## GREENPEACE

## Restoration up in smoke: Losing the battle to protect peatlands

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## Summary

2015 was a turning point for peatlands in Indonesia, a critical ecosystem that is rich in carbon and thus plays a crucial role in the climate crisis. In that year, large swathes of peatlands across Indonesia were burned, largely due to the expansion of large-scale palm oil and pulp plantations. With the dry season exacerbated by the climate phenomenon El Niño, fires lit to clear land for plantations raged out of control, resulting in the country's worst fire episode in nearly two decades.<sup>1</sup> In September and October 2015, the daily carbon emissions regularly exceeded those from the entire US economy.<sup>2</sup>

While the year was disastrous for peatlands, it also marked the beginning of Indonesia's journey to protect and restore its peat ecosystems, with the government announcing an ambitious target to restore some 2 million hectares (ha) of degraded peatlands.<sup>3</sup> The deadline for meeting that target was 2020.<sup>4</sup>

By restoring these peat landscapes, the Indonesian government aims to reduce the spread and intensity of peat fires and tackle the climate crisis at the same time by preventing the emissions caused by burning. Indeed, Indonesia will only achieve the emissions reductions it committed to in its Nationally Determined Contribution (NDC) to the Paris Agreement<sup>5</sup> if it succeeds in reducing deforestation, forest degradation and fires, particularly those affecting peatland.<sup>6</sup>



The government has claimed that the program was a success: according to the Ministry of Environment and Forestry, by the end of 2018 it had not only reached its target, but surpassed it by more than a million hectares through its own efforts as well as the private sector's.<sup>7</sup> A 2020 performance report stated that by the end of 2019 as many as 68 industrial forest (mainly pulpwood) companies and 212 palm oil companies had collectively restored over 3.47 million ha of their peat concessions, playing a crucial role in the country's peat restoration efforts.<sup>8</sup> While the government has not made the data available to back up these claims, it continues to tout these figures, as well as claiming that the decline in fires between 2015 and 2020 can be attributed to its successful peat restoration endeavor.<sup>9</sup>

1 Huijnen V et al (2016), World Bank (2015)

- 3 Cabinet Secretariat of the Republic of Indonesia (2016)
- 4 President of the Republic of Indonesia (2016a)
- 5 Indonesia has pledged to reduce its emissions unconditionally by 29% against the business-as-usual scenario by 2030, and by up to 41% with international assistance. See UNFCC (2016).
- 6 Wijaya A et al (2017)
- 7 Ministry of Environment and Forestry (2019)
- 8 DJ PPKL (2020) p128
- 9 Jong HN (2021), Puspa A (2021)

<sup>2</sup> Harris N et al (2015a)



But despite the government's claims, peatland clearance – including deforestation from the expansion of the palm oil and pulpwood industries – is still continuing and fires remain an annual occurrence in Indonesia, with the latest catastrophic fire season in 2019 nearly matching the scale of destruction in 2015.<sup>10</sup>

Greenpeace Indonesia<sup>11</sup> has attempted to verify the government's claims of success, but doing so has proven difficult due to the lack of transparency and accessibility of relevant information, inconsistent figures and missing maps of restored concession areas. In the absence of independent verification of the progress of peatland restoration, Greenpeace decided to conduct an analysis of the present condition of peatlands in Indonesia. The goal of this analysis is to establish the locations of the degraded peatlands which have been prioritized to be restored by the government and to assess the condition of the peat landscapes to see to what extent degraded peatlands show indications of restoration through the governmental program. The analysis revealed that almost a third of the analysed peatland hydrological units (PHUs) are in the 'intermediate critical' and 'high critical' status due to present land use for the cultivation of oil palm plantations and industrial forest plantations, such as for pulpwood. And despite existing restoration efforts, fires have continued to flare up inside these PHUs, further degrading them: between 2015 and 2019 there were fires in 200 of the 520 PHUs in the seven provinces prioritized to be restored by Indonesia's Peatland Restoration Agency (BRG),<sup>12</sup> with nearly 2 million ha affected.

Despite two-thirds of the analysed PHUs being in relatively good condition, these PHUs remain at risk of degradation. The presence of licensed oil palm and pulpwood plantations, coupled with the granting of new licenses on peatlands and PHUs, is contributing to both a continuing loss of peat and a growing risk of peat degradation.

12 Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan, South Kalimantan and Papua.

<sup>10</sup> Reuters (2019a)

<sup>11</sup> Further mentions of 'Greenpeace' in this report should be read as references to Greenpeace Indonesia unless otherwise indicated.



If strict measures for rehabilitation and protection are not rapidly implemented, these peatlands may soon reach critical levels of degradation, and a point where the damage is irreversible. This report's findings show that the government's current efforts to protect peatlands are not effective at preventing them from burning, as there are still many concessions and companies operating inside PHUs which continue to degrade their hydrological function by maintaining and extending canals, lowering the water table and expanding land clearance.

At the end of 2020, President Joko Widodo extended the peatland restoration deadline to 2024, and added mangrove rehabilitation to the restoration initiative.<sup>13</sup> The government agency tasked to lead the efforts, now called the Peatland and Mangrove Restoration Agency (BRGM), was given a new target to restore 1.2 million ha of peatlands and 600,000 ha of mangroves.<sup>14</sup> But if the government's approach to rehabilitating peatlands is not changed, with large-scale plantations still being allowed to operate in peatlands, the restoration initiative is set to fail. Furthermore, recent government policies aimed at spurring economic growth could open the door for more cultivation on peatlands. For example, uncertainties concerning the implementation of the Food Estate programme<sup>15</sup> within peatland regions, especially those in Papua and Central Kalimantan, bring potential risks of continuing forest and peatland degradation. Also, the regulations under the Omnibus Law are expected to have negative impacts on these landscapes because of the further weakening of social and environmental safeguards.<sup>16</sup>

Indonesia holds a significant percentage of global tropical peatland carbon stocks, and thus the country's peatlands have a critical role to play in the global efforts to tackle the climate crisis.<sup>17</sup> The cost of failure is simply too high. With the deadline for urgent action to meet the target of limiting the global temperature rise to 1.5 °C drawing near,<sup>18</sup> Greenpeace calls on all stakeholders to ramp up their efforts.

In Indonesia, this means the government must act immediately to address the weaknesses and close the loopholes in peatland protection and restoration regulations that are undermining their effectiveness.

- 15 Fitra S (2020)
- 16 Greenpeace Southeast Asia (2020b)
- 17 UNEP (2019)



<sup>13</sup> Jong HN (2021)

<sup>14</sup> Jong HN (2021), President of the Republic of Indonesia (2020b)

<sup>18</sup> IPCC (2018), Tollefson J (2018)

A comprehensive review of licenses that have been issued within peatlands and PHUs is also in order, to identify concessions that have contributed and are contributing to peatland degradation and fires, and to enforce the law on them accordingly.

Lastly, Greenpeace calls for stronger protection of PHUs in Indonesia by tailoring peat protection and restoration strategies to each PHU based on their status. For instance, a 'low critical' PHU might benefit from a moratorium on the issuance of new licenses and construction of new canals, whereas in a 'high critical' PHU which already has one or more largescale concessions in it an immediate review of existing licenses should be undertaken, with laws enforced and licenses revoked where appropriate.

Greenpeace believes that all peatlands should be protected and be off-limits for large-scale plantations, as such business practices have proven to be unsustainable regardless of the companies' supposed efforts to restore their concessions.

#### FFP Deployment at PT SUM Concession in Kubu Raya, West Kalimantan Burning peatland inside the palm oil concession of PT Sumatera Unggul Makmur (SUM) at Punggur

Burning peatiana inside the palm of concession PT Sumatera Unggul Makmur (SUM) at Punggul Kecil village, Sungai Kakap sub-district, Kubu Raya district, Pontianak, West Kalimantan. The Greenpeace Forest Fires Prevention team is deployed in the area for fire suppression and investigation. © Rendra Hernawan / Greenpeace

## Watch the Peatland



Peatlands are an essential ecosystem in Indonesia as they are critical for preserving biodiversity, regulating water flows across the landscape and minimising flood risk, and mitigating climate change.<sup>19</sup> Indonesian peatlands store huge amounts of carbon in their soil and biomass, especially in intact conditions, with on average about 12 times more carbon per hectare than tropical rainforests on mineral soil in insular Asia.<sup>20</sup>

20 Hergoualc'h K et al (2018)

<sup>19</sup> IUCN website 'Peatlands and climate change'



Figure 1. Mapped peat areas in Indonesia according to the Ministry of Agriculture (Ritung S et al (2011)), Wetlands International (Wahyunto et al (2006)) and the Regional Physical Planning Programme for Transmigration (RePPProT (1988, 1990)). This map shows the combination of these three map sets

Different peat maps estimate the area covered by Indonesia's peatlands at between 14.9 million ha and 30.9 million ha.<sup>21</sup> In 2019 the Ministry of Agriculture announced that it was producing a new peatland map,<sup>22</sup> but the complete map has not yet been published. A partial version of the map, which only covers the seven provinces, is available on the BRG website.<sup>23</sup>

Despite their importance, Indonesia's peatlands are at increasing risk of degradation and burning due to agricultural expansion, especially for oil palm and pulpwood. The plantation industries have been eyeing these ecosystems in recent decades as suitable lands with mineral soils have become increasingly scarce, with the majority of these having been converted into plantations and agricultural lands.<sup>24</sup> The loss and degradation of peatlands has been particularly severe in Sumatra and Kalimantan, the Indonesian part of Borneo. In 2015, only 426,000 ha of the total 5.78 million ha of peatland in Kalimantan, or 7.4%, remained in a pristine condition. In Sumatra the situation was even worse, with just 6% (436,000 ha of the total 7.23 million ha of peatland) showing no signs of human intervention.<sup>25</sup>

<sup>21</sup> The three available map sets are: Ritung S et al (2011); Wahyunto et al (2006) and similar publications for Kalimantan and Papua in 2004 and 2006, collectively referred to as the Wetlands International Peat Atlas; and RePPProT (1988, 1990).

<sup>22</sup> Ammurabi SD (2019)

<sup>23</sup> https://prims.brg.go.id/

<sup>24</sup> Rochmayanto, Y, Darusman, D & Rusolono, T (2013)

<sup>25</sup> Miettinen J, Shi C & Liew SC (2016)

Decades of unbridled cultivation on peatlands has made these ecosystems a major contributor to the annual fires in Indonesia, with drainage and deforestation greatly exacerbating the risk of burning.<sup>26</sup> While the fires crises of 2015 and 2019 have recently drawn international attention, land and forest fires are not a new thing in Indonesia. The first great fires in Indonesia happened in 1982-1983. According to data from the World Resources Institute (WRI), around 3.2 million ha burned on the islands of Sumatra and Borneo during this episode, including 2.7 million ha of tropical forests; an in-depth field study reportedly determined the cause of the fires to be not drought but 'the changed condition of the forest' as a result of extensive logging activities.<sup>27</sup> Widespread fires occurred repeatedly over the following decade<sup>28</sup> and have now become an expected occurrence in the dry season, mainly due to intentional burning for agricultural purposes.<sup>29</sup> These annual fires have contributed substantially to the climate crisis because when peatlands are burned, they release large amounts of gases and particles, including carbon dioxide, methane and fine particulate matter  $(PM_{25})^{.30}$ Carbon dioxide and methane are potent greenhouse gases that warm the climate.<sup>31</sup> PM<sub>25</sub> is a mix of fine particulates known for having negative health effects.<sup>32</sup>

If not managed properly in a sustainable manner, peatlands will become a ticking time bomb for the global climate crisis, with deforestation, drainage and fires leading to the inevitable release of their stored greenhouse gases into the atmosphere.<sup>33</sup> This could threaten international efforts to limit global warming to 1.5 °C. The planet's average temperature has already increased by 1 °C over pre-industrial levels, and scientists estimate that we only have until 2030 to take actions that could limit warming to the target of  $1.5 \,^{\circ}$ C.<sup>34</sup>

As one of the world's biggest emitters and also one that's highly affected by the climate crisis,<sup>35</sup> in its Nationally Determined Contribution (NDC) to the Paris Agreement Indonesia has committed to reduce its greenhouse gas emissions by 29% over business-as-usual by 2030 through its own efforts, and by up to 41% with international assistance.<sup>36</sup> Deforestation and peatland fires have reportedly accounted for half of Indonesia's carbon emissions so far this century,<sup>37</sup> and immediate action to reverse this trend is imperative if the government is to meet its 2030 emissions reduction target. There is no more time to waste.

The impacts of the climate crisis are already being felt in Indonesia, and they are expected to continue to increase in frequency and intensity. In early 2021, the country suffered a series of natural disasters. By the end of January 185 such events, dominated by floods and landslides, had already been recorded by the National Disaster Mitigation Agency (BNPB) in a number of regions, such as West Java, South Kalimantan and North Sulawesi.<sup>38</sup> According to the BNPB, seven of 10 natural disasters in Indonesia, such as droughts, floods, landslides, forest fires and extreme weather events, are linked to climate change.<sup>39</sup>

These events are affecting not only people's lives, but also the economy – and the costs of dealing with natural disasters will continue to increase as the climate crisis accelerates and their incidence grows. In recognition of this trend, the Indonesian government recently borrowed US\$500 million from the World Bank with the aim of strengthening the country's financial and fiscal resilience against the risks of natural disasters, climate change and risks originating from the health sector.<sup>40</sup>

28 Barber CV & Schweithelm J (2000) p7

- 30 Hu Y et al (2018)
- 31 See US EPA website 'Carbon dioxide emissions' and US EPA website 'Methane'.
- 32 US EPA website 'Particulate matter (PM) basics
- 33 Nikonovas T et al (2020)34 Tollefson J (2018)
- 35 Carbon Brief (2019)
- 36 UNFCC (2016)
- 37 Nikonovas T et al (2020
- 38 Sutrisno B (2021)
- 39 Harsono FH (2019)
- 40 CNN Indonesia (2021)

<sup>26</sup> Nikonovas T et al (2020)

<sup>27</sup> Barber CV & Schweithelm J (2000) p6

<sup>29</sup> See eg Haniy SU, Hamzah H & Hanifah M (2019), Reuters (2019b).



Figure 2. 15 September 2019: Burning and haze inside and surrounding the Kahayan River–Sebangau River PHU in Central Kalimantan. Image Source: NASA EOS.

In an effort to decrease the scale and incidence of peat fires and tackle the climate crisis in the process, the Indonesian government has been rolling out a series of policies to protect and restore peatlands. Among the policies aimed at protecting the remaining peatlands are a moratorium on issuing new permits for development of primary forests and peatlands,<sup>41</sup> a moratorium on new oil palm concessions,<sup>42</sup> and the establishment of protection zones inside peatland.

<sup>41</sup> President of the Republic of Indonesia (2011)

<sup>42</sup> President of the Republic of Indonesia (2018)

## What are the government policies and actions on protecting and restoring peatland?

Efforts to protect peatlands in Indonesia started back in 1990, when the government declared that all peatlands with thickness of 3 metres or more should be protected.<sup>43</sup> However, these measures proved insufficient. In 1997 the country experienced its worst El Niño-related drought in a century.<sup>44</sup> Warnings to avoid burning to clear land for planting – an increasingly common practice – were ignored, and in the dry conditions fires lit to clear specific areas quickly burned out of control.<sup>45</sup> Though estimates of the total damage vary, it is thought that some 11.7 million ha burned in the 1997–98 fires, including large swathes of peatlands on the islands of Sumatra and Kalimantan and in West Papua.<sup>46</sup> The fires are thought to have released between 0.81 and 2.57 Gt of carbon into the atmosphere, equivalent to 13–40% of the mean annual global carbon emissions from fossil fuels.<sup>47</sup> This is regarded as one of the greatest man-made environmental disasters in the history of Indonesia, and it is estimated to have cost the country US\$4.5 billion in fire- and haze-related damages.<sup>48</sup>

As a response to the 1997 fires, the Indonesian government established a national coordination team to mitigate land and forest fires.<sup>49</sup> In 2001, the government strengthened its policies on burning by issuing a regulation on control and repair of the associated environmental damage and pollution.<sup>50</sup> However, while the regulation stipulated general criteria for damage to peatlands from fire, it did not mandate the restoration of degraded peatlands.

It was not until 2009 that the government introduced the concept of peatland restoration through the new Environmental Law (Law 32/2009 on Environmental Protection and Management).<sup>51</sup> This was followed by a 2014 regulation on peatland protection and management, which banned virtually all conversion of peatlands for plantations and encouraged peat restoration.<sup>52</sup>



<sup>43</sup> President of the Republic of Indonesia (1990)

<sup>44</sup> Murty TS, Scott D & Baird W (2000)

<sup>45</sup> Barber CV & Schweithelm J (2000) pp7-11

<sup>46</sup> Tacconi L (2003) p5

<sup>47</sup> Page SE et al (2002)

<sup>48</sup> Economy and Environment Program for Southeast Asia & World Wildlife Fund for Nature (1998) p2

<sup>49</sup> Minister of Environment (1997)

<sup>50</sup> President of the Republic of Indonesia (2001)

<sup>51</sup> President of the Republic of Indonesia (2009)

<sup>52</sup> President of the Republic of Indonesia (2014)



But despite these measures, in 2015 widespread fires again burned uncontrollably across Indonesia. The 2015 fires were the worst the country had seen since 1997 and are considered one of the biggest environmental disasters of the 21st century. They destroyed some 2.6 million ha, 33% of which was peatland.<sup>53</sup> Smog from the fires reached Singapore and Malaysia,<sup>54</sup> resulting in tens of millions of people being exposed to levels of air pollution ranging from unhealthy to deadly.55 Overall, the fires caused an estimated US\$16.1 billion in economic loss,<sup>56</sup> more than three times the financial damage in 1997. The 2015 fires were also disastrous for accelerating climate change. They were the largest single source of carbon emissions from Indonesia since 1997, contributing up to 97% of all carbon emissions in the country that year.57 By mid-October it was estimated that the fires had released 1,043 million tonnes of CO<sub>2</sub>eq into the atmosphere, with the daily

- 55 Greenpeace Southeast Asia (2020a)
- 56 World Bank (2016) 57 Huijnen V et al (2016)
- 58 Harris N et al (2015a)
- 59 Mursid F (2020)
- 60 Cabinet Secretariat of the Republic of Indonesia (2016), President of the Republic of Indonesia (2016a)

carbon emissions in September and October regularly exceeding those from the entire US economy.<sup>58</sup>

In the wake of the 2015 fire episode, the government launched an initiative to restore 2.6 million ha of degraded peatland in the country.<sup>59</sup> To support this initiative, President Joko Widodo established the Peatland Restoration Agency (BRG) in 2016.<sup>60</sup> Prior to the establishment of the BRG, efforts to restore peatlands in Indonesia had been scattered and lacked focus, with no specific target. The agency was charged with leading and coordinating peat restoration efforts in seven priority provinces that had been heavily affected by the fires in 2015: Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan, South Kalimantan and Papua. These provinces were chosen because they all have vast areas of degraded peatland.

<sup>53</sup> World Bank (2016) p1

<sup>54</sup> Field RD et al (2016)

Undisturbed peatland is less prone to fires,<sup>61</sup> so the hope is that restoring peatland in Indonesia will contribute to a decline in the intensity and spread of fires. If peatland is not burned, the carbon it stores is preserved underground and thus does not contribute to the nation's greenhouse gas emissions.

The restoration of peat ecosystems is carried out with reference to a technical guideline issued by the Ministry of Environment and Forestry (MoEF) in 2017.62 The guideline includes instructions on how to restore the hydrological function of a peat ecosystem through the use of canal blocks, rainfall monitoring stations, water level monitoring wells and automatic water level monitoring equipment, as well as how to restore the natural vegetation. It stipulates that peatland restoration is to be carried out through natural succession (restoration without human intervention), hydrological restoration (rewetting), rehabilitation of vegetation (replanting) or 'other means in accordance with the development of science and technology'.63



#### Forest Fires in Pelalawan Riau

Aerial view from a helicopter of fires at forest and palm oil plantation in peatland area in Pangkalan Terap, Teluk Meranti, Pelalawan regency, Riau. Riau Province Forest Fires Task Force still try to extinguish the fire in the peatland area from the air and on the ground. © Rony Muharrman / Greenpeace

61 Turetsky MR et al (2015)

- 62 Minister of Environment and Forestry (2017)
- 63 Minister of Environment and Forestry (2017) pp5-6



#### **Peat restoration pitfalls**

When the BRG was established, the public expected the agency to be able to lead efforts to restore peatlands, including those within concessions that fall under the obligation of the private sector. The 2.6 million ha target set by the government included 900,000 ha outside concession land and 1.7 million ha inside concessions owned by industrial forest plantation and palm oil companies.<sup>64</sup>

In December 2016 the BRG sent letters to 25 forestry companies, ordering them to restore more than 200,000 ha of peatlands.<sup>65</sup> These 25 firms were all indicated to have canals in their concessions, which drain water from the peat domes there and degrade the peat, rendering it extremely combustible. The MoEF, however, declared the BRG's letters illegal, arguing that the agency did not have the authority to order companies to carry out their restoration obligations.<sup>66</sup>

The government's peat restoration and protection efforts also received opposition from the private sector, including pulp and paper companies. When the government banned companies from cultivating on deep carbon-rich peatlands through its 2014 peat protection regulation, the Indonesian Association for Forest Concession Holders (APHI) stated that it planned to challenge the regulation in court.<sup>67</sup> And when the government revised the regulation in 2016,<sup>68</sup> APHI sent an objection letter to President Widodo, arguing that the regulation would seriously damage the pulp industry by requiring companies to set aside parts of their concessions to be conserved and restored.<sup>69</sup>

These pushbacks from the industry seemed to bear fruit when the government issued some stipulations that gave firms leniency on protecting and restoring their peat concessions, as well as some leeway to continue cultivating on the fragile ecosystems. In 2019, the MoEF weakened regulations on peatland protection by issuing a new regulation that limits protection to the area of a peatland ecosystem where the peat is the thickest.<sup>70</sup> And in 2020, despite widespread criticism, the government passed into law an 'omnibus bill'<sup>71</sup> that contains numerous deregulation measures designed to weaken environmental protections and lower the standards to which companies from the palm oil and pulp sectors are held when opening up new areas for their plantations.<sup>72</sup> This means a potentially even greater risk of fire within the plantation sector, with even less liability risk for companies.

All these rollbacks increase the possibilities for companies to continue operating on and further degrading peatlands, in the name of profit. But even before these concessions were made, the Indonesian government had never totally banned companies from cultivating on peatlands, even though the vast majority of these areas in Indonesia were in the process of and at high risk of degradation.

- 66 Kompas (2017)
- 67 Laoli N (2015)
- 68 President of the Republic of Indonesia (2016b)69 Muhanda AD (2017)
- 70 Jong HN (2019a)
- 71 Ghaliya G (2020)

<sup>64</sup> Jong HN (2021), Mursid F (2020)

<sup>65</sup> Kompas (2017)

<sup>72</sup> Greenpeace Southeast Asia (2020b)

The absence of serious intention from the government to ban all large-scale plantation activities in peatlands is shown by the division of peat areas through government regulations. The government divides peat ecosystems into two categories based on their functions – protection and production – as stipulated in Article 9, item 2 of the 2016 revision to the peatland protection regulation.<sup>73</sup>

The regulation states that protected peatland must make up at least 30% of each peatland hydrological unit (PHU). Beyond this 30%, the protected status is extended to:

- A. Peatland with a depth of three metres or more;
- B. Areas containing specific and/or endemic germplasm (genetic resources that are only found in a certain area, location or type of habitat, or on a certain island, and naturally not found elsewhere);
- C. Areas containing species that are protected by the law; and/or
- D. Peat ecosystems that are inside protected zones as stipulated in spatial plans, protected forest areas and conservation forest areas.

Additional peatland within the PHU that does not meet any of these criteria is determined as a cultivation peat zone, which allows these areas to be used for plantations.

The regulation also prohibits degradation of all peatlands. It stipulates that protected peatland will be considered degraded if evidence of any of the following exists:

- A. Artificial drainage
- B. Sediment with pyrite and/or quartz exposed below the peat layer
- C. A reduction in the area and/or volume of the designated protected zone

For a cultivation function peatland to be determined to be degraded, it has to meet one or both of the following criteria:

- A. Groundwater level more than 0.4 metres below the peat surface
- B. Sediment with pyrite and/or quartz exposed below the peat layer

All peatland with a depth of less than one metre is considered degraded.

To avoid peat degradation, the regulation bans anyone from:

- A. Clearing new land until the protected and production zones inside peat ecosystems are determined;
- B. Constructing drainage canals that dry out peatland;
- C. Burning peatland and/or allowing fires to occur through neglect; and/or
- D. Carrying out other activities that cause peat ecosystems to be degraded in the ways mentioned above.



<sup>73</sup> President of the Republic of Indonesia (2016b)

#### Damming Activity in Central Kalimantan Environmental activists unfurl a banner

Environmental activists unfurl a banner reading 'Forest protection now' at Paduran village, Pulang Pisau district in Central Kalimantan. © Ulet Ifansasti / Greenpeace

# PULIHKAN GAMBUT, CEGAAH KEBAKARAN

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GREENPEACE

## Check on Claims on Peat Protection and Restoration Progress by the Government

What's the progress of Indonesia's peatland protection and restoration?

The year 2021 marks five years since the BRG was established and Indonesia's peatland restoration programme started. Considering the increasing threats posed by the climate crisis and extreme weather events, such as prolonged drought, it's important to assess how well peatland is actually being protected and how successful restoration efforts have been, including how much of Indonesia's peatlands have been restored to date.



Graph 1: Government claims on peat restoration progress, from various sources.

As the above graph shows, there have been differing claims on the area of peatlands that have been restored by the government, companies and other stakeholders. The following sections describe the respective assessments by the BRG, the MoEF and the 2020–2024 National Medium-Term Development Planning Strategy (RPJMN).

### BRG

According to data from the BRG, by the end of 2020 initial efforts had been made to rewet as many as 835,288 ha of peatland outside concessions, representing 94% of the agency's restoration target.<sup>74</sup>

To look into the details of this achievement, Greenpeace sent two Freedom of Information requests to the BRG in early 2020. The following data was received in response:<sup>75</sup>

- A table detailing a target restoration area of 2,676,601 ha, which consists of a total of 1,798,803 ha in concession areas and 877,798 ha outside concessions, in seven provinces;
- A map and a table detailing rewetting efforts by the BRG, which had undertaken a total of 20,321 projects to block canals, drill deep wells and backfill canals in six provinces (no data were available for Papua); and

3. A map showing the areas that have been impacted by restoration efforts in 2016–2018, covering a total of 528,189 ha.

The BRG claims that these restoration efforts helped to reduce Indonesia's greenhouse gas emissions in the period of 2017–2019 compared to 2012–2014.<sup>76</sup> Peat emissions in 2017–2019 also fell below the average of 2006–2015, which the BRG attributes to the decline in fires and peat decomposition. It is worth noting, however, that the level of greenhouse gas emissions from forest and peatland fires in 2015 was very high, with an estimated 692 million tonnes of CO<sub>2</sub> released<sup>77</sup> due to the sheer amount of carbon-rich peatland that was burned.

<sup>74</sup> BRG (2020b)

<sup>75</sup> BRG (2020a)

<sup>76</sup> BRG research 2020

<sup>77</sup> Huijnen V et al (2016)

#### **Peatlands divided by authorities**

According to the BRG website,<sup>78</sup> the BRG and the Ministry of Agriculture are responsible for supervising the restoration of 555,659 ha of the total area of peatland inside concession areas (mostly oil palm concessions) that is to be rehabilitated. They only monitor the restoration done by concession holders, and are not responsible for doing the restoration themselves. The BRG claims that by the end of 2020 restoration efforts had begun in 538,429 ha of plantations, or 96.89% of the target of 555,659 ha.<sup>79</sup> Meanwhile, the MoEF is the institution that supervises peatland restoration activities in the remaining ~1.2 million ha of industrial plantation areas targeted to be restored, which mostly consist of pulpwood plantations. These are located inside forest areas that fall under the authority of the MoEF, whose Directorate-General of Environmental Degradation and Pollution Mitigation (DJ PPKL) has requested that the BRG focus only on restoration efforts outside forest areas, often referred to as 'areas for other use' (APL).<sup>80</sup> Supervision authority in industrial forest concessions in forest areas is thus completely under the MoEF – a division of responsibility that precludes an integrated approach to peatland management and restoration efforts at the peat hydrological unit level.

### Ministry of Environment and Forestry

In the DJ PPKL's 2019 performance report, the MoEF claimed that between 2015 and 2019 it had restored 3.47 million ha of peatland, in 68 industrial forest concessions and 212 oil palm plantations. However, these figures appear to be based on self-reporting from the 280 companies of their plans to restore the peatlands in their concession areas and of the progress of those plans.<sup>81</sup> In the period of 2016–2018, the ministry claimed that a total of 3.1 million ha of peatland, both in concessions and outside concessions, were restored: 2,226,781 ha in industrial forest areas, such as for pulpwood; 884,580 ha in plantation areas, such as for oil palm; and 8,382 ha in local communities' lands.<sup>82</sup>

Based on these figures, the ministry claimed it had been able to reduce greenhouse gas emissions by 190.6 million tonnes of  $CO_2$ eq in 2018.<sup>83</sup> As a comparison, the 2019 fires in Indonesia released an estimated 708 million tonnes of  $CO_2$ eq into the atmosphere.<sup>84</sup>

- 78 BRG website 'Program Kerja'
- 79 BRG website 'Infografis'
- 80 BRG website 'Program Kerja 81 DJ PPKL (2020) p128
- 81 DJ PPKL (2020) p12882 Ministry of Environment and Forestry (2019)
- 83 Ministry of Environment and Forestry (2019)
- 84 Jong HN (2019c)

#### **National Medium-Term Development Planning** Strategy (RPJMN)

According to the 2020-2024 RPJMN, only 143,448 ha of areas inside concessions have been restored, or 8% of the reported 1,784,353 ha target.<sup>85</sup> This is a far cry from the 3.47 million ha claimed by the MoEF.

With all these differing claims, Greenpeace requested the following information from the ministry in early 2020 to verify its peat restoration achievement claims:

- 1. A list of the 212 oil palm concessions and 68 industrial forest concessions said to have their peatland rewetted in 2016-2019;
- 2. A map showing the locations of the 3.47 million ha of restored peatlands; and
- 3. An explanation of the methodology and the verification of data collection done on all areas claimed to have been restored.

At the time of writing of this report, the only response received has been to say that the request is still being processed.

Civil groups have also tried to acquire data on companies' plans to restore peatlands in their concessions that have been submitted to, and subsequently approved by, the MoEF, but to no avail.<sup>86</sup> The differing figures reported highlight the importance of data transparency - with the government not making data to back up its claims publicly available, it is impossible to verify the ministry's figures or hold the government to account.

In the meantime, peatland clearance, including deforestation from the expansion of the palm oil and pulpwood industries, continues unabated.<sup>87</sup> Furthermore, land and forest fires are still an annual occurrence in Indonesia, though the intensity fluctuates from year to year. The scale of the fires in 2019 nearly matched that of 2015, despite massive government spending on various measures to combat them, including water bombing<sup>88</sup> and artificial rain.<sup>89</sup> Because of the extent of the fires peatland emissions again increased in 2019, with the level in September approaching that of the 2015 fire disaster - an estimated 420 million tonnes of CO<sub>2</sub>eq, compared with 478 million tonnes in 2015.<sup>90</sup> This spike in emissions has threatened to derail Indonesia's efforts to reach its 2030 target, as well as calling into question the effectiveness of the government's peat restoration program and the seriousness of its commitment to protect peatlands.

- 85 President of the Republic of Indonesia (2020a)
- See Koalisi Anti Mafia Hutan (2019). 86
- 87 Greenpeace Indonesia (2019)
- Purnamasari DM (2019) 88 Antara (2019) 89
- The total emissions from the 2019 fires are estimated at 708 million tonnes CO, eq, compared with 1,385 million tonnes CO, eq in 2015 (see Jong HN (2019c)).

## **Recurring Fires** on Peatlands



To determine whether the government's efforts to restore peatlands have been effective in curbing fires or not, Greenpeace studied the occurrence of fires in PHUs and in areas that were affected by the restoration programme in 2016–2018. One of the indicators that an area has been impacted by the restoration programme is the presence of peat rewetting infrastructure put in place by the BRG and the MoEF, such as canal blocks, deep wells and canal backfilling.

#### Initial Findings from the spatial analysis on burned areas within PHUs

### 1. Fires continue to occur in many areas impacted by the restoration programme

According to the BRG map, 528,189 ha of peatland have been impacted by the restoration programme, 36.5% of which are located in areas targeted to be restored in 2016–2020, while the rest are located in non-target areas (but still inside priority areas).<sup>91</sup> Spatial analysis by Greenpeace of the MoEF's burned area maps<sup>92</sup> shows that 62,706 ha (12%) of peatland in the affected areas burned in the period 2016–2019. Most of the burning – some 49,446 ha – occurred in 2019, with nearly half of it (23,201 ha) on land that had previously burned in 2015–2017, indicating that repeated fires are likely to happen in these areas.

91 The government has made it a priority to restore degraded peatlands within the 12.9 million ha of PHUs in seven provinces, but only 2.6 million ha of them were targeted to be restored from 2016 to 2020. For further explanation, see BRG website 'Rencana strategis badan restorasi gambut 2016-2020'.
92 Data from https://geoportal.menlhk.go.id/arcgis/rest/services/KLHK, currently available at https://dbgis.menlhk.go.id/arcgis/rest/services.

#### 2. Many PHUs are still burning

Analysis of burned areas inside the 520 PHUs in the seven provinces prioritised to be restored revealed that there had been fires in 200 of the PHUs in 2015–2019, with a total of nearly 2 million ha burned. The majority of the fire damage occurred in 2015, when 1.28 million ha burned inside 150 PHUs. Between 2016 and 2019, when the peat restoration program was being carried out, over 936,000 ha burned in 186 PHUs, just 50 of which had not burned in 2015. The fires in 32 of these 50 PHUs occurred in 2019, accounting for 11,800 ha of the total damage. The vast majority of the burning – 916,000 ha – occurred in the 136 PHUs that had already sustained fire damage in 2015. Most of this burning took place in 2019, when fires in 161 of the 186 PHUs affected by fire in the years 2016–2019 destroyed some 706,000 ha.



Graph 2. Peat hydrological units with burned areas between 2015 and 2019.

From this data we can observe that the area which burned inside the PHUs in 2019 was more than half (55%) that which burned in these areas in 2015, even though restoration efforts had been going on for four years and trillions of rupiah had been spent on firefighting measures.<sup>93</sup>

93 Bernie M (2019), Jong HN (2019b)





**Forest Fires in Tanjung Taruna, Central Kalimantan** Greenpeace Indonesia Forest Fire Prevention (FFP) Team extinguish the fires at plantation and forest in Tanjung Taruna, Sub-district Jabiren Raya, District Pulang Pisau, Central Kalimantan, Indonesia. © Ulet Ifansasti / Greenpeace



#### 3. Most burning occurred in PHUs with concessions

Of the 520 PHUs analysed, 220 contained areas occupied by oil palm and industrial plantation concessions. Together, the concessions cover a total of 6,053,661 ha in these PHUs. There were fires in the vast majority of the 220 PHUs containing areas licensed for concessions between 2015 and 2019. During this period a total of 1,862,850 ha burned in these PHUs, representing 97% of the total burned area in all the PHUs in the priority provinces. In 2019, this subset accounted for 99% of the total burned area in the PHUs in the priority provinces – 697,752 ha of a total of 706,000 ha. 99% of the canals are also located in these 220 PHUs, stretching 221,096 km.

### 4. Fires still occur in PHUs with peat rewetting infrastructure

Between 2016 and 2019 peat rewetting infrastructure was put in place in 64 PHUs, with varying numbers in each PHU. Despite this, fires still burned 527,000 ha in these 64 PHUs in 2019.

The logical expectation might be that the PHUs with more peat rewetting infrastructure would be less susceptible to burning. However, in 2019 the 19 PHUs in which more than 200 infrastructure construction projects had been undertaken accounted for nearly half of the total area burned in these 64 PHUs (260,000 ha). There were even some PHUs in which more than 1,000 peat rewetting projects were implemented during this period – but this infrastructure was not able to prevent fires in these areas, with 165,000 ha of peatland in four such PHUs going up in flames in Central Kalimantan Province in 2019.

This analysis shows that burning is still rampant even in PHUs with large amounts of peat rewetting infrastructure. For example, there have been at least 5,321 peat rewetting infrastructure projects undertaken in the Kahayan River–Sebangau River PHU in Central Kalimantan, but fires still engulfed 72,800 ha of peatland in that PHU in 2019.

These findings show that most PHUs and areas that have already been impacted by the restoration programme are still vulnerable to fires, even after four years of peat restoration efforts.

## PHU Assessment



To further assess the effectiveness of the peat restoration efforts, Greenpeace has conducted an analysis on the condition of peatlands in Indonesia. The goal of this analysis is to understand which areas of Indonesia's peatlands show indications of restoration efforts undertaken as part of the governmental programme that aimed to restore 2.6 million ha of degraded peatland by 2020.94

In this analysis, Greenpeace focused on peatland hydrological units, which are peat ecosystems located between two rivers, a river and a sea, and/or in swamps. Land use practices in PHUs can impact the hydrological function of PHUs.

To conduct the analysis, Greenpeace looked at various available datasets. Three data sources often cited for peatland maps are the Ministry of Agriculture,95 RePPProT<sup>96</sup> and Wetlands International, <sup>97</sup>

<sup>94</sup> Purnamasari DM (2020)

<sup>95</sup> The Ritung et al (2011) maps are available in Agus F et al (2016) pp43-46. A partial version of the 2019 map, which only covers the seven priority provinces, is available on the BRG website: https://prims.brg.go.id/. 96 The RePPProT maps are available at https://databasin.org/datasets/eb74fe29b6fb49d0a6831498b0121c99/.

<sup>97</sup> The Wetlands International maps are available at http://www.wetlands.or.id/publications\_maps.php.



#### Why analyse PHUs?

PHUs are mapped areas considered by the MoEF for management decisions on peatlands.<sup>98</sup> Furthermore, PHUs play an important role in the peat ecosystem to maintain the water balance. Water tables within PHUs are interconnected; peat domes store water which wets dryer areas of lower-level terrain during the dry season, lowering the risk of fires spreading in these landscapes.

If a part of a PHU is being drained, the water storage function of the PHU as a whole will be affected. This might impact the water table of parts of the PHU at higher elevations, like the peat domes. If this happens continuously, without efforts to balance the water tables in the PHU, then the peat will become dry and decomposed. Its peat soil will also sink. All of this will make the PHU prone to burning during the dry season, and flooding during the rainy season. Once the peat catches fire, it is difficult to extinguish the blaze. The PHU is thus a part of the peat ecosystem that must be well managed for its peat protection and other landscape functions, such as regulating water cycles, preserving biodiversity and sustainable land use. It is of critical importance to restore degraded peatlands and maintain these as resilient landscapes to mitigate fire risks and further degradation. Without restoration, these landscapes are increasingly sensitive to fires and are not able to maintain their important functions – including their vital role in the present climate crisis as carbon stores.

Unfortunately, the Indonesian government's concept of PHU management still accommodates corporate interests, allowing large-scale plantations with long stretches of canals on the edges of peat domes and in areas that are classified by the government as peat cultivation function zones. At present, at least 231,400 km of canals have been built in PHUs for the purposes of drainage.

Due to the critical role PHUs play, an assessment of the condition of these ecosystems is the best way to measure the success of any government efforts to protect and restore peatlands. Analysing the impacts these efforts are having on specific PHUs provides a far better indication of their effectiveness than simply looking at the overall number of hectares that the government claims have been restored.

<sup>98</sup> Barus B, Gandasasmita K & Kusumo R (2009)



Figure 3. Peat hydrological map.<sup>99</sup>

#### **Distribution of PHUs in Indonesia**

In Indonesia, there are 865 PHUs spread throughout the islands of Sumatra, Kalimantan, Sulawesi and Papua. These PHUs occupy 24.1 million ha, or 12.8% of the country's land mass.

Half of this area – 12 million ha – is designated to be cultivated. In terms of degradation status, 13.2% of the total area in the 865 PHUs is either moderately or heavily degraded. Nearly all of the remaining area is mildly degraded. Within the PHUs, there are an estimated 10.9 million ha to 19.9 million ha of peatland, depending on which map is used.

 $99 \hspace{0.1in} \textbf{Source: http://pkgppkl.menlhk.go.id/v0/fungsi-ekosistem-gambut-nasional-skala-1250-000/.}$ 



#### **Distribution of PHUs in seven provinces**

Because the Indonesian government, through the BRG, has prioritised peat restoration in seven provinces, Greenpeace decided to focus its analysis on the 520 PHUs in these priority provinces, covering a combined area of 20.7 million ha. In the Sumatran provinces of Riau, Jambi and South Sumatra, there are 105 PHUs, while in the Kalimantan provinces of West Kalimantan, Central Kalimantan and South Kalimantan there are 161 PHUs. Lastly, there are 254 PHUs identified in Papua Province.

Within these 520 PHUs, 10.5 million ha (51%) are designated as cultivation zones. 13.2% of the total area in these PHUs is either moderately or severely degraded, while nearly all the rest is mildly degraded.

Of the 9.4 million ha of forest cover in all PHUs in Indonesia, 82.3% is located in the seven priority provinces. Of the 1.1 million ha within PHUs that have already been converted into industrial plantations, such as pulpwood, 97.6% are in the seven provinces. Similarly, 78,7% of the 3.676 million ha that have been converted to oil palm plantations are located in these provinces, as are 97% of the 231,400 km of canals that have already been built in PHUs. In terms of concession permits, the government has issued licenses for 3.7 million ha of industrial plantations in PHUs, and for 2.4 million ha of oil palm plantations. Nearly all of them are in the seven priority provinces.

The total area of peatland in these PHUs is estimated to be between 9.7 million ha and 17.1 million ha.

The Ministry of Agriculture has produced two versions of its peat map: one in 2011, and an updated version in 2019. The complete 2019 map has not yet been published, but a partial version covering the seven priority provinces is available on the BRG website.<sup>100</sup> Within these provinces, the area of peatland shown on the 2019 maps is 24% smaller than on the 2011 maps. According to these maps, the largest decrease of peat area happened in Papua Province, which has 1 million ha (61.8%) less peat in 2019 than it did in 2011.

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100 https://prims.brg.go.id/

### Methodology

Greenpeace conducted a spatial analysis on the PHUs in the seven priority provinces using **10 criteria to determine their level of degradation**. These criteria are:

- 1. Peatland distribution
- 2. Peat function area
- 3. Peat damage status according to data from MoEF
- 4. Peat canal existence
- 5. Peat restoration plan
- 6. Peat rewetting infrastructure
- 7. Natural forest cover
- 8. Areas protected by the government's moratorium on new development of primary forests and peatlands
- 9. Burned area size
- 10. Area cover of oil palm and industrial plantation concessions

Based on these 10 criteria, Greenpeace divided the PHUs into **three conditions: low critical, intermediate critical** and **high critical**. For example, assuming no large discrepancies in the other factors, the condition of a PHU with more/longer canals, larger burned areas and more concessions would be judged more critical than that of other PHUs with fewer/shorter canals, smaller burned areas and fewer concessions.

Greenpeace conducted the spatial analysis by overlaying peat-related maps with the PHU as a unit of analysis. We then determined the relative extent of each criterion in the PHU area. To determine whether a PHU was above or below average for a certain criterion, such as the area protected by the moratorium on new development, we calculated the average of each criterion for each of the islands (Sumatra, Kalimantan and Papua).

Based on the criteria, we classified the PHUs into **five levels of degradation** – very high disturbance, high disturbance, medium disturbance, low disturbance and almost not disturbed – **depending on the severity of the degradation in the PHUs**. Then we looked at the PHUs with a critical level of degradation to further divide them into three categories – **low critical**, **intermediate critical** and **high critical** – based on the key variables of canal length, burned area and concessions.

### **Critical PHUs in the seven priority provinces**







## GREENPEACE

#### PHU in 7 Provinces:

	#PHUs	Papua	Kalimantan	Sumatra
High Critical	56	1	19	36
Intermediate Critical	110	7	64	39
Low Critical	354	246	78	30

Figure 4. Maps of critical PHUs in seven provinces.

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## **Main results**

#### **High critical: 56 PHUs**

Region	High critical	Area
Sumatra	36 PHUs	5.6 million ha
Kalimantan	19 PHUs	3 million ha
Papua	1 PHU	57,000 ha

High critical PHUs are PHUs with severely degraded peatland, large areas covered by oil palm and industrial plantations, limited moratorium areas, few peat rewetting efforts, extensive canals, large burned areas and large areas covered by concession permits. The findings in this category were as follows:

#### 1. Peatland distribution

Greenpeace identified 56 high critical PHUs covering a total of 8.6 million ha in the seven provinces. In other words, while only 10.8% of the 520 PHUs are in the high critical category, these PHUs account for 41.7% of the 20.7 million ha total in PHUs in the seven priority provinces.

#### 2. Size of burned areas

Within these 56 PHUs, 1.2 million ha burned in 2015–2019. In 2016–2019, 220,000 ha that had previously burned in 2015 burned again, together with 318,000 ha not damaged by the fires in 2015. 399,000 ha burned in 2019.

#### 3. Peat canal existence

In these 56 PHUs, there are 154,000 kilometres (km) of canals, representing 68.8% of the total length of canals in all 520 PHUs in the seven provinces.

#### 4. Size of oil palm and industrial plantation concessions

Licenses for oil palm and industrial plantations have been granted in each PHU, covering between 4.3% and 98.1% of the total area (with an average coverage of 55%). The area covered by concession permits in these 56 PHUs represents 67% of the total permit area in all 520 PHUs.

### 5. Areas protected by the government's moratorium on new development of primary forests and peatland

Only 15 of the 56 high critical PHUs have relatively large areas of forest cover and areas protected by the moratorium, compared to the average of other PHUs in each peat restoration priority province.

#### 6. Peat rewetting infrastructure

Only 20 of the high critical PHUs are home to a larger than average number of peat rewetting infrastructure projects.



Forest Fires in Jekan Raya, Central Kalimantan An Indonesian policeman tries to extinguish the fires at plantation and forest in sub-district Jekan Raya, Palangkaraya city, Central Kalimantan, Indonesia. © Ulet Ifansasti / Greenpeace



To further assess the extent of damage in these high critical PHUs and measure the effectiveness of the government's peat restoration efforts, Greenpeace looked at the burned areas in the 20 PHUs which already have peat rewetting infrastructure in them as well as the nine PHUs that have relatively small areas covered by industrial and oil palm plantations. Here are the findings:

#### • Fires are still burning in PHUs with peat rewetting infrastructure

Even in the 20 PHUs that are identified as 'restored' due to the large amount of peat rewetting infrastructure, fires still occurred, burning 378,000 ha in 2016–2019.

Almost half the total area in these PHUs (46.8%) has been licensed for concessions.

In these 20 PHUs, there are already canals stretching over 100,000 km. The extensive system of drainage canals and vast areas on which concession permits have been granted might explain why burning still happens in these 20 PHUs.

#### • Fires are still burning in PHUs with small sizes of plantation areas

In the nine high critical PHUs identified as having relatively small plantation areas, there are already 20,000 km of canals.

In six of the PHUs licenses have been granted for oil palm and industrial plantation concessions, occupying more than 25% of each PHU.

Drainage with a view to developing the concession areas has contributed to the fires in these nine PHUs, which saw 291,000 ha burn in the 2015–2019 period (including 135,000 ha in 2019).

If drastic action is not taken, the six PHUs that have already been earmarked for cultivation through the issuance of oil palm and industrial plantation permits, as well as the other 50 high critical PHUs, could see more widespread burning in future years.

#### **CASE STUDY**

To understand how a PHU can be categorised as high critical even when restoration efforts have already been made, consider the case of the Sugihan River–Lumpur River PHU in South Sumatra. 125 peat rewetting infrastructure projects, such as building canal blocks, have been implemented in this PHU, which is one of the 20 PHUs mentioned above that are identified as 'restored'. However, large areas of the PHU continue to burn in the dry season, including in 2019, when there was extensive burning in both restoration areas and non-restoration areas in the PHU. This might be attributed to the presence of large concessions and some 13,700 km of drainage canals in this PHU.

There are three pulpwood plantations in the Sugihan River–Lumpur River PHU: PT Bumi Andalas Permai, PT Bumi Mekar Hijau and PT Sebangun Bumi Andalas Wood Industries. All three are on Greenpeace's list of companies with the largest areas burned in their concessions throughout Indonesia in the period of 2015–2019,<sup>101</sup> with vast areas burned both inside and around the concession areas. Together, these three concessions occupy 79.3% of the PHU's land.



Figure 5. Maps of Sugihan River–Lumpur River high critical PHU.

#### Low critical: 354 PHUs

Region	Low critical	Area
Sumatra	30 PHUs	600,000 ha
Kalimantan	78 PHUs	1 million ha
Papua	246 PHUs	4.8 million ha

Low critical PHUs are PHUs with a low level of degradation, small areas converted to oil palm and industrial plantations, relatively extensive moratorium areas, relatively extensive peat rewetting infrastructure, minimal canals, small burned areas and small areas covered by concession permits. The findings in this category were as follows:

#### 1. Peatland distribution

Greenpeace identified 354 PHUs with low critical status, covering 6.4 million ha. This represents 68.1% of the 520 PHUs in the priority provinces, but only 30.9% of the total area of those PHUs.

#### 2. Size of burned areas

Within these 354 PHUs, 97,000 ha burned in 2015–2019. In 2016–2019, 5,200 that had already burned in 2015 burned again, along with 44,000 ha that had not been damaged by the 2015 fires. 32,000 ha burned in 2019.

#### 3. Peat canal existence

Compared to the 56 high critical PHUs, which have a combined 154,000 km of canals, there are only 12,000 km of canals in these 354 low critical PHUs.

#### 4. Size of oil palm and industrial plantation concessions

The vast majority of these low critical PHUs – 300 (84.7%) – are devoid of any business licenses. Only 45 low critical PHUs have been licensed for cultivation with permit areas covering more than 1,000 ha (on average, 8% of the total area of the PHU in question).

### 5. Areas protected by the government's moratorium on new development of primary forests and peatland

In this category, there are 155 PHUs that have relatively large moratorium areas and areas of natural forest cover compared to the average in other PHUs in their province. Furthermore, 333 of the 354 PHUs have relatively small areas of oil palm and industrial plantations.

#### 6. Peat rewetting infrastructure

According to the data supplied, there is no peat rewetting infrastructure at all in these 354 PHUs. This might be because plantation activities in these PHUs are limited, and thus few drainage canals have been built.

Based on these findings, we can see that the PHUs in relatively good condition are characterised by a limited presence of drainage canals, large areas protected by the moratorium and few or no areas licensed for concessions. These factors also likely explain the much lower incidence of fire in these PHUs.

The analysis of burned areas in the low critical PHUs revealed a few important findings:

### • Fewer fires are detected in PHUs with larger areas protected by the moratorium and smaller or no plantations

Within the 155 PHUs with relatively extensive moratorium areas and natural forest cover compared to the others in their provinces, only 32,000 ha burned in 2016–2019. In the 333 PHUs with relatively small areas of oil palm and industrial plantations, just 48,000 ha burned during this period.

#### Canals still cause fires even in areas with small sizes of plantations

Canals have already been built in 56 of the 333 low critical PHUs with relatively small plantation areas, stretching over 11,000 km. The majority of fires in this group occurred in the PHUs with canals – 52,000 ha burned in 29 PHUs with canals in 2015–2019, with 29,000 ha burning in 2019. This shows the critical impact that canals have on the risk of burning.

#### Fewer fires are detected in areas with no concession permits, no canals and no plantations

There are 277 low critical PHUs that have no canals and no oil palm or industrial plantation cover, and in which no concession permits have been issued. The majority of the fires in these PHUs occurred in 2015, with only 5,250 ha burning in 2016–2019 (1,720 ha in 2019). These 277 PHUs represent 78% of the total of 354 low critical PHUs, and thus it can be concluded that the absence of plantation activity significantly reduces the likelihood of burning in PHUs.

Looking further into the 333 PHUs with relatively small areas of oil palm and industrial plantations, the majority of them have not been earmarked for further conversion. However, permits have been issued in 36 of these PHUs. Therefore, there is a risk of these 36 PHUs being degraded by companies' activities and seeing more extensive burning in the future if there is no serious effort made to protect them.

#### **CASE STUDY**

To illustrate how the issuance of permits can threaten a PHU, let's consider the example of the low critical Sambas Besar River–Seiyung River PHU in West Kalimantan. In 2015, just 711 ha burned in this PHU. But between 2016 and 2018, some 6,000 ha went up in flames. This dramatic increase in burned area indicates that the threat of fires has escalated. This change is likely due to plantation activity in the PHU. 11,942 ha of this PHU has been licensed to an oil palm company, PT Patiware Satu, and a 505 km canal has been built. So far the company has only started cultivating on a small plot of land in the PHU, but the risk of burning is expected to further increase once the firm has turned all 11,942 ha into oil palm plantations.



Figure 6. Maps of Sambas Besar River-Seiyung River low critical PHU.

Region	Intermediate critical	Area
Sumatra	39 PHUs	1.7 million ha
Kalimantan	64 PHUs	3.6 million ha
Papua	7 PHUs	218,000 ha

#### Intermediate critical: 110 PHUs

Between the two extremes described above are the intermediate critical PHUs, with conditions and threat levels somewhere in the middle of those found in the high critical and low critical PHUs. The findings in this category were as follows:

#### 1. Peatland distribution

Greenpeace identified 110 PHUs with intermediate critical status, covering 5.6 million ha. This represents 21% of the 520 PHUs in the priority provinces, and 27% of the total area of those PHUs.

#### 2. Size of burned areas

Within these 110 PHUs, 613,000 ha burned in 2015–2019. In 2016–2019, 76,000 that had already burned in 2015 burned again, along with 273,500 ha that had not been damaged by the 2015 fires. 275,000 ha burned in 2019.

#### 3. Peat canal existence

There are already 58,400 km of canals stretching across these 110 PHUs – nearly five times the length of canals in the 354 low critical PHUs.

### 4. Size of oil palm and industrial plantation concessions

Licenses for oil palm and industrial plantations have been granted in all of these PHUs, with permits issued for 51.2% of the total area on average. The permit coverage ranges from just 0.4% of the PHU all the way to 100%, meaning that the entirety of the PHU has been licensed for conversion to plantations. Permits covering more than 1,000 ha have been issued in 105 of the 110 PHUs.

#### 5. Areas protected by the government's moratorium on new development of primary forests and peatland

Only 25 of the intermediate critical PHUs (less than a quarter) are relatively well protected compared to other PHUs in their provinces, with more extensive moratorium areas and forest cover than the average.

#### 6. Peat rewetting infrastructure

The number of PHUs in this category with a relatively high amount of peat rewetting infrastructure, such as canal blocks, is even lower – just 11. Yet in these 11 PHUs there are already 19,300 km of canals, with concession permits granted on 28.5% of the total area.

Within the group of intermediate critical PHUs, there are a number of PHUs that have not been heavily degraded yet but which are at increased risk of becoming heavily degraded in the future if there is no concrete action taken to protect and rehabilitate them. These PHUs have relatively small areas that have been converted to oil palm and industrial plantations, but contain relatively extensive drainage canals.

There are 30 such PHUs in this group, with canals stretching over 24,300 km. Fires occurred in all 30 PHUs between 2015 and 2019, destroying a total of 498,000 ha; 231,500 ha burned in 2019 alone.

With no plan to protect and rehabilitate these PHUs in sight, drainage and plantation activities are likely to lead to more extensive burning in the future.

#### **CASE STUDY**

There are two intermediate critical PHUs in Papua Province: the Alekikosi Sia River–Alekikosi Digoel River PHU and the Alekikosi Yang River–Alekikosi Digoel River PHU. These two PHUs still have vast areas of natural forest and only a small number of canals. Likely as a result of these factors, there were no fires detected in them in 2015.

Unfortunately, large areas of these PHUs are under the control of two oil palm companies, PT Megakarya Jaya Raya and PT Tunas Sawaerma. Both companies had fires in their concession areas in 2016–2019, with 2,241 ha

burning in PT Megakarya Jaya Raya's concession and 708 ha in PT Tunas Sawaerma's.

Furthermore, these PHUs are not well protected as only a small area of each is covered by the moratorium on new development of primary forest and peatlands. Large parts of the two concessions have not been cultivated yet, especially in the Alekikosi Sia River-Alekikosi Digoel River PHU, meaning they remain under the threat of future fires and deforestation linked to plantation activities.



Figure 7. Maps of Alekikosi Sia River–Alekikosi Digoel River intermediate critical PHUs.

## **Ongoing Threats** to Peatlands



To understand the threats that PHUs are facing, Greenpeace looked at how many of them are zoned for cultivation, how many are protected by the moratorium on new development of primary forests and peatlands and how many have been licensed for oil palm and industrial plantations.

Within the 865 PHUs in Indonesia some 12 million ha, or 50% of the total area covered by the PHUs, are designated as cultivation areas. In the 520 PHUs in the seven restoration priority provinces, 10.5 million ha have been allocated as cultivation areas, or 51% of the total area of 20.7 million ha. A significant portion of this area has already been converted to plantations, and the remainder is under threat and at increased risk of degradation, whether through drainage or through deforestation if forest cover remains.



Of these 520 PHUs, there are only seven that are theoretically safe from the threat of industrial expansion, as 100% of their area is zoned for protection. On the other side of the coin, there are 66 PHUs that have 100% of their area zoned for cultivation. Nearly all of them are in Papua Province, which is home to Indonesia's last forest frontier.

The majority of the 520 PHUs are also not well protected by the moratorium on new development, with coverage extending to just 0–1% of the total area in 30 PHUs, 1–25% in 146 PHUs and 25–50% in 109 PHUs. Therefore, there are still a large number of PHUs that are underprotected by the moratorium, and if the moratorium areas are not increased in these PHUs the fire and deforestation threats will only intensify in the future.

The rest are relatively well protected by the moratorium, with more than half of their total area designated as moratorium areas. There are 174 PHUs with 50–99% of moratorium coverage, and 61 PHUs which are completely protected by the moratorium. There are indications that the protection the moratorium offers plays a role in curbing fire damage, as only three of the 61 PHUs that are completely covered by the moratorium were affected by fires during the 2015–2019 period. And even in these PHUs the damage was not too severe, with the burning (most of which occurred in 2015) affecting on average 15% of their total area.

In terms of oil palm and industrial plantation permits, there are 220 PHUs in which concession permits have been issued. The permits cover more than 57% of the total area in 101 of these PHUs, 22–57% of the total area in 80 PHUs, 1–22% of the total area in 35 PHUs and 0–1% of the total area in 4 PHUs. There were fires in all of these PHUs in the 2015–2019 period, burning a total of 1,865,000 ha: 434,000 ha in the 101 PHUs in the first group, 982,000 ha in the 80 PHUs in the second group, 438,000 ha in the 35 PHUs in the third group and 8,900 ha in the 4 PHUs in the last group.

In the remaining 300 PHUs no permits have been issued yet. Just 54,000 ha burned in these PHUs between 2015 and 2019.

Together, the 220 PHUs in which concession permits have been granted accounted for a total of 1.86 million ha (97%) of the 1.92 million ha that burned in the 520 PHUs in the seven priority provinces in 2015–2019. This represents 42% of the total burned area in Indonesia during this period – some 4.4 million ha – and a massive contribution to the health, economic and climate crisis.<sup>102</sup>

<sup>102</sup> This figure represents the total geographical area where fires occurred over this period, based on spatial analysis by Greenpace of the MoEF's burned area maps for 2015–2019. Some of these areas burned once, and others two, three, four or even five times. For further details, see Greenpeace Indonesia (2020).

## Urgent Need to Step Up Action to Address Weakness in Peat Protection and Restoration

As the results of this analysis show, the strategy adopted by the Indonesian government for recovering and protecting peatland has not been effective up to now.

One of the main reasons for this failure is that the government has allowed large-scale plantations to continue to operate inside PHUs, and thus allowed companies to continue to damage these fragile ecosystems by clearing vegetation and draining peatlands. Indeed, before installing infrastructure to rewet degraded peatlands, the root cause of this degradation – activities that damage peat, such as building drainage canals – should have been addressed, through an evaluation of existing permits and the revocation of permits held by companies that are found to be damaging peatland.

Instead, this activity has been facilitated by the separation of PHU areas into two zones: land designated for cultivation and for protection. But so long as companies continue to operate in cultivation zones, efforts to restore protection zones and prevent their degradation will continue to be undermined – because their ecological functions are connected, clearing and draining in cultivation zones has a direct impact on protection zones in the same PHUs.

A major factor that is hampering peat restoration efforts is that they are carried out on a partial basis, rather than covering an entire PHU. If the government has installed infrastructure to restore peatland in some areas of a PHU but in other areas companies are still being allowed to drain peatland in their concessions, the restoration efforts will not have their maximum effect.

This ineffectiveness is further compounded by lack of transparency. The public cannot access concession data or relevant information such as field data from validation sampling, company maps on management zones, etc. As a result, the public and civil society cannot participate in monitoring the progress of peat restoration efforts in concession areas to make sure that companies meet their obligations to restore peatland in their concessions.

If these weaknesses are left unaddressed, peatland restoration work in Indonesia will remain ineffectual. Moreover, if the task of monitoring companies' peatland recovery activities remains divided in two, with the BRG responsible for overseeing plantation companies and the MoEF supervising forestry companies, it will be impossible for the BRG to work effectively and make sure that the private sector is carrying out its restoration obligations. If this agency, whose tenure has been renewed by President Joko Widodo until 2024, does not have its authority strengthened to include all companies, it will remain toothless and the private sector will be able to continue operating inside fragile peat ecosystems without accountability.



## Climate and Emission Targets

As this analysis has shown, Indonesia's peatlands remain at grave risk. While less land burned in the weak La Niña years of 2016–2018, the return of El Niño conditions in 2019<sup>103</sup> – with the fire crisis that year nearly matching the scale of the 2015 disaster – made it plain that this temporary 'success' owed far more to climatic conditions than to the government's peat restoration efforts.<sup>104</sup>

Looking ahead, it is clear that these restoration efforts will remain ineffective if key aspects of peat degradation, such as water volume, subsidence and carbon stocks, are not mapped in detail. Failure to preserve the peatlands will further increase the risk of Indonesia failing to meet the greenhouse gas emissions reduction target stipulated in its NDC to the Paris Agreement.<sup>105</sup> Emissions from peat fires are thought to have been responsible for up to 97% of the country's carbon emissions in 2015,<sup>106</sup> and they catapulted Indonesia from sixth to fourth place on the list of the world's biggest emitters that year.<sup>107</sup> Fires in equatorial Asia contribute 8% of global carbon emissions, far out of proportion to the 0.6% of global burned area that they represent, and a key factor in this is the large proportion of carbon-rich peatland in these areas.<sup>108</sup>

103 Golden Gate Weather Services website 'El Niño and La Niña years and intensities'

- 104 For a comparative analysis of areas burned in 2015–2019, see Greenpeace Indonesia (2020) p5.
- 105 UNFCC (2016)
- 106 Huijnen V et al (2016)



<sup>107</sup> Harris N et al (2015b)

<sup>108</sup> Voiland A (nd)



#### Dayak Tribe Man in Central Kalimantan

A Dayak Ngaju tribe man tries to extinguish fire using a brunch on burning peatland at a sanctuary reserve area inside the oil palm concession of PT Globalindo Agung Lestari (GAL) in Mantangai, Kapuas district, Central Kalimantan. PT GAL is under the group of Malaysian company Genting Plantations Berhad. © Jurnasyanto Sukarno / Greenpeace

Indonesia is home to some 36% of the world's peatlands, and it is estimated that about a quarter of the total burned area in 2019 and a third of that burned in 2015 was on peat.<sup>109</sup> Mitigating the risk of fire – especially on peat, which stores on average 12 times as much carbon as tropical rainforests on mineral soil<sup>110</sup> – will therefore be key to the country's efforts to meet its emissions targets. This means urgent action is needed to halt deforestation and drainage, both of which make peatland more susceptible to burning, and to restore degraded peat so that it retains its invaluable role as a carbon store. Indeed, each hectare of degraded peat that is restored could potentially remove 11 tonnes of  $CO_2$ eq from the atmosphere per year.<sup>111</sup>

For peat restoration and protection to be effective, attention must be paid to PHUs that are still in good condition but which are threatened by the activities of companies that have acquired permits in these PHUs. Threats might also come from various government development programmes, such as the food estate programme, which will see the establishment of largescale agricultural projects in several regions that are rich in peatland, including Papua.<sup>112</sup> Coincidentally, Papua is home to a large number of PHUs that have not yet been degraded, with only one high critical PHU and seven intermediate critical PHUs. On the other hand, low critical PHUs are abundant in Papua, with 246 of the province's PHUs in this category. This is because the peatland in this region is still relatively untouched and covered by lush rainforests, which are more resistant to fire;<sup>113</sup> as a result, the size of the burned areas in the PHUs in Papua is also small. Now is the time to protect Papua's peatlands from future degradation, before the forests give way to large-scale concessions.

112 Pribadi IA (2020)

43

<sup>109</sup> Jong HN (2019c)

<sup>110</sup> Hergoualc'h K et al (2018) 111 Wijaya A et al (2017)

<sup>113</sup> Nikonovas T (2020)

## Conclusions

- Government policy that divides PHUs into two zones – cultivation and protection – has allowed large-scale plantation activities to continue in PHUs.
- 2. The cultivation of PHUs for oil palm and industrial plantations, which involves the building of drainage canals, contributes to massive and repeated burning, especially during the dry season.
- 3. During the years when peat restoration projects were being carried out (2016–2019), fires continued to destroy vast swathes of peatland in the restoration priority provinces. A total of 936,000 ha burned in 186 PHUs, 50 of which had not had any fires in 2015.
- 4. 56 of the 520 PHUs within the seven peat restoration priority provinces are at a high critical level of degradation, with heavily disturbed peat condition due to severe degradation, massive cultivated areas, large extents of canals, large burned areas and large areas covered by concession permits. Even though the ecological burden in these PHUs is already very high, protection and restoration efforts are proving ineffective: the majority of the burning in 2016-2019 538,000 ha was concentrated in these 56 PHUs.
- 110 of the 520 PHUs are at an intermediate critical level of degradation, with a degradation and risk status falling between those observed in the high critical and low critical PHUs. These PHUs also saw significant areas burn in 2016–2019 some 350,000 ha and are in danger of reaching high critical levels if serious efforts are not made to recover and protect them.

- 6. 354 PHUs are at a low critical level of degradation, with mildly disturbed peat condition. These PHUs are characterised by mild peat degradation, strong moratorium protection, low levels of cultivation, no or short canals, no or few burned areas and no or few concession permits. However, these PHUs will remain at risk of further degradation in the future if their protection is not strengthened.
- 7. The limited burning in low critical PHUs illustrates that in the absence of drainage canals, concession permits and oil palm or industrial plantations, the occurrence of land and forest fires can be curbed, or even eliminated completely. In the 354 low critical PHUs, which account for 30.9% of the total area of the PHUs in the seven priority provinces, just 97,000 ha burned between 2015 and 2019. This represents just 5% of the total of 1,917,092 ha that burned in the 200 PHUs where fires occurred during this period.
- 8. The government moratorium on new development is designed to protect Indonesia's remaining primary forests and peatlands, and the results of this analysis suggest that it has a vital role to play. Peat ecosystems in PHUs with large extents under moratorium protection are at less risk of degradation, and undisturbed peatlands are much less prone to fire; therefore, upholding the moratorium is key to mitigating the risk of land and forest fires and peat destruction in Indonesia.<sup>114</sup>

<sup>114</sup> See Greenpeace Indonesia (2019)

## Recommendations

Based on the findings of this PHU analysis, Greenpeace has developed a set of recommendations for policy makers and corporate actors to halt peat degradation in PHUs and enable degraded PHUs to be restored effectively:

- 1. Stop all cultivation of PHUs as large-scale plantations (existing and in the future), and immediately begin work to restore the peatlands in these PHUs.
- 2. Protect all PHUs, either under a moratorium on all new development of forests and peatlands or by declaring them conservation or protection areas.
- Restore all degraded peatland, prioritizing the rewetting of dried peat that is especially prone to fire and considering each PHU as a single ecosystem (hydrological unit), instead of focusing restoration efforts in individual areas.
- 4. Protect low critical PHUs so that their condition is not further degraded and carry out the aforementioned recommendations in intermediate critical and high critical PHUs. All undeveloped areas in PHUs that are currently designated as cultivation zones for large-scale plantations should be immediately redesignated as protected zones.
- Enforce the law by imposing strict sanctions on concession owners in the case of fires, both inside and around their concession areas within a PHU.<sup>115</sup>
- 6. Make available to stakeholders all relevant data on peatlands, including maps of restored areas both inside and outside of concessions.

- 7. Carry out an independent high-level assessment of the impact of five years of restoration efforts since 2016 to identify what worked, what did not and why.
- 8. Review all concessions in priority peat landscapes.



Forest Fires in Tanjung Taruna, Central Kalimantan Greenpeace Indonesia Forest Fire Prevention (FFP) Team extinguish the fires at plantation and forest in Tanjung Taruna, Sub-district Jabiren Raya, District Pulang Pisau, Central Kalimantan, Indonesia. © Ulet Ifansasti / Greenpeace

<sup>115</sup> See Greenpeace Indonesia (2020)

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Download PHU\_KHG\_ANALYSIS\_2020 Excel

**Open CRITICAL PHU DASHBOARD** 

Read ANNEX (in Bahasa)

#### LIST of DATA

- 1. KLHK Peat Hydrology map
- 2. KLHK Peat Ecology Function map
- 3. KLHK Peat Damage Status map
- 4. Amalgam BBSDLP 2011, Repprot & Wetland International Peat maps a. Kementan/BBSDLP 2011
  - b. RePPProT
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- 5. BBSDLP 2019 7 Prov Peat map
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- 7. BRG Peat Restoration Priority & Target map
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9. KLHK Landcover 2019 map

- 10. The Treemap Oil Palm Cover map
- 11. KLHK Forest&Peat Moratorium (PIPPIB 2020 period 2) map
- 12. KLHK Burned Area 2015-209 map
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- 15. BRG Restoration Impacted Area 2016-2018 map

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Damming Activity in Central Kalimantan Environmental activists unfurl a banner reading 'Forest protection now' at Paduran village, Pulang Pisau district in Central Kalimantan. © Ulet Ifansasti / Greenpeace





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