RESTORASI
EKOSISTEM RIAU

Progress Report 2020

APRIL BIDARA FAUNA & FLORA INTERNATIONAL

Photo Cover Two Purple Herons (*Ardea purpurea*) flying above the Serkap River
Photo credit: Caine Delacy

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RER is part of broader Kampar Peninsula and Padang Island landscapes that also include APRIL-managed plantations, communities and government-managed conservation forests

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"WHILE THE PANDEMIC AND ITS ASSOCIATED RESTRICTIONS POSED A CHALLENGE TO WILDLIFE MONITORING, RESEARCH CONTRIBUTIONS CONTINUED TO BE A MAINSTAY AS DEDICATED RER FIELD TEAMS CONTINUED TO GATHER VALUABLE INFORMATION ABOUT WILDLIFE THROUGHOUT THE YEAR."

BEY SOO KHIANG

Chairman, Advisory Board
Restorasi Ekosistem Riau

No one needs reminding that 2020 was one of the more difficult years that people and communities have encountered in recent times. It was no different for Restorasi Ekosistem Riau (RER), where the impact of the Covid-19 pandemic tested our resolve and resilience. While some programs or initiatives were interrupted or postponed during the year, I am proud to report that despite the challenges posed by travel restrictions and social distancing, our people maintained their focus and well-being and achieved remarkable progress in difficult circumstances.

One of the high-profile examples of the practical work at RER was the release of Corina, a female Sumatran Tigress that was found injured and snared in a community plantation on the Kampar Peninsula in March 2020. She was rescued, rehabilitated and then released back into the wild on the Kampar Peninsula in December 2020.

This success story was a multi-stakeholder effort directly led by the Ministry of Environment and Forestry of Indonesia together with Riau Nature Conservation Agency (BBKSDA Riau), Dharmasraya Sumatran Tiger Rehabilitation Centre (PR-HSD), Yayasan Arsari Djojohadikusumo, APRIL, and University of Gadjah Mada. Prior to the release, we also had help from Forum Harimau Kita, SINTAS Indonesia, Fauna and Flora International (FFI) and the Zoological Society of London, who collectively developed an action plan to prepare for Corina's return. We were delighted that RER was determined to be an ideal location for her release, reinforcing its status as a safe haven for nature and biodiversity, including endangered species.

While the pandemic and its associated restrictions posed a challenge to wildlife monitoring, research contributions continued to be a mainstay as dedicated RER field teams continued to gather valuable information about wildlife throughout the year. Work completed revealed a new total of 823 species of plant and animal species inside RER, including 76 mammal species, 308 bird species, 101 species of herpetofauna and 192 species of plants.

Many of these are of conservation concern, with 66 listed on the IUCN Red List as being Vulnerable (39), Endangered (17) or Critically Endangered

FOREWORD

(10). There are now also 115 species on the CITES list and 99 species noted by the Government of Indonesia as being of conservation concern.

Other research endeavours reinforced the importance of RER as a focus for biodiversity in the region, including migratory raptor monitoring which resulted in 302 raptor sightings, and the Asian Waterbird Census (AWC), which observed 440 birds representing 8 different species in a single day. A Sumatran Tiger survey was carried out in RER in March as part of the Sumatra Wide Tiger Survey (SWTS), which aims to identify conservation gaps and formulate conservation strategies and actions. We are awaiting the results of this survey, but it is an initiative actively supported by RER and APRIL.

A further biodiversity monitoring project, the Edge Effect Study, progressed despite challenging circumstances. This study investigates mammal and bird species richness across the edge or interface between RER's peat swamp forest and the adjacent acacia plantation using linear camera traps. A total of 28 species were recorded including three felid species: the Marbled Cat, Leopard Cat and Sunda Clouded Leopard as well as Malayan Sun Bear, Bearded Pig, and the ground dwelling bird species, the Crestless Fireback among others. This study will continue into 2021.

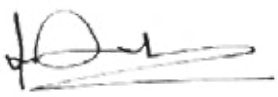
The first of four planned Odonata surveys was also completed in partnership with one of the IUCN Odonata Specialist Group members in early 2020. Preliminary results reported 57 species of damselflies and dragonflies, one of which is listed as Vulnerable, and one listed as Endangered by the IUCN Red list. Of those 57 species, nine are the first recorded in Riau Province, four species are the first recorded in Sumatra, and one species the first recorded for Indonesia. These positive results show that there is still much to learn about the Odonata of the Kampar Peninsula.

Elsewhere, we were pleased to continue the publication of our research, with two new reports released during the last year focusing on bird life and amphibians and reptiles respectively, as well as an important project to verify the RER's carbon stocks. The carbon verification and validation audit processes are scheduled to be completed in 2021.

In 2020, we have also began operating APRIL Eco-Research Camp after four years of concerted concept development and planning. Located on the edge of the RER, it provides a customised operational base and field office for the RER program, including accommodation for employees and visitors. The Eco-Camp will serve as a tropical peatland science hub for national and international scientists and academics, and for stakeholders who wish to experience ecosystem restoration work on the ground.

It is heartening to note the continued resilience and regeneration of the biodiversity in the RER area, matched by the dedication or RER's people and its partners who continued to forge ahead with important monitoring, research and restoration work. The progress made reinforced one of the core themes behind APRIL's 2030 commitments and targets which is the idea that nature cannot wait, and that active investment and protection is needed to promote thriving landscapes.

While there remains some uncertainty about the road ahead, we can look forward to increased collaboration through our Eco-Research Camp and continuing to advance our understanding and knowledge of this important landscape. In closing, I wish to sincerely thank our people and partners for their dedication and commitment in the most trying of years.



Bey Soo Khiang

01

ABOUT RER

RER program is responsible for the restoration and conservation of a combined landscape almost the size of greater London

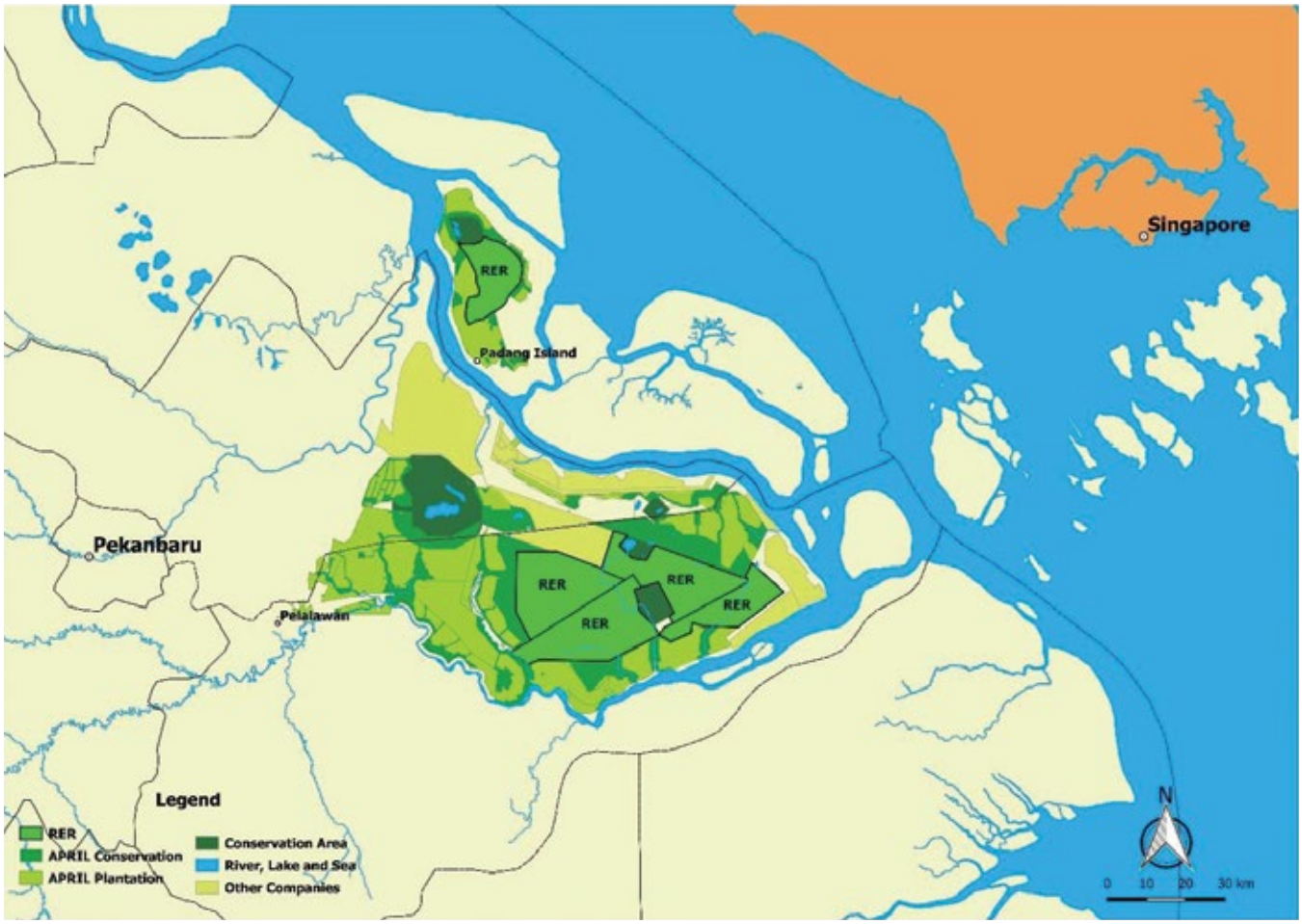
SEVEN YEARS AND COUNTING

Restorasi Ekosistem Riau (RER) marked its seventh year of operation in 2020, a year that will be remembered for its immense impact on peoples' lives around the world.

While it was far from business as usual, RER still managed to achieve steady progress in terms of biodiversity, forest restoration and community engagement.

Established in 2013, RER program consists of five ecosystem restoration concessions (ERC - *Ijin Usaha Pemanfaatan Hasil Hutan Kayu-Restorasi Ekosistem or IUPHHK-RE*) granted by the Ministry of Environment and Forestry of the Republic of Indonesia for a 60-year period spread across two ecologically diverse landscapes in Riau Province, Sumatra. The first is located on peat swamp forest on the Kampar Peninsula with a total area of 130,095 ha, and the other is on Padang Island covering an area of 20,599 ha. In total, the RER program is responsible for the restoration and conservation of a combined landscape almost the size of greater London.

RER's peat swamp forest area, located in the interior of the Kampar Peninsula, is surrounded by sustainably managed fiber plantations. This design provides



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

protection for the peat swamp forest by reducing exposure to forest encroachment, while at the same time the revenue generated by productive plantations provides funding and operational resources for the restoration program. This production-protection approach has enabled RER to achieve its objective of restoring ecologically significant peat swamp forests and generating multiple ecosystem benefits through broad stakeholder and community collaboration.

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
TOTAL	**150,693.37**	

RER concessions on Kampar Peninsula and Padang Island in Riau Province, Indonesia

The RER program began with the protection and restoration of 20,000 hectares of peat forest on the Kampar Peninsula in 2013. At COP 21 in Paris in 2015, APRIL Group announced the program's expansion to 150,000 hectares and committed US$100 million to support and secure its long-term conservation and restoration for an initial 10-year period. Today, RER is one of the largest private sector-funded peatland restoration initiatives in Southeast Asia.

The program is supported and gained expertise from partners Fauna & Flora International (FFI), BIDARA, Laskar Alam and APRIL who collaborate to manage RER's vast landscapes.

This integrated approach is based on the productive fiber plantations being located on the perimeter of RER, which work to protect the interior peat swamp forest and peat domes. These productive Acacia plantations create a buffer zone that reduces human encroachment, illegal logging and fires. The plantation ring also provides a renewable fiber resource to produce value-added products such as pulp, paper and viscose that generate economic returns and provide employment opportunities. This has proven to be a reliable, consistent and effective approach to support restoration in Indonesia, especially given the significant financial and technical resources required to maintain the program over time.

APRIL's sustainable forest plantation on the perimeter of RER provides protection, funding and technical resources

PRODUCTION-PROTECTION LANDSCAPE MODEL

RER is part of broader Kampar Peninsula and Padang Island landscapes that also include APRIL-managed plantations, communities of more than 40,000 people, and government-managed conservation forests. It is also the habitat of hundreds of native plants and wildlife. To manage the needs of this diverse group of stakeholders, RER employs an integrated production-protection approach to guide its management of the landscape.

RER also works with the surrounding communities and landscape managers who utilise the forest as part of its restoration program. Together with APRIL, RER collaborates with communities to utilise the forest in ecologically-friendly ways through education and training, while at the same time improved livelihood opportunities to reduce potential threats to the forest. The RER program operates in tandem with the managers of neighbouring government conservation

forests and other fiber plantation concession owners, acknowledging that biodiversity and wildlife don't always respect man-made boundaries and to safeguard the integrity of the broader landscape.

PARTNERSHIPS

RER is operated in partnership with with FFI, BIDARA, Laskar Alam, and APRIL. Collectively, RER's partners provide essential expertise in landscape management supported by knowledge of the local communities that depend on the forest.

FFI serves as a technical partner supporting RER's science-based restoration approach. FFI has extensive experience in integrating innovative restoration methods with social needs to deliver sustainable conservation solutions. RER has benefitted greatly from FFI's work, including the completion of a baseline survey of the area's biodiversity, carbon storage and local community inhabitants.

In 2020, RER teams began work in assessing the PT Global Alam Nusantara concession, which is one of the most pristine of the RER areas, but also the most difficult to access.

BIDARA works to strengthen relationships with local communities on the Kampar Peninsula. Their efforts focus on advancing human resources and environmental development within communities. Laskar Alam helps educate communities in Padang Island on how to implement sustainable farming and agroforestry.

APRIL Group is a leading producer of fiber, pulp, paper and viscose with plantations and integrated manufacturing operations in Riau Province. The company provides financial support, leadership, operational resources and technical expertise to the RER program.

LANDSCAPE MANAGEMENT

RER teams protect the landscape from illegal activities such as forest encroachment, poaching and illegal logging through routine security and ranger patrols, as well as resource management and protection schemes that run in partnership with local communities.

Since the program was established, RER has achieved significant progress, including the cessation of illegal logging and no new land encroachment. Notably, there has not been any occurrence of fire inside RER in the Kampar Peninsula for seven years, due largely to the efforts of RER teams who monitor weather, ensure fire suppression teams are prepared, and communicate with fishermen and other forest users to prevent fire use within the forest.

In 2020, all five of RER's concessions received the Occupational Safety and Health Management System Award from the Indonesian Government's Minister of Manpower and Transmigration, while also receiving ISO 45001 certification based on the same criteria.

ADVISORY BOARD

RER teams receive guidance from an Advisory Board that includes Indonesian and international third-party experts on conservation, community engagement and landscape management.

BEY SOO KHIANG
Chairman of APRIL Group

MARK ROSE
Chief Executive Officer
Fauna & Flora International

JEFFREY ARTHUR SAYER
Professor of Tropical Forest Conservation
University of British Columbia

I MADE SUBADIA GELGEL
Director General 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

ECO-RESEARCH CAMP

After a four-year effort, the APRIL Eco-Research Camp, or Eco-Camp, was completed in 2020.The Eco-Camp provides an operational base and field office for the RER program, including housing for 48 employees and up to 14 visitors.

Eco-Research Camp that will serve as APRIL's peatland science hub and RER operational base

> THE ECO-CAMP IS AN IMPORTANT LANDMARK AND WILL SERVE AS A PEATLAND SCIENCE RESEARCH HUB

The facility is designed to integrate modern quality, local culture and green building concepts into an operational center customized for a tropical peat swamp environment. The Eco-Camp is powered by renewable energy sources, and optimizes the use of clean water to minimize water consumption.

The Eco-Camp is located 140 km southwest of Singapore on the east coast of Sumatra in Riau Province. The 34 ha site is a former Acacia fiber plantation immediately adjacent to a High Conservation Value forest area near the Serkap River, one of main river systems passing through the RER on the Kampar Peninsula. A total of 12 ha is designated for the facility, while the remaining 22 ha are being restored as natural forest.

The Eco-Camp is a 30-minute helicopter flight or a 4-hour drive from nearby Pangkalan Kerinci in Pelalawan. Guests arrive at the Serkap River, then travel 3.2 km in traditional boats using clean-energy battery powered outboard motors or paddle kayaks, before walking 1.1 km through the forest on an elevated boardwalk to reach the Eco-Camp.

The Eco-Camp is unique from other facilities in the area. Its structures are elevated 1.5 m above the peat surface to allow for normal seasonal flooding. Seven of its structures are made from SVLK certified wood sourced from northern Sulawesi, complemented by two glamping tents to allow a more natural forest experience. The remaining structures were built using composite materials for durability and low maintenance.

The Eco-Camp is powered by an off-grid photovoltaic hybrid-electric system paired with two electric generators. Potable and non-potable water is sourced directly from the peat soil through filtration, treatment and reverse-osmosis system.

Organic gardens and a fruit orchard produce a self-sustaining food supply, while a variety of plantings of early successional native vegetation attract a wide array of birds and small mammals.

The Eco-Camp is an important landmark and will serve as a peatland science research hub where students, researchers and company representatives and stakeholders can gather to share ideas and dialogue on the challenges and opportunities for responsibly managing Indonesia's tropical peatland resources.

Changeable Hawk-eagle (*Nisaetus cirrhatus*)
Photo credit: Prayitno Goenarto (RER)

02

BIODIVERSITY

Plant and animal monitoring is an essential part of any restoration project and is a key operational task that the RER team undertakes each year

PLANT AND ANIMAL MONITORING

Plant and animal monitoring is an essential part of any restoration project and is a key operational task that the RER team undertakes each year with the support of FFI. Intensive biodiversity surveys were first conducted in 2015 by FFI to establish a baseline on species presence across approximately 90,000 hectares on the Kampar Peninsula. Since then, RER teams have continued to build upon this data using a range of monitoring tools.

In 2020, the COVID-19 pandemic and associated restrictions posed a challenge to wildlife monitoring. Several planned surveys involving external experts were put on hold due to the health and safety precautions and travel restrictions.

However, RER field teams continued to gather valuable information about wildlife throughout the year, through the use of remote camera trapping, bird monitoring and floristic surveys. These activities revealed a new total of 823 species of plant and animal identified in RER to date. During the year, the RER team deployed a total of 196 camera traps over a total period of 7,155 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

A group of Bearded Pigs (*Sus barbatus*) captured by RER camera trap in 2020

them the critically endangered Sumatran Tiger and the endangered Flat-headed Cat. Species count also includes seven primates, 308 bird species, 101 species of herpetofauna and 192 species of plants.

During the year, RER refined and reviewed the amphibian and reptile species list with help from local experts to produce an updated checklist on the herpetofauna of the area. This refinement saw a reduction in the listed species in the area from 106 to 101 as more evidence came to light since the list was first compiled in 2016.

Of the 823 species of plants and animals, many are of conservation concern with 66 listed on the IUCN Red List as being Vulnerable (39), Endangered (17) or Critically Endangered (10). There are also 115 species on the CITES list and 99 species noted by the Government of Indonesia as being of conservation concern. Since 2016, RER has participated in two important bird monitoring programs: Migratory Raptor Monitoring and the Asian Waterbird Census. These programs support RER conservation efforts as well as contributing 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. In 2020,

Taxa (Nov 2019)	Total Species	IUCN			CITES	GoI
		CR	EN	VU		
Mammals	76	2	6	11	24	18
Amphibians & Reptiles	101	2	3	5	20	5
Birds	308	1	5	15	45	76
Plants	192	3	1	5	26	-
Fish	89	2	1	2	-	-
Odonata	57	-	1	1	-	-
TOTAL	**823**	**66**			**115**	**99**

Plant and animal species recorded in RER concession areas

monitoring resulted in 302 raptor sightings with the Oriental Honey Buzzard (*Pernis ptilorhynchus*) recorded as the most predominant species.

The Asian Waterbird Census (AWC) is conducted in January each year throughout the Asia Pacific region. The census serves as an indicator of the condition of regional wetlands. In Indonesia, the event is led by Wetlands International and the Indonesian Ministry of Environment and Forestry. The data collected is shared with global conservation organisations such as IUCN and Ramsar Convention, while the Ministry will use the data to ensure conservation and sustainable management of wetlands in Indonesia. Over a one-day period, 440 birds were observed representing 8 different species, with the most predominant species being Purple Heron (*Ardea purpurea*) with 367 appearances. The various water bird species ranged from large heavy-set purple herons to smaller sized nimble White-winged Terns.

An occupancy survey for the Sumatran Tiger on the Kampar Peninsula was concluded in March 2020. This survey forms part of the Sumatra Wide Tiger Survey (SWTS) which aims to update the status of the Sumatran Tiger through Indonesia's 2010 National Tiger Recovery Programme (NTRP). The Peninsula-wide survey was commissioned by APRIL and led by SINTAS Indonesia, with the much-anticipated results of the survey soon to be reported by the Ministry of Environment and Forestry. The objective of the SWTS is to identify conservation gaps, formulate conservation strategies and priority actions and direct funds to maintain and recover the critically endangered Sumatran Tiger population.

Once the SWTS is completed, the data will be used to compile a predictive map of Sumatran Tiger distribution, indicating the species occupancy across Sumatra including the Kampar Peninsula. Practical recommendations on how best to manage and conserve the Sumatran Tiger across the Kampar Peninsula will be developed as part of this process.

No	Survey	Period	Findings
1	Asian Waterbird Census	January 2020	440 birds observed representing 8 species, predominant species is Purple Heron (*Ardea purpurea*) with 367 sightings.
2	Migratory Raptor Monitoring	August – September 2020	302 raptors observed, predominant species is Oriental Honey Buzzard (*Pernis ptilorhynchus*).
3	Sumatra Wide Tiger Survey (SWTS) conducted by Sintas Indonesia Foundation.	September 2019 – March 2020	9 of 20 species targeted were detected. The most frequent species signs detected were wild pig, Sumatran tiger, Sambar deer and barking deer.
4	Edge Effect Study	May – August 2020	28 species were recorded by camera trap during a total of 1,133 camera nights, including three Marbled Cat (*Pardofelis marmorata*), Leopard Cat (*Prionailurus bengalensis*) and Sunda Clouded Leopard (*Neofelis diardi*), Malayan Sun Bear (*Helarctos malayanus*), and the Crestless Fireback (*Lophura erythrophthalma*).
5	Odonata Survey (1st phase) conducted by Dr Rory Dow	January 2020	The survey reported 57 species of damselflies and dragonflies, one of which is listed as vulnerable and one listed as Endangered by the IUCN Red list. Of those 57 species, four species are the first recorded in Sumatra, and one species the first recorded for Indonesia.
6	Baseline Biodiversity Survey at PT Global Alam Nusantara (PT GAN) conducted by Fauna and Flora International (FFI)	Nov 2020 – March 2021	Ongoing

RER Biodiversity Survey in 2020

The SINTAS team's survey of the Kampar Peninsula has predicted that Tiger occupancy across the area may be higher than previously thought.

A further biodiversity monitoring project, the Edge Effect Study, continued this year, although there were logistical delays due to COVID-19 and travel restrictions. The first round of sampling for this project was completed over the period between May and August 2020, for a total of 1,133 camera nights. The Edge Effect Study is investigating mammal and bird species richness across the edge or interface between RER's peat swamp forest and the adjacent acacia plantation.

Linear camera trap transects were deployed, running from the natural forest into the acacia plantation areas. A total of 28 species were recorded including three felid species: the Marbled Cat (*Pardofelis marmorata*), Leopard Cat (*Prionailurus bengalensis*) and Sunda Clouded Leopard (*Neofelis diardi*), as well as Malayan Sun Bear (*Helarctos malayanus*), Bearded Pig (*Sus barbatus*), and the ground dwelling bird species, the Crestless Fireback (*Lophura erythrophthalma*) among others. This study will continue into 2021, with final results anticipated in late 2021 or early 2022.

FIRST PHASE OF ODONATA SURVEY

Insects and spiders play an essential role in ecosystem function. They are the most diverse group of animals on Earth and can be used as indicators of the overall health and integrity of an ecosystem. As a result, RER has begun gathering data on this important group starting with the order Odonata – Dragonflies and Damselflies.

This order of winged insects has aquatic larvae and are carnivorous as both adults and larvae. All Odonata species are dependent on water for the development of their larval stage and, as such, this group serve as surrogate indicators of the water quality and ecosystem health of the immediate environment where they are found.

In early 2020, the first of four planned Odonata surveys were completed by Dr. Rory Dow, a well-published expert on topical Odonata species and a member of the IUCN Odonata Specialist Group. Due to the pandemic and travel restrictions, the final three surveys were delayed and are scheduled to be completed in 2021, pending the easing of travel restrictions.

However, preliminary results reported 57 species of damselflies and dragonflies, one of which is listed as Vulnerable and one listed as Endangered by the IUCN Red list. Of those 57 species, nine are the first recorded in Riau Province, four species are the first recorded in Sumatra, and one species the first recorded for Indonesia. These positive initial results indicate that there is still much to learn about the Odonata of the Kampar Peninsula.

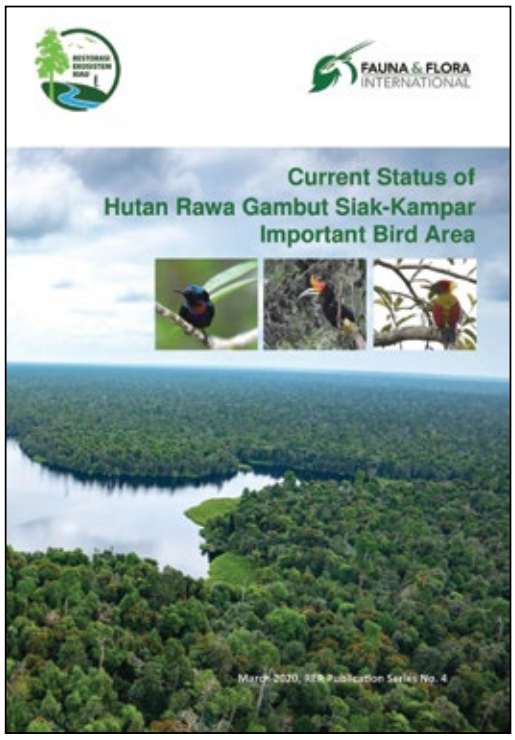
The Odonata survey is supported by Sateri, a global leader in sustainable viscose rayon and a part of Royal Golden Eagle group of companies. The contribution has helped RER to better understand the landscape where it operates and advise its ecosystem restoration efforts.

Brachygonia ophelia
Photo credit: Ganjar Cahyadi (FFI)

RER PUBLICATION NO. 4: CURRENT STATUS OF HUTAN RAWA GAMBUT SIAK-KAMPAR IMPORTANT BIRD AREA

In May 2020, RER published its fourth publication on the status of bird life on the Kampar Peninsula, 'Hutan Rawa Gambut Siak-Kampar Important Bird Area'. The RER is part of the wider Hutan Rawa Gambut Siak-Kampar Important Bird Area (IBA) that was designated by Birdlife International in 2003. Ornithological surveys from 1992-93 documenting 128 bird species across the Kampar Peninsula were used to form the basis for the IBA designation.

The RER publication updates the previous survey, reporting 307 species of birds. 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*).



RER Publication Series No. 4 Current Status of Hutan Rawa Gambut Siak-Kampar Important Bird Area

40% OF SUMATRA'S 758 BIRD SPECIES WERE IDENTIFIED ON THE KAMPAR PENINSULA

These 307 species represent 40% of Sumatra's 758 bird species. A total of 241 (78%) are resident, 58 (19%) are migrant and nine (3%) are 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 many migratory species.

RER PUBLICATION NO. 5: AMPHIBIANS AND REPTILES OF THE KAMPAR PENINSULA, AN ANNOTATED CHECKLIST

This Checklist was published in December 2020 after RER analysed and refined its knowledge of the herpetofauna of the Kampar Peninsula. It serves as a reference for information on the amphibians and reptiles of the area, habitats they have been recorded in, and their current conservation status globally and in Indonesia. It also serves as a basis for future updates on amphibian and reptile species in the region. The annotated checklist details 80 reptile and 21 amphibian species confirmed to be present on the Kampar Peninsula including the critically endangered Great River Terrapin (*Orlitia borneensis*) and Painted Terrapin (*Batagur borneoensis*).

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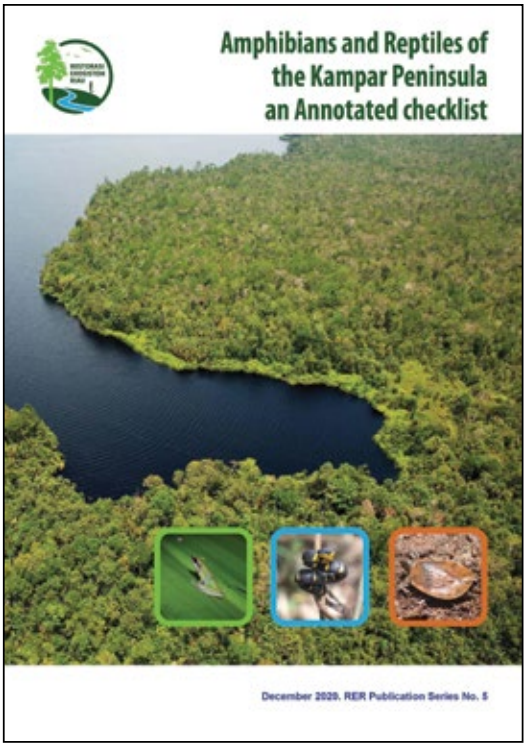


RER Publication Series No. 5 Amphibians and Reptiles of the Kampar Peninsula

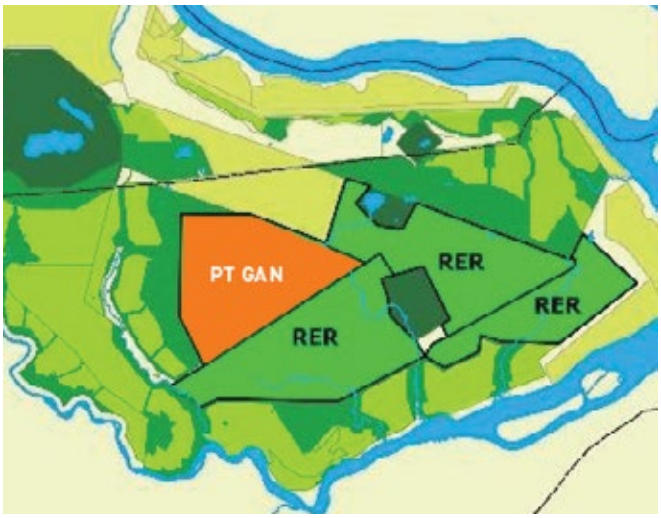
This publication was compiled by RER resident ecologists and FFI and referenced previous surveys undertaken by Tropenbos Indonesia, and Museum Zoologi, Sekolah Ilmu dan Teknologi Hayati, Institut Teknologi Bandung. This is the fifth document in the RER publication series that provides publicly available updates on the progress of the RER program. Together with the previous four publications, this new checklist contributes to a better understanding of the biodiversity of the Kampar Peninsula.

Spiny Turtle (*Heosemys spinosa*)
Photo credit: Andri Irawan (FFI)

BIODIVERSITY BASELINE SURVEY

Towards the end of 2020, baseline biodiversity surveys of PT Global Alam Nusantara restoration concession began – the last of the four RER ecosystem restoration concessions on the Kampar Peninsula to be surveyed. This 36,525 hectares area is considered to be the most remote of all the restoration concessions on the Kampar Peninsula and covers one of RER's two main peat domes.

Due to its remoteness, this area has been one of the least scientifically studied parts of the Kampar Peninsula landscape to date. This survey is being undertaken by FFI with the first results expected to be available in mid-2021. The data gathered from the survey will be used to complete a comprehensive baseline understanding of the plant and animal communities present within RER. The methods used throughout the survey are in line with those employed in the other three RER restoration concession surveys that took place in 2015.



PT Global Alam Nusantara restoration concession

BIODIVERSITY OF RER

TOTAL
823

PLANTS	192
BIRDS	308
MAMMALS	76
ODONATA	57
AMPHIBIANS & REPTILES	101
FISH	89

Case Study: Corina Tigress Returns to Kampar Peninsula

After nine months of rehabilitation and recovery, a female Sumatran Tiger (*Panthera tigris sumatrae*) was released back to the wild in the Kampar Peninsula on 20 December 2020. The tigress, later named Corina, was previously found injured and snared in a community plantation on the Kampar Peninsula on March 2020.

She was rescued and brought to the Dharmasraya Sumatran Tiger Rehabilitation Center (PR-HSD) by Riau Nature Conservation Agency (Balai Besar Konservasi Sumber Daya Alam Riau - BBKSDA Riau). Three months after she first arrived at the facility, her wounds were healed completely. She was then transferred to a quarter hectare forest recovery area where she could regain her strength. During this rehabilitation period, Corina maintained her wild nature and was deemed by experts to be ready for release back to her original habitat on the Kampar Peninsula.

After consultation with Forum Harimau Kita, Yayasan SINTAS, FFI and the Zoological Society of London, RER developed an Action Plan to prepare for Corina's return. The primary components of the Action Plan included (i) conducting a tiger occupancy analysis (ii) conducting a tiger prey analysis (iii) conducting a tiger perception survey with local communities and plantation workers (iv) campaigning anti-snare practice to the communities (v) snare-sweeping in high risk areas (vi) developing a Tiger Habitat Suitability Index (HSI) map with Universitas Gadjah Mada (UGM) (vii) installing camera traps at the planned release site one-month prior to and one month after the release of Corina, and (vii) constructing habituation and transport cages.

After reviewing several proposed release sites based on ease of access, distance from human settlement and prey availability, BBKSDA Riau and RER agreed on a location inside RER and began the release preparation.

The team also planned to attach a GPS/VHF transmitter collar to Corina to understand how and where she re-establishes her home range. This was the first time a Sumatran Tiger released in a lowland peat swamp forest was fitted with a GPS collar.

After all of the items in the Action Plan were completed and final snare-sweeping conducted in early December, Corina was finally transported by helicopter from PR-HSD in West Sumatra to the release site in the Kampar Peninsula on 14 December 2020. This short journey of approximately one hour did not require the use of anesthetics, minimizing health risks to the tiger.

At the release site, Corina was placed in a temporary enclosure to enable her to acclimatize back to her peat swamp forest home. The GPS collar was later fitted on 17 December 2020 and Corina was determined by PR-HSD veterinarians to be healthy and ready for release.

Corina was officially released back to her home on Kampar Peninsula on 20 December 2020, under the supervision of the Director General of Conservation of Natural Resources and Ecosystem, Ministry of Forestry and Environment of Indonesia.

The return of Corina marks a significant step towards supporting the conservation of Sumatran Tigers, where every individual of this critically endangered species is of value, especially a female that can produce cubs.

"FROM THE EVALUATION, THE MOST SUITABLE PLACE IS IN RER BECAUSE THE AREA IS MANAGED BY APRIL AND THE HABITAT CONDITIONS ARE VERY GOOD."

Prof. Dr. Satyawan Pudyatmoko
Senior Researcher, Universitas Gadjah Mada

Corina being transported from her rehabilitation centre using helicopter

Corina arrived on the Kampar Peninsula and transported to her habituation cage

Corina in her habituation cage

Attaching GPS Collar on Corina's neck

Leading the Corina release, Ir. Wiratno, Director General of Nature Resources and Ecosystem Conservation, Ministry of Environment and Forestry (blue hat) together with APRIL and RER management

Corina sprinting back to her home


Safety
LIFE

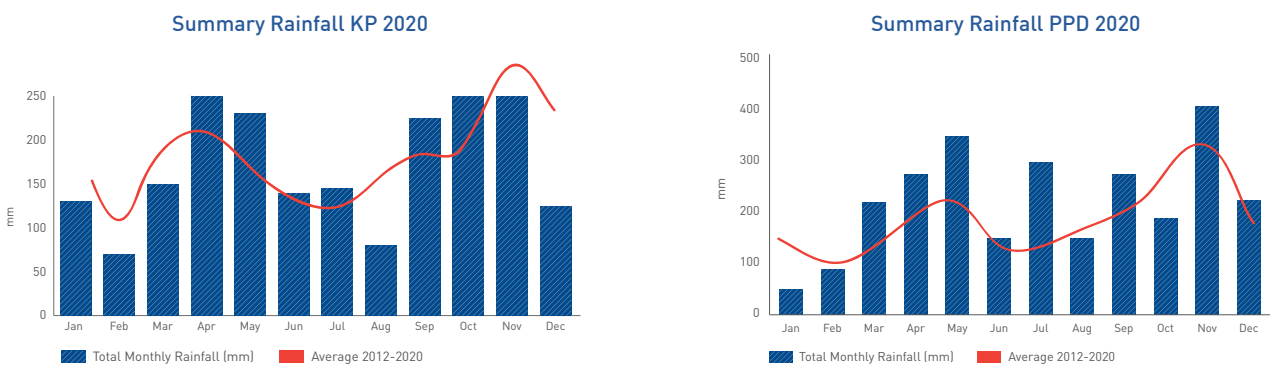
03

CLIMATE

Rainfall fluctuates seasonally and dry conditions commonly occur twice per year, in late January to mid-March and again from June to September

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 2,139 mm in the Kampar Peninsula and 2,063 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.



Summary of rainfall on Kampar Peninsula and Padang Island

In 2020, annual rainfall was 4.8% below normal on the Kampar Peninsula and 24.3% above normal on Padang Island. The lowest rainfall occured in the period between February and August with 67.9 mm and 83.4 mm respectively. However, the 2020 dry season from June to September was wetter than 2019 with a difference in total rainfall in the same period of 47.1% on the Kampar Peninsula and 100.6% on Padang Island.

During the dry season, river flows usually reach their lowest level, especially on the Kampar Peninsula. On the Serkap River, the lowest levels occurred in March (-0.2 m) and the highest level occurred in December (1.3 m). For the Sangar River, the lowest level also occurred in March (-0.47 m) and the highest level occurred in November (1.58 m).

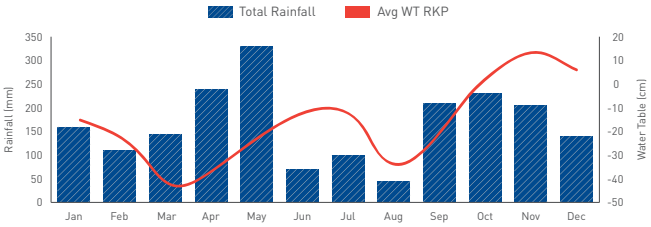
From this data it is clear that river levels fluctuate widely based on seasonal rainfall, with fluctuations of 1.5 m for the Serkap River and 2.05 m for the Sangar River recorded in 2020. This difference is attributed to the ability of each river to store water reserves and the size of the catchment area. The Sangar River catchment area is 18,961 ha and the river is relatively narrow with few waterlogged basins that hold water during the dry season. At 74,725 ha, the Serkap River catchment area is four times larger than Sangar River with a wide and meandering channel and large waterlogged basins that hold and supply water longer during the dry season. The Sangar River is often not navigable by small boats during the peak of the dry season.

Recorded River Level on 2020

River water level fluctuation in the RER Kampar Peninsula

As rainfall is the only source of water for peatlands, and evapotranspiration from the peat soil can lower peat moisture content, the dry season in 2020 contributed to average peat water table depths descending to more than 40 cm below the peat surface in March and August.

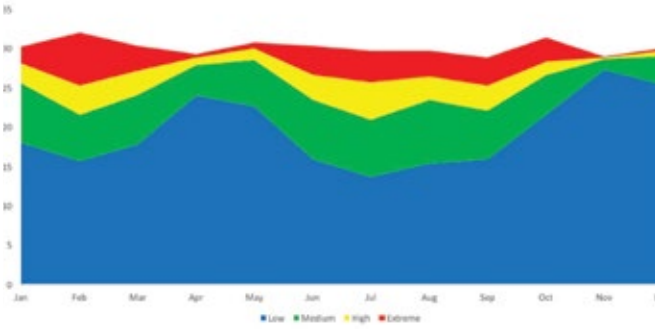
Water Table Monitoring on RKP 2020 (cm)



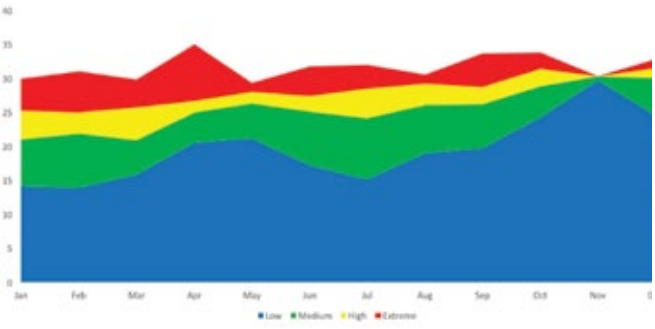
Average water table movement on RER Kampar Peninsula (RKP) 2020

RER teams monitor daily weather and rainfall at several locations across the Kampar Peninsula and Padang Island to calculate a daily Fire Danger Rating (FDR) that provides a measure for quantifying fire risk. This data ensures that fire suppression teams are available to conduct patrols and ready to quickly respond as required. During 2020, the majority of High and Extreme FDR days occurred during the first dry season from mid-January to mid-March.

Summary FDR Kampar Peninsula 2020



Summary FDR Pulau Padang 2020



Summary FDR on Kampar Peninsula and Padang Island

Satellite detected hotspots are an indicator of potential fire risk and are then ground-truthed. There were 476 hotspots recorded in Riau Province during 2020 and none within RER restoration concessions. Despite the dry season, there were no fires in RER on the Kampar Peninsula during 2020.

Hotspot distribution map in Kampar Peninsula and surrounding areas in 2020

DESPITE THE DRY SEASON, THERE WERE NO FIRES IN RER ON THE KAMPAR PENINSULA DURING 2020

FOREST RESTORATION

RER restoration concessions are covered by isolated, water inundated tropical peat swamp forests. In these 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 assessments. After being verified and supported with on-the-ground inventories and assessment, teams produce site-specific restoration plans to identify the appropriate species for planting, restoration planting techniques, monitoring and maintenance requirements, as well as site-specific restoration objectives.

Tropical peat swamp forest can recover quickly from past disturbance without the presence of new anthropogenic factors 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 succession. Additionally, where there is an already high level of forest cover and seed source and the often-isolated nature of many restoration sites often means natural regeneration is the most cost-effective approach for restoring forests. However, in many cases, intervention is required in the restoration process and direct planting, enrichment planting and assisted natural regeneration (ANR) is applied.

RER teams apply a range of restoration approaches, depending on the characteristics of the restoration site, such as past disturbance intensity, the size and shape of the area, its position in the landscape and forest type.

Year	Planting	ANR/ Enrichment	Maintenance	Natural Regeneration
2014	0.26	0.00	0.00	-
2015	5.41	3.23	0.00	2,072.00
2016	4.57	0.00	6.58	2,043.50
2017	0.09	0.00	0.63	10,316.00
2018	19.34	24.67	4.37	11,080.00
2019	4.67	5.47	162.00	10,403.00
2020	0.00	3.00	182.52	21,693.20
TOTAL	**34.34**	**36.37**	**356.1**	**57,607.20**

Annual restoration and maintenance accomplishments (in Ha)

The restoration objective can differ from one site to another and may include restoration to increase forest cover, store carbon, provide habitat for biodiversity, increase the abundance of rare or threatened peat swamp forest species or all of the above.

In 2020, RER restoration plans focused on maintaining previously planted restoration sites by replacing dead trees and clearing weeds around planting areas. The cumulative maintenance area was 182.52 ha. There was no direct planting activity during 2020 as there were no forest sites identified as requiring restoration in the Annual Work Plan or *Rencana Kerja Tahunan* (RKT).

TREE NURSERIES

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

In 2020, RER maintained 46,000 seedlings in seven nurseries on the Kampar Peninsula and Padang Island. From this stock, RER planted 2,900 seedlings to replace dead trees in the previous year's restoration sites. A total of 23,500 seedlings from RER nurseries are ready to be planted in restoration areas for 2021.

Estate	Number of Nurseries	Number of Species	Number of Seedlings	Seedlings Planted in RER	Seedlings Ready to be Planted
Kampar Peninsula Restoration	5	60	27,579	2,403	5,577
Padang Island Restoration	2		18,680	504	18,017
TOTAL	**7**	**60**	**46,259**	**2,907**	**23,594**

Nursery stock in 2020

Nursing the native tree 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[1].

By 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 m wide and 50-150 cm deep. These canals caused 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.

Since 2015, RER has been working to close old drainage canals in order to maintain peat moisture within normal seasonal fluctuations. The overall objective is to re-wet the peat and retain water in the peat soil during dry seasons in order to minimise peat drying, oxidation and subsidence, minimizing fire threats and carbon emissions.

In 2020, RER teams identified another two canal systems. To date, RER teams have identified 48 canal systems stretching 211 km across the RER restoration concessions. The Kampar Peninsula hosts 35 of these canal systems at 146 km in length and impacting 9,542 ha. A further 13 canals totalling 65 km impacting 2,932 ha have been identified on Padang Island. The goal is to restore water control at 40 cm elevation intervals along the entire canal network by 2025. Before blocking these canals, RER teams conduct surveys to determine the length, width, slope and optimal location for dam placement.

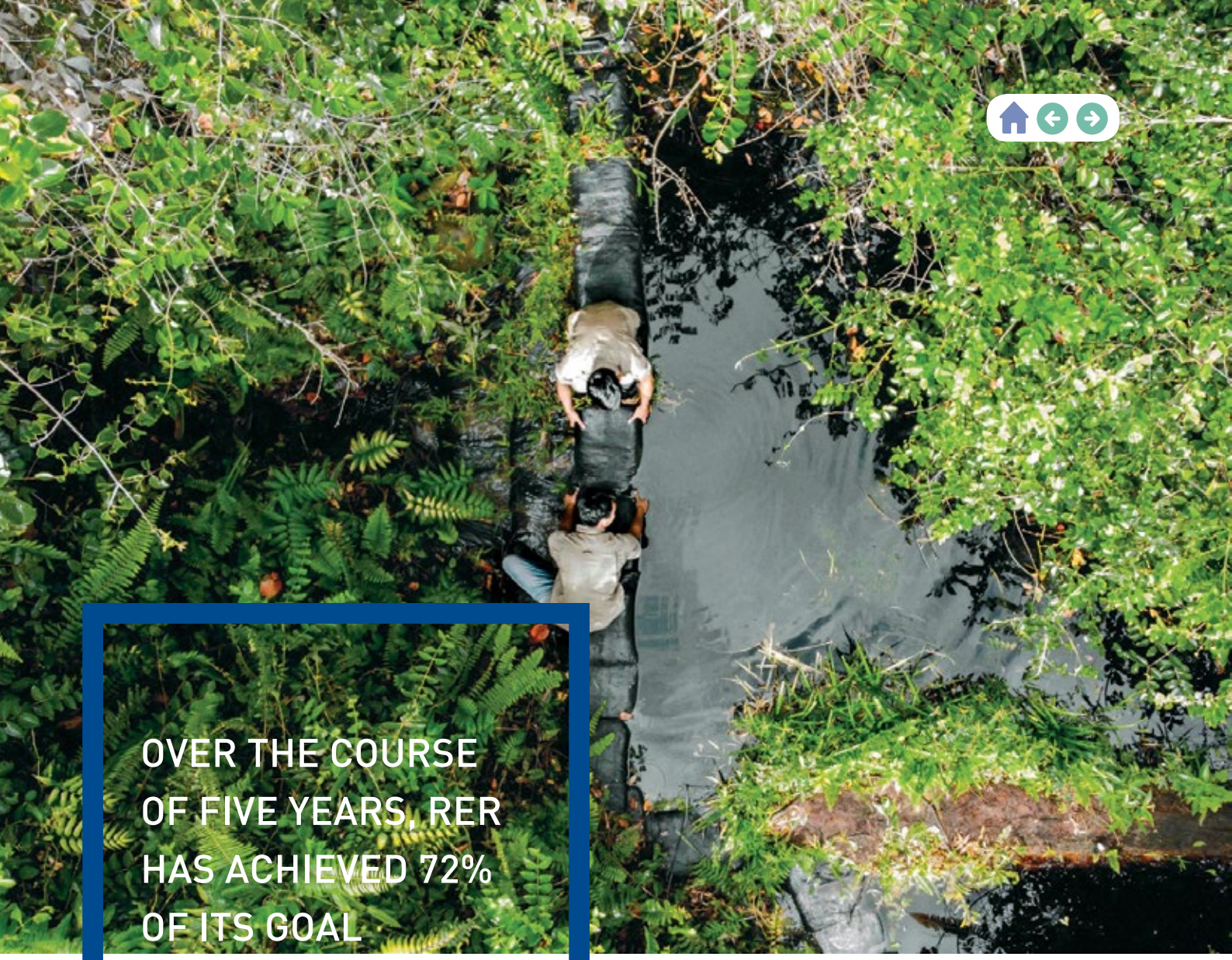
Over the course of five years, RER has achieved 72% of its goal by constructing 79 dams that have successfully closed 27 canal systems, totalling 158.2 km in length and impacting 8,920 ha on the Kampar Peninsula and Padang Island.

Year	Canal	Dam	Length (m)	Impacted Area (Ha)
2015	1	2	2,704	109.4
2016	5	17	20,269	1,207.0
2017	2	4	15,045	902.1
2018	12	30	44,060	2,915.6
2019	5	15	45,454	2,845.1
2020	2	11	30,693	941.1
TOTAL	**27**	**79**	**158,225**	**8,920.3**

Annual canal closures in RER

Water quality monitoring

[1]) 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.



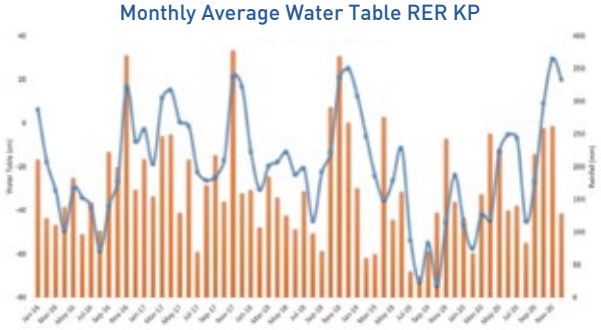
OVER THE COURSE OF FIVE YEARS, RER HAS ACHIEVED 72% OF ITS GOAL

BY CONSTRUCTING 79 DAMS THAT HAVE SUCCESSFULLY CLOSED 27 CANAL SYSTEMS

Blocking old canals

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 forest areas. 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.

Monthly Average Water Table RER KP



Average monthly water table changes in RER Kampar Peninsula (RKP)

Case Study: RER Carbon Project

Since RER was established in 2013, better understanding the landscape and developing research-based restoration and conservation management plans have been a focus. Among the studies conducted are analyses of the carbon stock inside 130,095 ha of tropical peat swamp on the RER's Kampar Peninsula restoration area.

The peat soils on the Kampar Peninsula measure 3-15 m in depth and are composed of partially decomposed organic matter saturated in water. These areas are a huge carbon store that have been present for more than 5,100 years. If disturbed, the peat soils have the potential to release millions of tons of carbon into the earth's atmosphere, contributing to greenhouse gas (GHG) emissions and global warming.

In 2015, as a part of the Paris Agreement, the government of Indonesia submitted its Nationally Determined Contribution (NDC). The submission stated the country's commitment to unconditionally reduce the country's greenhouse gas emissions by 29% by 2030 from 2010 business as usual (BAU) emissions which spread across five sectors: Energy, Industrial Processes and Product Use, Agriculture, Waste, and Forestry. The latter accounts for 48.5% of Indonesia's annual emissions. In addition, Indonesia committed to reduce emissions from this sector by 497 million tons CO_{2e} by 2030.

IT IS ESTIMATED THAT THE RER AREA ON KAMPAR PENINSULA CONTAINS 2.14 BILLION TONS OF CARBON STOCK

To measure its contribution to this emission reduction commitment, RER has prepared a Project Document (PD) which upon verification and validation will establish the carbon stock and avoided emissions against the BAU land use that would otherwise have occurred without the RER program in place. The PD utilizes Voluntary Carbon Standard (VCS) methodology VM0007, 'REDD+ Methodology Framework (REDD-MF)' version 1.5 to measure avoided planned conversion to plantations and planned wetlands degradation on the RER managed areas.

From the study, it is estimated that the RER area on the Kampar Peninsula contains 2.14 billion tons of carbon stock, of which 97% is stored below ground in the saturated peat soils. The VCS verification and validation audit is scheduled to be completed in 2021.

04

COMMUNITY

There are around 40,000 people living in the surrounding RER restoration areas. Many benefit from the forest's non-timber products to support their livelihood, with most utilising it as a secondary or even tertiary source of income

There are nine villages on the Kampar Peninsula, with a total population of around 17,000 people. Most people live to the south of the Kampar River on its nearby coastline. Residents of this landscape are mostly ethnic Malay with several migrant population that include Malay, Java and other ethnic groups that moved to the region in search of better livelihoods.

These people participate in a mixed economy by combining several livelihood activities to meet their basic needs. These include farming, fishing, labouring, trading or entrepreneurial activities. 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 three main categories: agriculture (rice, maize), plantation (sago, coconut, oil palm, and rubber), and fisheries.

None of the nine villages share a direct boundary with RER, but utilise the forest's non-timber forest products such as fish from the four rivers that flow through RER, forest honey and some medicinal plants. They also benefit from RER's presence as a source of clean water, flood protection, as well as supporting water retention during long droughts.

On Padang Island, approximately 24,000 people live in 21 villages. Many of them reside on the east coast of the island. The people of Padang Island include the native Akit, Malay, Banjar, Java, Batak, and Bugis.

Their primary livelihoods are farming and fishing. Since the 1960s, plantations of rubber, sago and coconut have been established and form the basis of the local economy. There is also a reliance on fish from the rivers and coastal areas of the island to generate income and food.

The production-protection approach to landscape management emphasises the importance of working closely with communities. RER emphasizes community development so that the surrounding population will have the awareness and capabilities needed to manage the forest.

FARMING AND FISHING

Despite Covid-19 restrictions, community programs continued in 2020. Activities focused on skills development and improvement as well as continuing the community wellbeing programs. RER is working with local farmers and youth groups assisted by our partner Laskar Alam to prepare no-burning agricultural demonstration plots in Padang Island communities for intercropping with betel nut, rubber, and pineapple to increase farmers' yield with limited farming area. Elsewhere, our partner BIDARA assisted communities in Kampar Peninsula yard farming and fruit farming.

Communities assisted by Bidara managed to complete three harvests from yard farming with commodities including chili, eggplant, long bean, celery, banana and cassava. This assistances aims to increase interest in developing unused land surrounding households more effectively and to make communities more economically independent.

They are several fishermen groups in the Kampar Peninsula that utilise the rivers seasonally. They usually stay in huts alongside rivers during fishing seasons. RER works with these groups to ensure they fish using sustainable methods that will not harm the rivers and the forests. This year, assistance included renovating huts to better protect fishermen from weather conditions so that they can improve their yields.

Ikan salai or smoked fish caught by local fishermen in Serkap River

Long bean harvesting

COMMUNITY WELLBEING

In 2020, because of the COVID-19 pandemic, we also improved our community well-being programs including support for religious and sporting activities, employee volunteering, eco-education for elementary schools students, campaigns to encourage clean and healthy life behaviour, and providing a clean water facility.

In September 2020, we worked with students and residents of neighboring Teluk Meranti sub-district to hold sports and conservation activities to improve well-being during the pandemic, while at the same time preserving the coastal regions in the Kampar River by planting native tree species.

RER teams also recorded significant sales for Madu Hutan Riau. The sales of this community generated honey are returned back to the community to support livelihoods. RER teams sold nearly 400 liters of honey worth around IDR 65 million. These improved sales were due to a more aggressive strategy in finding buyers and completing several consumer goods certificates.

Green Paddy Frog (*Hylarana erythraea*)

05

OUTREACH & ENGAGEMENT

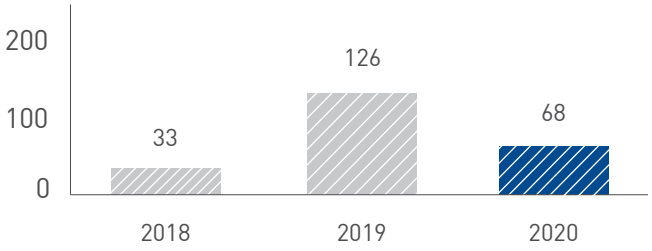
FIELD VISITS

The remote geographic location and size of RER on the Kampar Peninsula and Padang Island make it challenging to explain the scope and ambition of the program. Field visits play a crucial role in helping stakeholders understand the scale of the task of restoring and protecting the landscape. Due to Covid-19, there were significant restrictions on visitors in 2020.

In early 2020, prior to the onset of the pandemic, we began supporting the filming of a documentary. Other visits to RER areas in early 2020 related to restoration and conservation activities including conservation research, wildlife release planning, carbon surveying and operational safety assesments. Upon the onset of the COVID-19 pandemic, visits were restricted to essential activities and strict preventive measures were implemented to ensure the safety and well-being of our people and nearby communities.

In total, we had 68 visitors to the RER areas during 2020.

Number of RER Visitor 2018 - 2020



Several visitors were able to visit the newly constructed Eco-Research Camp site. The facility will enable visitors to better understand the scope of work that RER does and experience first-hand the implementation of the production-protection approach used to support the wider landscape.

EXTERNAL ENGAGEMENT

RER teams were able to share their expertise and key learnings at a number of national and international events held virtually during 2020. These included:

1. Indonesia Climate Change and Environment: Nature Conservation with Local Wisdom Webinar hosted by the Ministry of Environment and Forestry of Indonesia on 5 June 2020
2. Pathways to Climate Resilience, an Indonesia Business Council on Sustainable Development (IBCSD) Webinar Series held on 13 August 2020

RER Director of External Affairs during a webinar session hosted by the MInistry of Environment and Forestry of Indonesia

3. Global Landscapes Forum digital exhibition on 28-29 October 2020
4. Green Leader online programme organized by Eco-learning Camp (Yayasan Sahabat Lingkungan Hidup) in Bandung on 26 September 2020
5. Corina Pulang Kampung Webinar hosted by the Ministry of Environment and Forestry of Indonesia from APRIL Eco-Research Camp, 20 December 2020

INTERNSHIP PROGRAMME

The internship program at the RER provides hands-on restoration and conservation experience to students while building on the knowledge and capacity of RER to deliver high-quality restoration and peatland conservation.

In 2020, as part of its ongoing engagement with academic institutions, RER hosted two international internship students from the University of British Columbia, Masters of International Forestry course. These projects were carried out remotely, due to the pandemic.

In early 2020, RER hosted three undergraduate students from local universities in Riau. One student was from Universitas Muhammadiyah Riau, Undergraduate Biology programme in early 2020 and another two students were from from Universitas Riau, Undergraduate Biology programme. The student projects are outlined in the table below:

Institution	Intern period	Project
University of British Columbia, Canada, Masters of International Forestry	3 months	Reviewing RER areas as a potential *Kawasan Ekosistem Esensial* (Essential Ecosystem Areas)
University of British Columbia, Canada, Masters of International Forestry	3 months	Developing a literature review, report and poster on small carnivore conservation in RER.
Universitas Muhammadiyah Riau, Undergraduate Biology programme	1 month	Odonata biodiversity data collection
Universitas Riau, Undergraduate Biology programme	1.5 months	Monitoring and measuring restoration planting in ex-Acacia plantations around the Eco-Research Camp

RER 2020 internship program

Case Study: Documentary Filming

The ecosystem restoration model operated by Restorasi Ekosistem Riau was the basis for a documentary created by a team of filmmakers from Singapore and Indonesia during 2020. The documentary will show how a fragile peatland forest landscape can be protected and restored through collaboration between stakeholders including state authorities, NGOs and private companies.

During filming in early 2020, the cinematographers captured stories about RER teams' efforts to protect and restore the landscape and capturing the connection between the surrounding communities and the forests of RER.

The documentary serves as a unique way to communicate the effectiveness of the production-protection landscape approach, where sustainably managed fiber plantions provide funding for the restoration while at the same time providing technical capabilities and support.

Behind the scenes during the production stage of the documentary

FINANCIAL SUMMARY

in USD ('000)

No	Description	2013	2014	2015	2016	2017	2018	2019	2020
1	Employees	90	246	389	695	784	960	1,141	1,214
2	Total Operational & Overhead Costs	237	384	410	747	809	958	869	959
3	Legal and License Costs	1,078	3,349	161	597	2,470	161	334	237
4	Partnerships*	119	219	2,864	931	1,240	181	379	154
5	Advisory Board	-	-	9	140	11	11	19	-
6	Capex	-	3	7	556	488	377	1,260	1,953
	TOTAL	**1,524**	**4,200**	**3,840**	**3,666**	**5,822**	**2,648**	**4,002**	**4,517**

*Dependent on the phasing of the implementation of agreed activities

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