achieved at RER is a testament to the ongoing work of our colleagues across a range of functions, from hydrology and nurseries to biodiversity monitoring and fire management, in protecting one of the last intact peatland forest landscapes in the region.

Through their efforts, supported by our valued partners and advisors, we look forward to advancing our restoration program and sharing our knowledge with the global conservation and sustainability community.

**Bey Soo Khiong**



Tasik Koali is a freshwater lake in Tasik Serkap Wildlife Reserve, which is surrounded by RER restoration concession areas

## ABOUT RER

RER is an ecosystem restoration programme made up of 150,693 ha of peat swamp forest, situated in two landscapes on Sumatra's eastern coastline

01

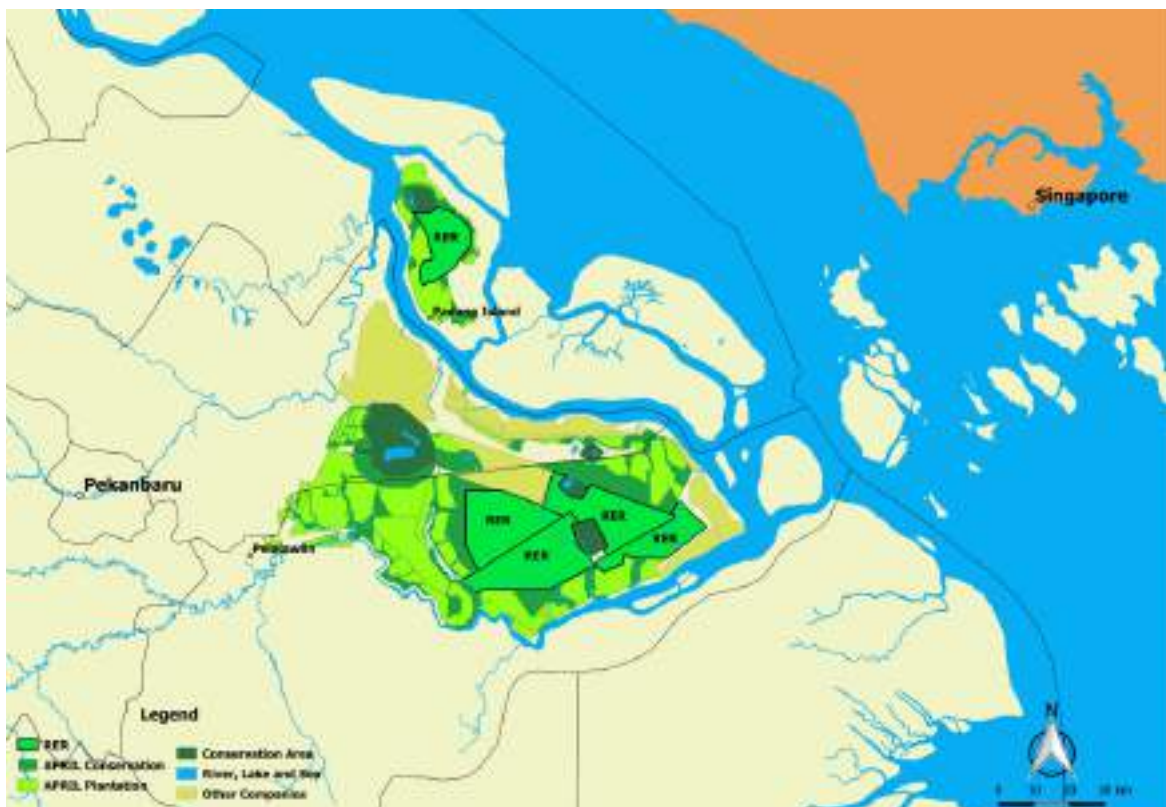
# Six Years and Counting

**Established** in 2013 by APRIL Group, a leading producer of fibre, pulp and paper, Restorasi Ekosistem Riau (RER) is an ecosystem restoration programme made up of 150,693 ha of peat swamp forest, situated in two landscapes on Sumatra's eastern coastline. The first landscape is an area of 130,095 ha located in the heart of a larger 344,600 ha forest block on the Kampar Peninsula, while the second, an area of 20,599 ha, is located on nearby Padang Island.

The Kampar Peninsula is a 720,000 ha coastal plain which includes a variety of land uses, such as agriculture, forest plantations, protected areas, and natural forest. Natural forest and acacia fibre plantations together occupy around 80% of the

Kampar Peninsula. Padang Island is 110,936 ha off the east coast of Riau Province. This island landscape is comprised of 60-70% peatland, lakes, rivers and coastal area. The RER area represents about 49% of all forested lands of Padang Island.

Operating under five ecosystem restoration concessions (ERCs) issued by the Indonesian government for a 60-year period, the RER restoration area is about the size of London. The purpose of an ERC is to restore a degraded forest to a balanced condition, and to ensure that it can provide ecosystem services such as water storage and supply, carbon storage, fisheries and non-timber forest products.



→ RER consists of 150,693 ha of degraded tropical peat swamp forest on the Kampar Peninsula and Padang Island in Riau Province, Sumatra, Indonesia

Concessions	Size (ha)	Location
PT Gemilang Cipta Nusantara (GCN-KP)	20,123.33	Kampar Peninsula
PT Gemilang Cipta Nusantara (GCN-PPD)	20,598.53	Padang Island
PT Sinar Mutiara Nusantara (SMN)	32,781.06	Kampar Peninsula
PT The Best One UniTimber (TBOT)	40,665.67	Kampar Peninsula
PT Global Alam Nusantara (GAN)	36,524.78	Kampar Peninsula
<b>TOTAL</b>	<b>150,693.37</b>	

→ Five RER concessions located on Kampar Peninsula and Padang Island

Part of APRIL's production-protection landscape, the RER programme aims to protect and restore the fragile peat domes at the centre of the two landscapes, to develop jobs and empower local communities to reduce the drivers of deforestation, and to contribute to Indonesia's carbon emission reduction commitments.

Before the RER was established, the area experienced decades of degradation through commercial and illegal logging by private businesses and local communities who cleared and drained the forest.

During this time, large trees were harvested from the area and networks of canals were built to provide access to locations deep within the peat forest for transporting logs. The drainage canals reduced water levels, drying out the peat and increasing the risk of fire.

The RER programme began with the protection and restoration of 20,000 ha of peat forest on the Kampar Peninsula. At COP 21 in Paris in 2015, APRIL announced the programme's expansion to 150,000 ha and committed US\$100 million to support long term conservation and restoration initiatives, including RER, for a 10-year period. Now, RER is one of the largest private sector-funded peatland restoration initiatives in Southeast Asia.

### Production-Protection Landscape Model

A critical element of the RER programme is operationalising an integrated production-protection landscape model. The production element of this model involves fibre plantations on the perimeter of the restoration area that not only provide protection but actively fund ecosystem restoration, forest protection and operational capability.

Experience since the establishment of the RER programme has shown that the production-protection landscape model is a reliable, consistent and effective approach for conservation and restoration in Indonesia, given the extent of the financial and technical resources required for long-term and active landscape management.

Potential threats have been significantly reduced through the active implementation of the model. Since 2014, no cases of illegal logging and land encroachment have been recorded within RER on the Kampar Peninsula. This has also contributed to achieving zero hotspots and fires in this area during this time.

Although there have been cases of song-bird poaching, the intensive efforts of RER teams, working in partnership with the Natural Resources Conservation Agency, have resulted in a notable drop in the number of birds being removed from the area.

Every year, ecosystem restoration license holders in Indonesia are monitored by the Ministry of Environment and Forestry (MoEF) to measure compliance with yearly work plans. Three RER license areas received a 'Good' rating in 2019 from the Monitoring and Evaluation activity, with the other two concessions receiving 'Average' ratings. Out of 16 ecosystem restoration license holders evaluated across Indonesia, the RER concessions were the only ones to receive a 'Good' rating.

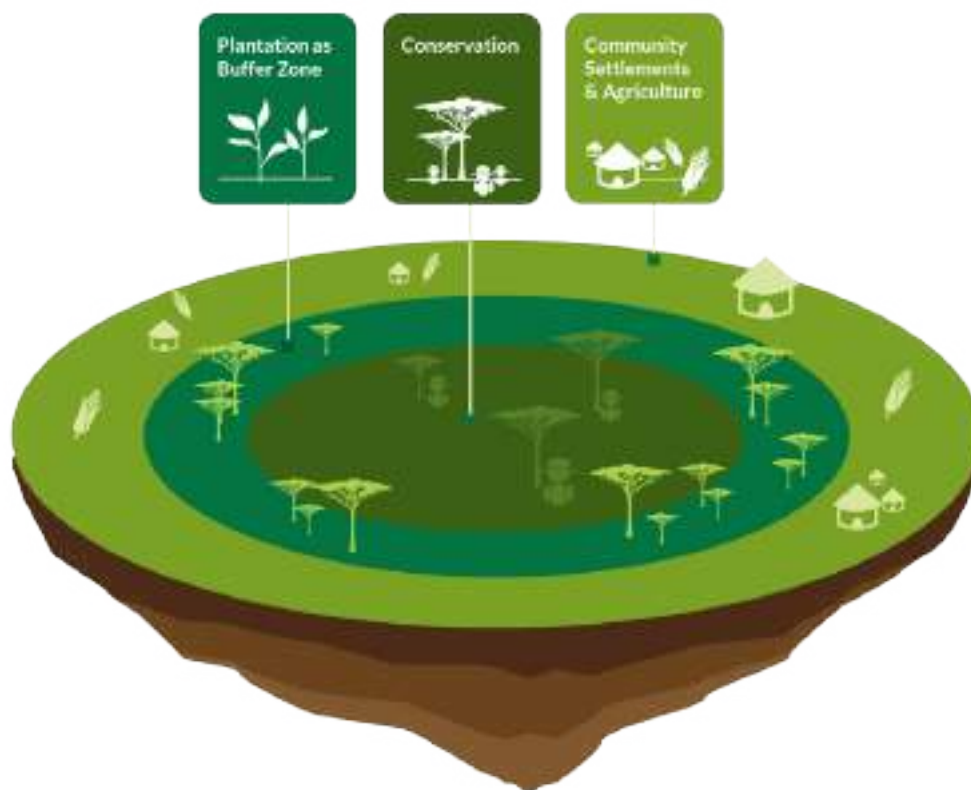
### Partnerships

RER has partnerships with Fauna & Flora International (FFI), BIDARA, Laskar Alam, and APRIL. Each partner brings essential expertise in managing the landscape and knowledge of the local communities that depend on the forests.

FFI serves as a technical partner in support of RER's science-based restoration approach. Established in

1903, FFI integrates innovative methods with social needs to produce sustainable conservation solutions and to protect threatened species and ecosystems worldwide. Since developing the partnership, RER has benefitted greatly from FFI's work, which has included the initiation of baseline surveys of biodiversity, carbon, and community. FFI has also shared valuable expertise and knowledge on carbon markets and landscape planning.

In 2016, FFI produced a technical report on estimated carbon stocks in a 92,507 ha area of the RER concession on the Kampar Peninsula. The report was based on extensive field surveys carried out in 2015 in three of the four RER concessions in Kampar Peninsula. Based on the analysis, FFI calculated that 98% of the total carbon content of the forest and peat soil is found below ground in the peat soil. The research was particularly important, in light of the fact that Indonesia holds the largest stock of peat



→ Production-protection integrated landscape model



"APRIL's commitment to biodiversity conservation in Riau, through RER, is truly impressive and we are proud to be partners in their efforts. Our surveys have shown that RER supports globally important biodiversity. The APRIL and RER teams, together with the scientific and NGO community are a powerful partnership to address biodiversity conservation and climate change. The amount of carbon sequestration at RER is making a significant contribution to national targets for reducing the release of greenhouse gases that contribute to global warming."

**Matt Walpole**

Senior Director, Conservation Program  
Fauna & Flora International (FFI)



carbon in tropical countries. FFI also advised the RER managers on the development of publications on bird and mammal species to be found on the Kampar Peninsula, published in 2017 and 2018, respectively. As a valued partner, FFI continues to share valuable expertise and knowledge with the RER teams.

BIDARA works to strengthen community social capital initiatives within rural communities on the Kampar Peninsula. It aims to ensure long-term social welfare (economy, education, and health) in a responsible and sustainable way. Its activities vary from promoting additional alternative income, improving farmers capability in managing existing land, to facilitating zero burn and low-cost environmental friendly farming. Laskar Alam Foundation, based in Padang Island, works to empower individuals and communities to develop sustainable lowland agriculture through farm education, campaigns, and school programmes. Specific activities in 15 villages have included organising farmer groups, creating land inventories, establishing demonstration plots, and fire prevention/awareness programmes.

Committed to sustainable forest management through the production-protection model, APRIL Group is a leading producer of fibre, pulp, paper and viscose with plantations and manufacturing operations in Riau Province. The company provides financial support, leadership, operational resources and technical expertise to RER.

### Management

Since the program was established, RER has achieved significant progress, including the reduction of illegal logging and new land encroachment. There has also been an elimination of fire occurrences, due largely to the efforts of RER personnel who monitor weather, ensure the preparedness of fire suppression teams, and communicate with fishermen and other forest users to prevent fire use within the forest.

RER teams also receive management guidance from an advisory board that includes both Indonesian and international third-party experts. For example, Jeffrey Sayer, a Professor of Tropical Forest Conservation at the University of British Columbia and RER advisory

### RER Advisory Board



#### BEY SOO KHIANG

Chairman of APRIL Group



#### MARK ROSE

Chief Executive Officer  
Fauna & Flora International (FFI)



#### JEFFREY ARTHUR SAYER

Professor of Tropical Forest Conservation  
University of British Columbia



#### I MADE SUBADIA GELGEL

DG of Forest Protection Nature Conservation  
(2002-2003)



#### M. NASIHIN HASAN

Founder & Director, Community Resources  
Development Institute (BIDARA)



#### ANTHONY SEBASTIAN

Conservation Planning Specialist



#### LUCITA JASMIN

Director for Sustainability & External Affairs  
of APRIL Group

board member, held a workshop with local conservation NGO Tanah Air Beta in January 2019, during which he highlighted the RER programme as a positive example of how the private sector can support conservation initiatives. Tanah Air Beta provides a platform for people to share ideas and practical solutions in relation to conservation and sustainable development.

He is also currently mentoring one of the RER conservation officers, who is a graduate student at the University of British Columbia.

### Eco-Research Camp

To enhance RER's operational capabilities and to encourage academic research on peatland management and restoration, RER leadership and

partners have undertaken the development of a unique peatland research facility, the Eco-Research Camp. Construction began in April 2019 following a multi-year planning effort.

Located on a 34 ha former fibre plantation on peatlands managed by APRIL, and immediately adjacent to the Serkap River High Conservation Value Forest corridor, the Eco-Research Camp or Eco-Camp includes 12 ha for facilities and agroforestry and 22 ha that will be restored to provide natural peat forest cover.

The Eco-Camp has been designed to integrate cultural and sustainable building concepts. The facility will use renewable energy sources, will optimise production of clean water, and will minimise water consumption, pollution and solid waste. Through expert planning and design, the Eco-Camp will be integrated into the natural peat forest surroundings.

Set to be completed in 2020, the facility will provide an operational base and field office for RER teams, with accommodation for 48 staff and 14 visitors. It will also help stakeholders, researchers and eco-tourists better understand the unique peat forest biodiversity and the production-protection landscape model.



RER Eco-research camp facility, scheduled to open in 2020



In 2019, RER updated its biodiversity list to 797 species of plants and animals and started the Odonata survey, which includes dragonflies and damselflies



## BIODIVERSITY

The peat swamp forests of RER are some of the most critically threatened habitats on Earth and are highly significant for biodiversity

# 02

# Plant and Animal Monitoring

**Monitoring** is a key operational component of the RER programme. Intensive biodiversity surveys were first conducted in 2015 by FFI to establish baseline information on species presence. Since then, the RER team has continued to build upon this data, collecting information about the plants and animals present within RER.

The peat swamp forests of RER are some of the most critically threatened habitats on Earth. These forests have been acknowledged as highly significant areas for biodiversity, recognized at the international, national and regional level by:

- World Wide Fund for Nature (WWF) and Wildlife Conservation Society (WCS) regard the area as a global eco-regional priority for Sumatran Tiger conservation (Class II, Priority 2) capable of supporting 50 or more individual tigers.<sup>1</sup>
- The International Union for the Conservation of Nature (IUCN) has stated that the RER is a Key Biodiversity Area (KBA) that is part of the Sundaland Biodiversity Hotspot.<sup>2</sup>
- Birdlife International has classified the Kampar Peninsula as an Important Bird Area (IBA).<sup>3</sup>

Extensive camera trapping, bird monitoring, and floristic surveys have recorded 797 species of plants and animals (see table below) in RER. In 2019, the RER team deployed a total of 76 camera traps which cumulatively recorded 7,142 nights on the Kampar Peninsula and Padang Island.

To date, 76 mammal species have been recorded, including five of Sumatra's six cat species among which is the critically endangered Sumatran Tiger, seven primates, 307 bird species, 107 species of herpetofauna and 190 species of plants.

Of the 797 species of plants and animals, many are of conservation concern with 57 listed on the IUCN Red List as being vulnerable (36), endangered (13) or critically endangered (eight). There are also 114 species on the CITES list and 99 species noted by the Government of Indonesia as being protected.

Since 2016, RER has participated in two important bird monitoring programmes, including migratory raptor monitoring and the Asian Waterbird Census. These programmes support not only RER

Taxa	Total Species	CR	IUCN EN	VU	CITES	Government of Indonesia
Mammals	76	2	4	11	25	18
Amphibians & Reptiles	107	2	3	5	20	5
Birds	307	1	5	15	45	76
Plants	190	3	2	4	24	-
Fish	89	-	-	-	-	-
Odonata	28	-	-	-	-	-
<b>Total</b>	<b>797</b>		<b>57</b>		<b>114</b>	<b>99</b>

→ Plant and animal species recorded in RER concession areas

1. Sanderson et al. (2010). *Setting priorities for conservation and recovery of wild tigers: 2005-2015*. Tigers of the world: the science, politics and conservation of *Panthera tigris*. 155.

2. Conservation International – Indonesia, Departemen Kehutanan Republik Indonesia, LIPI, Universitas Andalas, Universitas Syiah Kuala, and Wildlife Conservation Society. 2007. *Priority Sites for Conservation in Sumatra: Key Biodiversity Areas*. Jakarta, Indonesia. 16pp.

3. Birdlife International (2020) Important Bird Areas factsheet: Hutan Rawa Gambut Siak-Kampar. Downloaded from <http://www.birdlife.org> on 20/04/2020



→ *Xylopia malayana*, one of tree species found in RER areas

conservation efforts but also contribute to global forest and wildlife conservation initiatives.

Migratory raptor monitoring is a bi-annual event held in the spring and autumn on the Kampar Peninsula and Padang Island. The event monitors birds of prey that fly from the temperate forests of China and Russia towards the Malayan Peninsula and Indonesia to escape the cold of winter and to breed before returning.

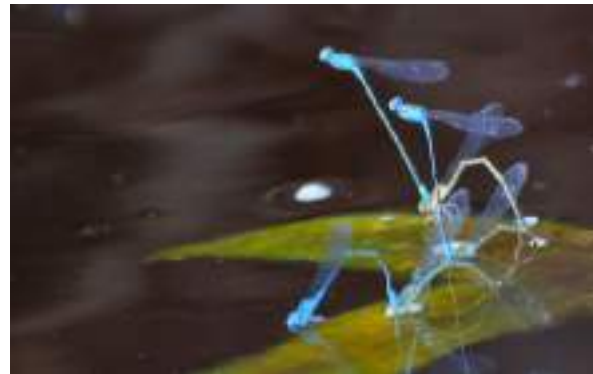
The most predominant species observed include Chinese Goshawks (*Accipiter soloensis*) and Oriental Honey Buzzards (*Pernis ptilorhynchus*). In 2019, monitoring resulted in 2,243 raptor sightings during a '13-day period' with the Oriental Honey Buzzard recorded as the most predominant species.

The Asian Waterbird Census (AWC) is coordinated by Wetlands International-Indonesia Programme in collaboration with the Directorate General of Forest Protection and Nature Conservation of the Ministry of Environment and Forestry. Conducted in January each year throughout the Asia Pacific region, the AWC serves as an indicator of the condition of regional wetlands.

During a one-day period in 2019, RER observed 580 birds representing 21 different species. The data collected from the AWC monitoring is reported to Wetlands International-Indonesia each year.

### Odonata Survey

Insects are key to a functioning ecosystem through their role as pollinators, in nutrient cycling, decomposition and pest control. This sometimes-



→ Blue riverdamself, *Pseudagrion microcephalum*, a common species of damselfly recorded on the rivers of RER

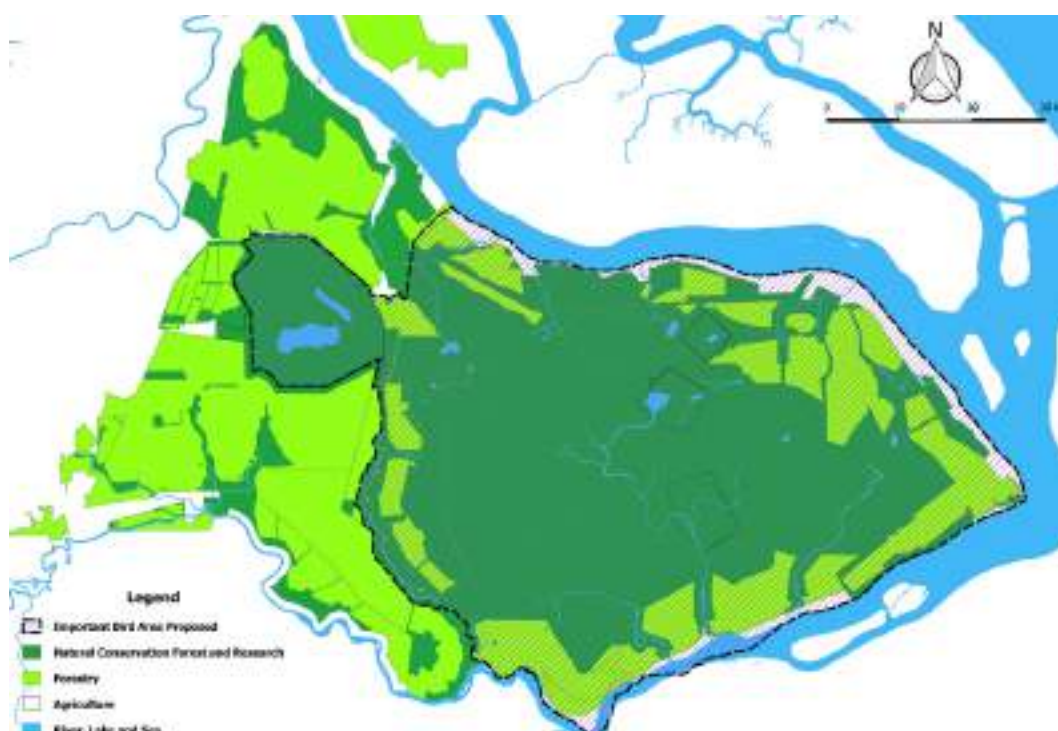
overlooked group of animals can also be an important indicator of ecosystem health.

In 2019, the first insect survey in RER was undertaken, focusing on the Order Odonata which includes dragonflies and damselflies. The survey is done in consultation with Dr Rory Dow, a distinguished British entomologist. Odonata are known to be important indicators of ecosystem health, particularly in water inundated environments such as peat swamp forests.<sup>4</sup>

Preliminary studies identified 28 species of dragonflies and damselflies along the Serkap and Sangar rivers, some of which were recorded on the island of Sumatra for the first time. Additional surveys will be carried out in 2020 to develop a Dragonfly Biotic Index (DBI) which can be used to assess the environmental health of aquatic ecosystems and to monitor changes over time.



→ Storm's stork *Ciconia stormi* (EN) one of the globally threatened bird species recorded in HRGSK Important Bird Area



→ Hutan Rawa Gambut Siak-Kampar Important Bird Area

### Hutan Rawa Gambut Siak-Kampar Important Bird Area

RER concessions on the Kampar Peninsula are part of a wider Hutan Rawa Gambut Siak-Kampar Important Bird Area (IBA) that was designated by Birdlife International in 2003. Surveys from 1992-93 that documented 128 bird species on the Kampar Peninsula were used as the basis for the IBA designation.

Since then, 307 species of birds have been identified on the Kampar Peninsula. This inventory includes eight out of nine Sumatran hornbill species including the Helmeted Hornbill (*Rhinoplax vigil*) (CR), as well as the Storm's Stork (*Ciconia stormi*), White-winged Duck (*Asarcornis scutulata*), and Malay Crestless Fireback (*Lophura erythrophthalma*).

The 307 species in the area represent 40% of Sumatra's 758 bird species. A total of 241 (79%) are resident, 57 (18%) are migrants and nine (3%) are both resident and migrant. The number of migrant birds recorded suggests the peat swamp forests of central and eastern Sumatra are an important staging and wintering habitat for migratory species.

### Pilot Study: Impacts of the Production-Protection Model on Native Mammal Species on the Kampar Peninsula

The production-protection model is a critical component of RER's integrated landscape management approach. While this approach has effectively reduced anthropogenic disturbance to RER's peat swamp forest areas, it is unknown how local wildlife respond at the interface or edge of RER's forests and the surrounding acacia production plantations.

These landscape types differ in forest structure, biomass, species diversity and hydrology. The 'Edge Effect' is defined by Murcia *et al* (1995) as: "the result of the interaction between two adjacent ecosystems, when the two are separated by an abrupt transition [edges]."<sup>5</sup> An important component of the RER programme is the documentation and management of local biodiversity not only within the core peat swamp forests that comprise RER, but also at the transitional zones where natural forest is adjacent to monoculture plantation.

4. de Moor FC. Dragonflies as indicators of aquatic ecosystem health. S Afr J Sci. 2017;113(3/4), Art. #a0199, 2 pages. [http:// dx.doi.](http://dx.doi.org/10.2989/00036817.2017.1333344)

5. Murcia, C. (1995). Edge effects in fragmented forests: implications for conservation. *Trends in ecology & evolution*, 10(2), 58-62.



→ Binturong *Arctictis binturong* was one of the mammals recorded during this pilot study

In 2019, a pilot study was carried out to investigate how mammal species respond to the interface between acacia plantation and peat swamp forest. The pilot investigated the presence of mammal species across the plantation-natural forest edge and observed whether there were changes in these faunal communities across this environmental gradient.

Remote camera traps were placed along two adjacent linear transects that ran from the natural peat swamp forest into the adjacent plantation. A total of 20 mammal species were detected. Four of these species were recorded only in plantations, four were recorded in both plantation and peat swamp forest and 12 species were recorded only in peat swamp forest.

The data collected and conclusions drawn from this study will be used to develop a long-term production-protection biodiversity monitoring project. It will also provide the first insight into how species use the interface between plantation and peat swamp forests on the Kampar Peninsula.

During the study, the team introduced baited camera traps to attract local wildlife and recorded the first sighting of the Malay Weasel *Mustela nudipes* on the Kampar Peninsula, adding to the RER species inventory.

### Sumatra Wide Tiger Survey

In 2019, RER began work with Yayasan SINTAS (Save the Indonesian Nature and Threatened Species) to survey 517,500 ha of the Kampar Peninsula. The Peninsula is one of 12 landscapes in Sumatra surveyed as part of the second Sumatra Wide Tiger Survey (SWTS) to update on the status of Indonesia's 2010 National Tiger Recovery Programme (NTRP).

Although nine landscapes were surveyed in 2007-09 during the first SWTS, this is the first survey of the Kampar Peninsula following national survey protocols described by the NTRP. The NTRP aims to double the number of critically endangered tigers (*Panthera tigris sumatrae*) in Sumatra by 2022 with the goal of identifying conservation gaps, formulating conservation strategies and priority actions, and directing funds to maintain and recover the Sumatran Tiger population.

SINTAS's approach to surveying the Kampar Peninsula includes the survey of 21 separate 17x17 kilometre grid cells over an eight-month period, scheduled to conclude in 2020. Surveys collect data on tiger presence, prey and threat presence, and are undertaken by three teams of people that will cover more than 340 kilometres of transects overall. A patch occupancy cluster sampling framework is used to account for imperfect detection and relaxes the assumption of independence among replicates.

During the first phase, seven out of the ten grids surveyed documented the presence of the Sumatran Tiger. Presence is determined through the observation of various signs including pugmarks, scrape marks, scratches and faeces. Five cells contained threats to wildlife such as traps or other human disturbances like logging, fishing or fire. Traps were removed by field teams. Signs of tiger prey such as Sambar deer, wild pigs, and Barking deer were found extensively throughout the surveyed areas.

On completion of the survey, a predictive map of Sumatran Tiger distribution will be produced, indicating the species occupancy across the Peninsula, along with practical recommendations on how best to manage and conserve the Sumatran Tiger across the Kampar Peninsula.



→ Sumatran tiger *Panthera tigris sumatrae*

### Case Study: Flat Headed Cat

The peat swamp forests of RER support a wide array of plants and animals, including five of Sumatra's six cat species: Sunda clouded leopard, Leopard cat, Marbled cat, Sumatran tiger and Flat-headed cat. Of these felids, the Flat-headed cat is one of the least understood, with very little known about their behaviour or habitat requirements.

Flat-headed cats (FHC) are wetland specialists, with a strong reliance on riverine forests and water sources for their aquatic prey. This close association with wetlands is reflected in unique anatomical adaptations such as slight webbing between toes, a flattened skull, small ears and large (for its size) canines, all to assist in the capture of aquatic prey such as fish and amphibians.<sup>6</sup>

This species is listed as Endangered by the IUCN Red List and is described as one of the least-known, highly-threatened cat species in the world.<sup>7</sup> The key threats acknowledged for FHC are habitat loss and fragmentation through degradation and land conversion. Additional threats include contamination of prey from agricultural run-off and depletion of fish stocks from over-fishing.

There is a significant lack of information about the Flat-headed cat's distribution, ecology and

conservation needs; this lack of information is also considered to be a threat to the species.<sup>8</sup>

RER's remote monitoring programme began in 2015, with intensive baseline biodiversity surveys undertaken by FFI. These surveys were the first to reveal that the Flat-headed cat was present on the Kampar Peninsula, with five separate detections of the species that year. In 2017, the species was again recorded, with another single detection also recorded in 2018.

In the last 2.5 months of 2019, four separate Flat-headed cats were recorded across three of the four RER concessions on the Kampar Peninsula more than 1 kilometre apart. These detections provide further confirmation that the species is present and distributed relatively broadly across the RER area.

All eleven records of this species have been in close distance to water, either near river systems or old drainage canals containing water, at an average of 351 metres away. Targeted monitoring of this rare and elusive species will continue in 2020, with an objective to learn about its distribution and habitat requirements and to develop conservation management planning for the Flat-headed cat on the Kampar Peninsula.



→ Flat-headed cat *Prionailurus planiceps* recorded inside RER concession areas

6. Wadey, J., Rami, M., Moore, J., Fletcher, C. and Compos-Arceiz, A. (2016) Flat-headed cats, *Prionailurus planiceps* – a literature review of their detection-rate camera-trap studies and failure to re-detect them in Pasoh Forest Reserve, Malaysia, *Journal of Indonesian Natural History*, 4:22-34
7. Wilting, A., Cord, A., Hear, A. J., Hesse, D., Mohamed, A., Traeholdt, C., Cheyne, S. M., Sunarto, S., Jayasilan, M-A., Ross, J., Shapiro, A. C., Sebastian, A., Dech, S., Breitenmoser, C., Sanderson, J., Duckworth, J. W. and Hofer, H. (2010) Modelling the Species Distribution of Flat-headed Cats (*Prionailurus planiceps*), an Endangered South-East Asian Small Felid. *PLoSOne*, 5:1-18.
8. See 4 and Wilting, A., Brodie, J., Cheyne, S., Hearn, A., Lynam, A., Mathai, J., McCarthy, J., Meijaard, E., Mohamed, A., Ross, J., Sunarto, S. & Traeholdt, C. (2015) *Prionailurus planiceps*. The IUCN Red List of Threatened Species 2015



"I have been a keen observer of efforts to conserve Indonesia's forests for several decades. The restoration and conservation efforts of the APRIL group on the Kampar Peninsula stand out as truly impressive. The forests of the RER concessions are of extreme biodiversity importance and are now amongst the best protected forest areas in Indonesia. Navigating the small rivers that flow through the peat swamps is one of Indonesia's outstanding nature experiences. The RER is delivering benefits to local communities whilst also contributing to global biodiversity and climate change mitigation targets. I hope that the success of the Kampar initiative might inspire other companies to sponsor similar conservation activities elsewhere in Indonesia."

**Jeffrey Arthur Sayer**  
Professor of Tropical Forest Conservation  
University of British Columbia



→ Serkap River, one of four main rivers in the RER concession areas

# Biodiversity of RER

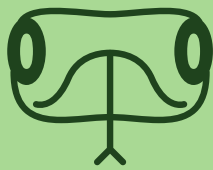
Mammals

76



Amphibians &  
Reptiles

107



Birds

307



Plants

190



Fish

89



Odonata

28



Total

797



With continuous weather monitoring and fire management, RER concessions experienced zero hotspots and zero fires for the sixth consecutive year despite 2019 being the driest year since 2002

## CLIMATE

The landscapes of the Kampar Peninsula and Padang Island are warm, moist tropical peat swamp forests with an average annual rainfall of 2,183 mm on the Kampar Peninsula and 2,046 mm on Padang Island

03



# Weather Monitoring and Fire Management

The landscapes of the Kampar Peninsula and Padang Island are warm, moist tropical peat swamp forests with an average annual rainfall of 2,183 mm on the Kampar Peninsula and 2,046 mm on Padang Island. Rainfall fluctuates seasonally, and dry conditions commonly occur twice per year, in late January to mid-March and again from June to September.

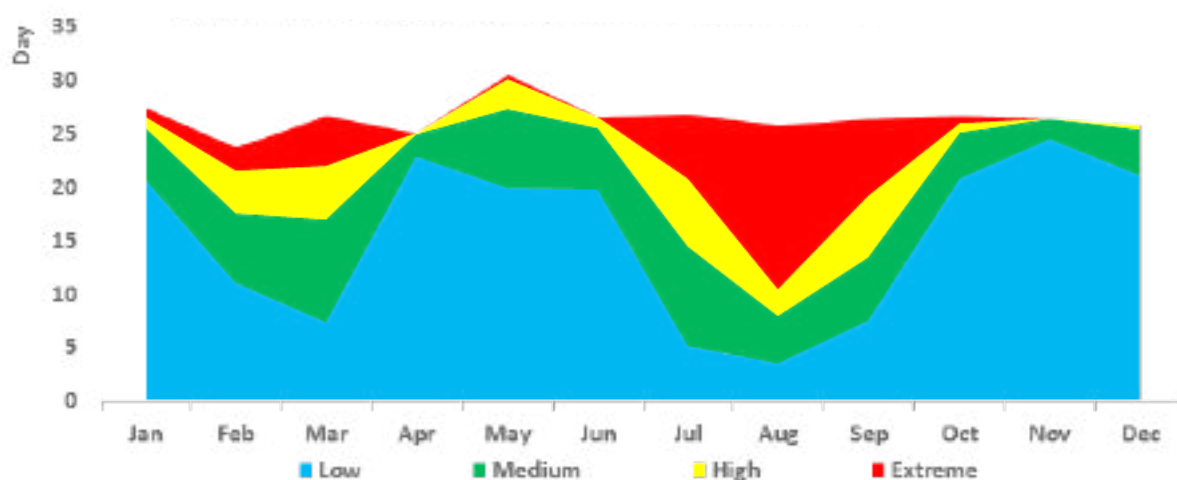
In 2019, annual rainfall was 35% below normal on the Kampar Peninsula and 15% below normal on Padang Island, making 2019 the driest year since 2002. An Indian Ocean Dipole (IOD) event was the driver of drought in 2019. During its peak, there was a 43-day period when no measurable rainfall occurred inside RER, resulting in the lowest recorded river level on Serkap (-1.4 m) and the second lowest record on Sangar (-0.9) river in September, before rainfall recovery occurred in October.



→ Fire Danger Rating

As rainfall is the only source of water for peatlands and evapotranspiration from the peat soil can lower peat moisture content, the 2019 drought contributed to peat water table depths descending to more than 70-cm below the peat surface, threatening forest health and increasing the hazard of fire.

Monthly Fire Danger Rating Summary Kampar Peninsula 2019



Despite a Moderate-to-Extreme Fire Danger Rating for almost 50% of the year due to the low rainfall, RER experienced zero hotspots and zero fires inside the Kampar Peninsula concessions for the sixth consecutive year. This achievement is the result of active fire patrols, formal agreements with communities to not use fire, and no active community land-clearing occurring within RER concessions.

RER firefighting teams remained active during the severe drought and fire season, assisting neighbouring plantation managers and fishermen to suppress 17 forest and land fires that occurred from 3 to 60 kilometres outside RER concessions.

### Forest Restoration

RER concessions are densely covered by sometimes impenetrable peat swamp forests that are often flooded making access and movement through these areas very difficult and time consuming. In such conditions, the identification and prioritisation of restoration sites is essential to ensure operational efficiency. RER teams use satellite imagery, aerial reconnaissance and drone photography to identify patches of degraded forest for preliminary assessments.



→ Pictured is Dr. Chela Powell, RER Restoration Manager, who oversees RER restoration activities

After the sites have been verified and supported with on-the-ground inventories and assessments, restoration teams produce site-specific restoration plans. These plans identify the correct species for planting, the restoration planting approach and the ongoing monitoring and maintenance requirements of each site. In 2019, RER planted 24.1 ha of forest area, as well as monitoring and maintenance on 124 ha which had previously been planted and/or where assisted natural regeneration (ANR) had occurred.

Tropical peat swamp forest can recover quickly from past disturbance without the presence of new disturbances, such as logging or fire. These forests may be able to recover without human intervention, particularly when the disturbed area is less than two hectares, allowing for natural regeneration. The RER teams apply a range of site specific restoration approaches, depending on the characteristics of the restoration site, such as the past disturbance intensity, the size and shape of the area, as well as the position of the site in the landscape and surrounding forest type.

A range of restoration approaches are applied in degraded forest areas in RER including: direct planting, enrichment planting and assisted natural regeneration. In many cases the forests of RER have the capacity to regenerate naturally and therefore no intervention is required.

Year	Planting/ANR (Ha)
2014	0.3
2015	8.6
2016	8.9
2017	12.5
2018	58.2
2019	24.1
<b>TOTAL</b>	<b>112.6</b>

→ 2014-2019 Forest restoration activities

Estate	Number of Nurseries	Number of Species	Number of Seedlings	Seedlings Planted in RER	Seedlings Ready to be Planted
Kampar Peninsula Restoration	5	60	10,020	8,102	5,982
Padang Island Restoration	2		23,268	556	21,505
<b>TOTAL</b>	<b>7</b>	<b>60</b>	<b>33,288</b>	<b>8,658</b>	<b>27,487</b>

→ Tree nursery stock across RER areas

### Tree Nurseries

Restoring tree cover on a landscape as large and remote as the RER poses significant logistical challenges. As a result, mini-nurseries are developed close to remote restoration sites. RER maintains a stock of natural seedlings in its nurseries that consist of 60 different native tree species collected from the local peat swamp forest.

In 2019, RER developed 33,288 seedlings in seven nurseries on the Kampar Peninsula and Padang Island. From this stock, the team planted around 8,658 seedlings to restore 24 ha of previously degraded forest. An additional 27,487 seedlings from RER nurseries are ready to be planted in restoration areas throughout 2020.



→ Nurturing seedlings

### Hydrological Restoration

Tropical peat swamp forest soils are composed of 90% water and 10% organic solids. The water table depth of peatland varies seasonally with rainfall and evapotranspiration. Water may be several centimetres above the surface in the wet season and drop to 100 cm below the surface in extended periods of drought. A good indicator of a healthy peatland is if it is actively accumulating peat at a rate of 2-5 mm per year.<sup>9</sup>

Before the establishment of RER in 2013, much of the Kampar Peninsula and Padang Island had been degraded by decades of commercial and illegal logging. These activities removed large trees and created networks of canals and rails to transport logs out of the forest. Typically, the canals were 1-9 meters wide and 50-150 centimetres deep. These canals drained water, causing peat subsidence, making the forest vulnerable to fire by drying the peat surface. As dry peat enhances peat oxidation and decomposition, releasing carbon dioxide in the atmosphere, these activities contributed negatively to climate change.

RER teams have identified a total of 46 old drainage canals systems with 186 kilometres of length across the RER concessions. The Kampar Peninsula hosts 34 of these canal systems, 146 kilometres in length, while the other 10 canals totalling 26 kilometres are located on Padang Island.

9. Verwer, C. C., & van der Meer, P. J. (2010). *Carbon pools in tropical peat forest : towards a reference value for forest biomass carbon in relatively undisturbed peat swamp forests in Southeast Asia*. (Alterra-report; No. 2108). Wageningen: Alterra.

Since 2015, RER has been working on closing the old drainage canals in order to maintain peat moisture within normal seasonal fluctuations. The overall objective of this work is to re-wet the peat, retaining water in the soil during dry seasons in order to minimise oxidation and subsidence, thus minimizing fire threats and potential carbon emissions.

The goal is to construct dams in all of the canals by 2025. Before blocking these canals, RER teams conduct surveys to determine the length, width, slope and optimal location for dam placement. In 2019, RER closed three canal systems (18.1 kilometres in length)

with 14 dams. Over the course of five years, RER has achieved 56% of its goal by constructing 67 dams that have successfully closed 24 canal systems, totalling 81.2 kilometres in length.

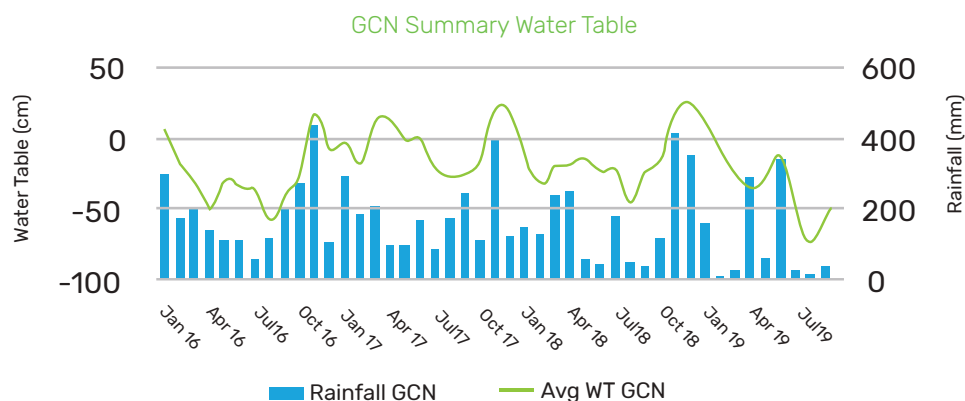
To assess the impact of canal closures on peat water table levels, water monitoring is undertaken through manually measured dip-wells. The well locations are established on multi-kilometre transects across the terrain, from river edges to deep in the forest. Water table levels are measured every one-to-three months. The data collected allows RER teams to monitor the trends of seasonal water levels relative to monthly rainfall.



→ Blocking canals using sand bags

Year	Canal	Length (km)	Dam
2015	1	0.6	2
2016	5	15.3	17
2017	2	3.9	4
2018	13	43.3	30
2019	3	18.1	14
<b>TOTAL</b>	<b>24</b>	<b>81.2</b>	<b>67</b>
	<b>52%</b>	<b>56 %</b>	

→ Annual canal closures in RER



→ Average monthly water table changes in PT GCN concession on Kampar Peninsula



## The primary aim of the survey was to determine if the temporal conditions of the RER peat swamp forests have improved under RER's management

### Case Study: Assessing Trends in Forest Health

Since 2013, the restoration approach in the RER area has focused on active forest protection from anthropogenic disturbance such as illegal logging, forest encroachment, and fire, as well as tree planting, assisted natural regeneration and canal blocking. These efforts are aimed towards restoring the vegetative and hydrological condition of the forest to a near-natural state.

Until 2019, there was no over-arching study to determine if the management activities have been effective in creating a healthier forest condition across the broader RER area. To understand the impact of these restoration activities on the overall condition of the peat swamp forests of RER, an analysis was undertaken in 2019 using Normalised Differential Vegetation Index (NDVI) as a proxy for vegetation health during a seven-year period (2012–2018).

NDVI was first used to determine the health conditions of natural ecosystems in 1974 by Rouse *et al.*<sup>10</sup> and since then the method has been used widely to demonstrate changes in temporal conditions in a range of environments, including natural forests.

Healthy leaves are known to absorb high levels of visible blue and red light and reflect high levels of near-infrared (NIR) and green light. NDVI is the ratio of the amount of visible red light (RED) absorbed and the amount of NIR reflected by leaves ( $NDVI = (NIR - RED) / (NIR + RED)$ ). In simple terms, the value itself

reflects the photosynthetic capacity of the forest, strongly correlating to overall health and 'greenness' of the forest.

The primary aim of the survey was to determine if the temporal conditions of the RER peat swamp forests have improved during RER's management, between the years 2012 to 2018. "Improved" in this study was defined by the forest's greenness or photosynthetic capacity and therefore assumed forest health. An assessment of the forest 'greenness' over time was made using the median NDVI collected in each year as a time-series data set.

There was an overall positive trend in increasing greenness of the peat swamp forests of RER from 2012 to 2018. However, it is important to note that although there was a positive relationship between time and forest greenness, this positive trend was not statistically significant.

Of note was a significant decline in NDVI value of the forest in 2015 which is assumed to be associated with the extreme drought conditions experienced during the strong El Niño event that year which caused extreme drought.

These preliminary results suggest the forests are becoming progressively healthier during RER's management. However, to fully understand the impact of RER's restoration activities on the overall forest health, annual monitoring will continue.

10. Rouse, J.W., R.H. Haas, J.A. Schell, and D.W. Deering, 1974. Monitoring vegetation systems in the Great Plains with ERTS, In: S.C. Freden, E.P. Mercanti, and M. Becker (eds) Third Earth Resources Technology Satellite-1 Symposium. Volume I: Technical Presentations, NASA SP-351, NASA, Washington, D.C., pp. 309–317.

2012



2013



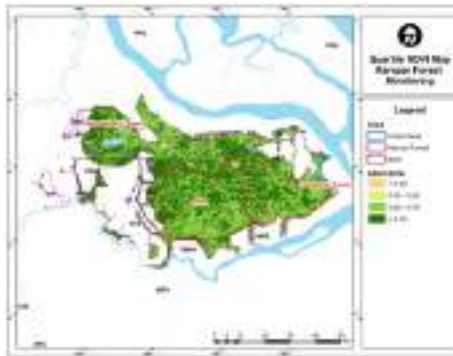
2014



2015



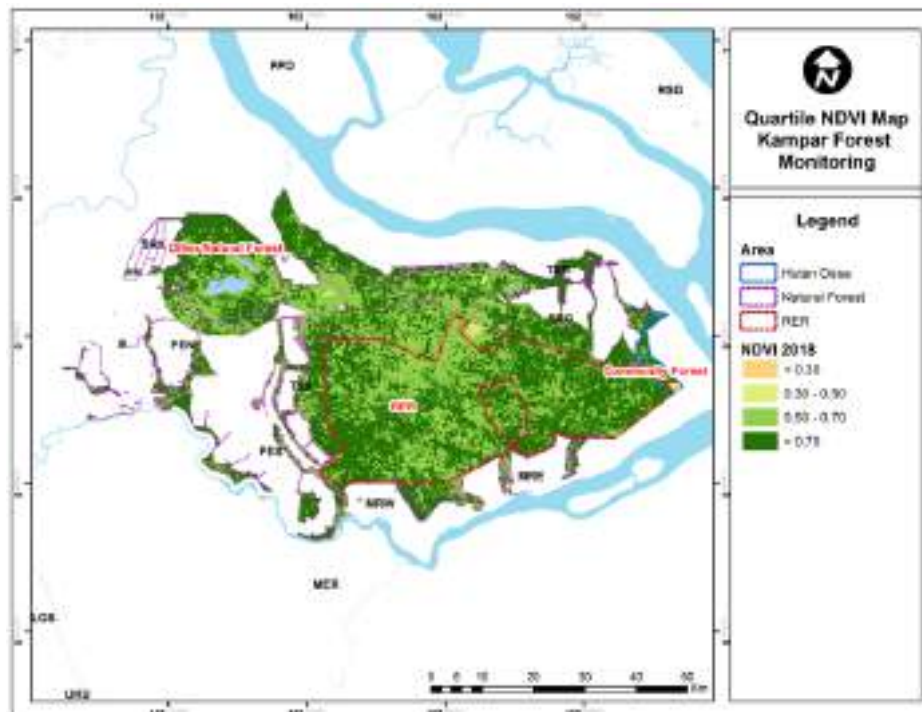
2016



2017



2018



→ Annual NDVI trend of RER concessions on the Kampar Peninsula, Riau (2012-2018)<sup>6</sup>

6. Haldar, A.K., and Zia, J.P. 2019. Assessment of RER forest using satellite-based NDVI time-series data. In-house report. FiberOne. Remote Sensing Department. 16pp.



“The programme is one of the world’s pioneering restoration initiatives conceived and fully implemented by a large pulp-and paper company. For this reason, it stands apart from many of the newer restoration initiatives over the past five years. It has also been the place of learning and testing of restoration methodologies and approaches in tropical peat swamp forest, one of the most important, and challenging environments to work in.

As the RER programme completes its sixth year of operations, the role of its Advisory Board is also evolving. During the early years, it necessarily served a more directly-involved guiding role. Today, its role is steadily more strategic than operational. This is natural progression, and demonstrates continuing increasing efficiency. Most of all, it clearly reflects the increasing capacity being developed on the ground, with new qualified staff, and a larger restoration team.”

**Anthony Sebastian**  
RER Advisory Board Member



→ Greenhouse gas (GHG) tower positioned in RER to measure GHG emissions flux from the surrounding environment



The production-protection approach to landscape management emphasises the importance of working closely with communities

## COMMUNITY

The forest is a source of clean water, flood protection, fish stock as a source of protein and income, medicinal plants, as well as honey from local bees



04

# Community

There are nine villages associated with RER on the Kampar Peninsula, with a total population of around 17,000 people. Most people live on the south side of the Kampar River, far from RER. The native people are mostly ethnic Malay. The migrant population consists of Bugis, Java, Sundanese, Batak and other ethnic groups that migrated to the region because of livelihood opportunities.<sup>11</sup>

The local communities of the Kampar Peninsula practice a mixed economy, where they combine several livelihood activities to fulfil their basic needs. They follow market trends and commodity prices when choosing livelihood activities that are mostly based on the availability of natural resources and can be grouped into four main categories: agriculture (rice, maize), plantation (sago, coconut, oil palm, and rubber), fisheries, and native timber logging.

Although none of the villages associated with the Kampar Peninsula share a boundary with RER, they interact with the forest through gathering non-timber forest products (NTFPs) and/or through their dependence on the forest ecosystem. The forest is a source of clean water, flood protection, fish stock as a source of protein and income, medicinal plants, as well as honey from local bees. The four rivers of RER are particularly important to local fishermen who seasonally reside along the banks of the rivers, trapping fish for sale in the local markets.

On Padang Island, approximately 24,000 people live in 21 villages, clustered mainly on the east coast of the island. The people of Padang Island are mainly of Javanese or Malay descent. Since the 1960s, plantations of rubber, sago and coconut were established and form the basis of the local economy. There is a reliance on fish from the rivers and coastal areas of the island to generate income and for food.

## Farming and Fisheries

The communities close to RER predominantly work as farmers and fishermen. Before the establishment of the RER programme, they



→ Community-lead Lele fish farming in Padang Island

11. Pusat Kajian Antropologi Universitas Indonesia (2015), *Kajian Sosial Budaya dan Kelembagaan di Sekitar Wilayah Restorasi Ekosistem Semenanjung Kampar PT. RAPP Kabupaten Pelalawan Provinsi Riau*. Jakarta: Universitas Indonesia

often employed unsustainable techniques to clear areas for planting or to fish in the rivers.

RER teams have worked closely with the communities to develop farming and fishing methods that are more sustainable, which have helped to improve yields and generate additional income for families. In 2019, RER supported six community groups, five groups focused on the use of no-burning agricultural practices and another on freshwater fishing.

The agricultural groups received support in clearing and maintaining designated five-hectare farming areas. Specific assistance included the provision of seeds, water pumps and protective nets to protect crops from pests and wild animals. Farmers were encouraged to develop crops that can be sustainably and responsibly planted, such as corn, tomato, spinach, kale, cucumber, and chili. The freshwater fishery group received support in the form of 39,000 catfish seeds and feed.

In total, these efforts helped the community groups to generate an additional income of IDR47.52 million.

### Community Wellbeing

During 2019, RER teams conducted a number of community development activities in Kampar Peninsula and Padang Island villages, including employee volunteering, eco-education, and support for clean water facilities.



RER teams have worked closely with the communities to develop farming and fishing methods that are more sustainable, which have helped to improve yields and generate additional income for families

A key activity was the roll-out of a programme designed to promote clean and healthy practices across 10 villages. RER teams provided support for better sanitation and clean water access, while encouraging elementary students to practice healthy lifestyles.

RER team members volunteered their time to help renovate public infrastructure and facilities, such as mosques, roads, schools and community halls. The ongoing engagement with local communities ensured their interests are reflected in the operations of the RER and are aligned with the conservation and restoration of the landscape in RER concessions.



→ RER teams reach out to elementary students to promote healthy lifestyles



"The RER programme is a living example of the private sector supporting forest management through ecosystem restoration. Observing the progress RER has made during the six years of its operations, the programme highlights the importance of sustained resources, both financial and technical, to support ecosystem restoration.

Managing interrelated climate, community and biodiversity dimensions in its operations, the RER programme faces continuous but enriching challenges in protecting and restoring the valuable peat swamp landscape in Sumatra. The diversity of the RER Advisory Board enables the programme to have a balanced approach to ensure it brings long lasting benefits to the landscape, the environment and its people."

**Nashihin Hasan**  
RER Advisory Board Member



→ RER teams work with communities which use the Serkap River



Field visits play a crucial role in helping stakeholders understand the scale of the task of restoring and protecting the landscape



## OUTREACH & ENGAGEMENT

Visits allow stakeholders to better understand the challenges of managing forest restoration at scale

05

# Outreach & Engagement

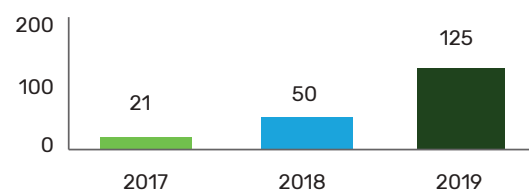
## Field visits

The remote geographic location and size of the RER areas on the Kampar Peninsula and Padang Island make it challenging to explain the scope and ambition of the programme. Field visits play a crucial role in helping stakeholders understand the scale of the task of restoring and protecting the landscape.

In 2019, more than 120 visitors were hosted. Spread across several groups, these included customers, business associations, media, conservation experts, graduate students and even a mountaineering club from Riau. Improved facilities and enhanced operating procedures meant that RER teams were able to host considerably more visitors in 2019 compared to previous years.

Visitors were able to visit the GHG flux tower situated in RER, one of four that are located on peat landscapes in Riau. They were also able to see a natural tree mini-nursery and a demonstration of canal blocking in action. Their visits included a 3-kilometre boat trip on the Serkap River to see wildlife and local fishermen and a one-kilometre trek in the peat forest to experience walking on elevated roots and moist organic soils.

Number of RER Visitors 2017-2019



During the course of the visits, stakeholders were briefed on essential activities to support ecosystem restoration, such as water table management, the development of native tree nurseries, and forest protection strategies.

In almost all cases, stakeholders observed that the visits allowed them to better understand the challenges of managing forest restoration at scale, gaining insight into the complexities of the different activities and in supporting the livelihoods of the surrounding communities. The visits also helped stakeholders to understand the actual implementation of the production-protection model used to support the wider landscape.



→ MAPALA Riau visit to RER to commemorate Independence Day of the Republic of Indonesia

### External engagement

RER teams participated in several events and conferences in 2019 to share updates on key aspects of the programme. Through these engagements, RER leaders contributed to the growing body of knowledge on peatland restoration and shared perspectives on how public and private sectors can collaborate to support conservation and restoration work.

Events attended by the team during 2019 included:

- Global Landscape Forum held - Kyoto, Japan (May)
- Asia Pacific Forestry Week - Incheon, South Korea (June)
- 29th International Congress for Conservation Biology - Kuala Lumpur, Malaysia (July)
- 11<sup>th</sup> Asian Raptor Research and Conservation Network International Symposia - Bali, Indonesia (October)
- Responsible Business Forum - Singapore (November)
- Innovation Forum - London, UK (November)
- Tanah Air Beta Annual Landscapes Retreat - Seram, Indonesia (December)



→ Nyoman Iswarayoga, RER Head of Corporate Communication (*first from the right*) participated in the Responsible Business Forum, Singapore

### Case Study: Innovation Forum

RER worked with Innovation Forum in 2019 on a series of activities, including participation at the company's annual sustainability conference in the UK. Innovation Forum is an independent London-based company with extensive experience in sustainability events and publishing.

In September, RER hosted Innovation Forum founder, Tobias Webb, on a visit to the Kampar Peninsula. He was briefed on how the production-protection approach sustains and supports the RER landscape, receiving a first-hand experience of the valuable yet complex work of managing peat forest ecosystem restoration.

Shortly after the site visit, Innovation Forum hosted a webinar on the topic 'How Does Landscape Conservation/Restoration Work on the Ground? An Indonesian Case Study' to share learnings about the RER programme and how it may potentially apply to other ecosystem restoration projects. The webinar featured speakers from the Tropical Forest Alliance and IDH Sustainable Trade Initiative.

Innovation Forum published a podcast in October featuring an interview with the RER Head of Operations, arising from the visit. The following month, RER leaders presented at Innovation Forum's annual Sustainable Landscapes and Commodities Forum in London, UK.

Through the Forum and the webinar, RER leaders explained that the critical element that defines the RER programme is the maintenance of an integrated landscape model based on the production-protection approach. The RER leaders explained how

this approach works to protect peat landscapes, providing forest products for society as well as protecting biodiversity and ecosystem services for future generations.



→ Lucita Jasmin, RER Advisory Board Member (*left*) and Brad Sanders, RER Head of Operations (*right*) participated in the Innovation Forum, in London, UK

### Internship programme

In 2019, as part of its ongoing engagement with academic institutions, RER hosted four international internship students from the University of British Columbia, Canada and Texas A&M University. The interns' projects focused on a range of important topics from wildlife monitoring to social studies engaging with local communities.

Institution	Intern period	Project
Texas A&M University, Master of Ecosystem Science & Management	2 months	Fishermen's perspectives on use and access of the Sangar River
University of British Columbia, Canada, Master of Forestry	2 months	Possible economic alternatives to bird poaching in the Kampar Peninsula
University of British Columbia, Canada, Master of Forestry	2 months	Understanding different wildlife monitoring methods in the forests of the Kampar Peninsula
University of British Columbia, Canada, Bachelor of Conservation of Natural Resources	3 months	Remote Camera trapping pilot study to assess the production-protection model on the Kampar Peninsula

→ RER 2019 Internship programme

# Financial Summary

in USD

No	Description	2013	2014	2015	2016	2017	2018	2019
1	Employees	89,505	245,585	389,090	694,523	783,541	959,551	1,646,981
2	Total Operational & Overhead Costs	236,971	383,757	410,410	746,551	809,079	958,087	869,218
3	Legal & License Costs	1,077,760	3,348,966	161,256	596,887	2,469,479	161,043	333,716
4	Partnerships*	119,425	218,810	2,863,720	931,174	1,240,273	180,823	378,758
5	Advisory Board	-	-	8,980	140,881	10,989	10,989	18,594
6	Capex	-	3,121	6,664	555,737	487,834	376,979	1,259,952
	<b>TOTAL</b>	<b>1,523,661</b>	<b>4,200,239</b>	<b>3,840,120</b>	<b>3,665,753</b>	<b>5,821,832</b>	<b>2,647,472</b>	<b>4,507,219</b>

\*Dependent on the phasing of the implementation of agreed activities



