

Sumatra: Going up in smoke

New evidence shows peat and forest protection is key to stopping the Haze Wave

28 May, 2014

Indonesia's annual forest and peat fires are largely a man-made crisis, with devastating health impacts for Indonesia and Southeast Asia. Operating under weak and poorly enforced laws, plantation companies are continuing their reckless practises: clearing forests, draining wet, carbon rich peatlands, and laying the foundations for these fires, known as the Haze Wave. Left in their natural state, peat fires would rarely occur, but decades of destruction have made parts of Indonesia a giant tinderbox – and a threat to the health of millions in Sumatra, and the rest of the region. In Southeast Asia, smoke from peat and forest fires can be attributed to 300,000 deaths during El Niño years.

This year, which is widely expected to be an El Niño year characterised by extended drought conditions in Indonesia, the fire could exceed even last year's impact. Singapore is taking action through a proposed Transboundary Haze Law, but comprehensive action to tackle the fires at their root has not been forthcoming from the Indonesian government. However, the Haze Wave is the most visible sign that business as usual for the plantation sector cannot continue. Protecting all peatland and forests is the best long-term solution we have to stop the fires and avoiding a public health disaster in the future.

Summary of findings

Mapping analysis by Greenpeace mapping experts have shown the extent to which forest fire hotspots occur on deforested peatland in Sumatra.

1) The frequency of fire hotspots is five times higher on peat than it is on mineral soils¹.

2) Protecting peat forests significantly reduces the chance of fires. Fire hotspots in 2013 were 3.5 times more frequent on peat that was not forested as of 2011 than on peat that remained forested. Most fire hotspots on peat areas that were still forested in 2011 occurred along forest edges. This suggests that the areas may have been deforested by 2013 when the fires occurred; alternatively, forests along margins are more exposed and therefore vulnerable to fire.

- An example of this is the 10,500ha PT Rokan Adi Raya oil palm concession in Riau, which includes forested deep peat, and experienced large-scale forest clearance between 2009 and 2013 and uncontrolled fires in 2013. Landsat mapping analysis shows by the end of December 2013 just 419ha of forest remained. Greenpeace field investigations in June 2013 documented an excavator continuing construction of a drainage canal through the peatland within the concession even as fires raged around it. The area shown in the photo was forested in 2011.

See Appendix 1

3) Riau is ground zero for the Haze Wave. Riau accounts for just 5% of Indonesia's land area, but 40% of all fires hotspots and nearly three-quarters of all fire hotspots on peat.

- Riau is also home to a significant portion of Indonesia's plantation sector, Riau is the largest palm oil producing province in Indonesia. Ongoing expansion of oil palm plantations is leading to massive environmental destruction and carbon emissions. Some 40% of Indonesia's palm oil is traded through Riau's port of Dumai.

See Appendix 2

4) Forest fires on legally protected land: In May 2011, Indonesia introduced a two-year moratorium on permits for new concessions in primary forests and peatlands.² While this moratorium was a welcome step, it does not protect all forests nor peatlands. Greenpeace analysis shows that in February 2014, more than 30% of fire hotspots actually occurred on land meant to be protected under the moratorium. Of all fire hotspots on moratorium land, nearly 80% occurred on peat areas, despite the moratorium's stated goal to temporarily halt new land clearance in these areas.

See Appendix 3

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What is peat? And why should it be protected?

Tropical peat predominantly consists of partially decayed, dead vegetation accumulated over thousands of years and is typically saturated or near saturation with water. Left untouched in its natural state, it is virtually impossible to set alight. Peatlands are a massive store of carbon, locking carbon underground and preventing it from being released into the atmosphere.

Fast Facts:

- Indonesia's peatlands store nearly 60GtC³ (in addition to the carbon in the forests). This is equal to six times the amount of carbon released every year by fossil fuels⁴. If these peatlands disappear, it would unlock much of this carbon and release it into the atmosphere.
- The province of Riau alone is estimated to hold 40% of Indonesia's peatland carbon stores,⁵ equivalent to more than a year's worth of global greenhouse gas emissions,⁶ with peat reaching depths of 14 metres or more in some locations.⁷
- Fires in equatorial Asia affect global concentrations of greenhouse gases. Average fire emissions from this region are estimated at 0.12GtC/yr, which is comparable to fossil fuel emissions for the region⁸.
- El Niño years, of which 2014 has a high probability of becoming, are characterised by periods of drought which increase the extent and longevity of fires. It is estimated that the extensive burning of peat and vegetation in the 1997 El Niño year, released between 0.81 and 2.57GtC, equivalent to a staggering 13–40% of global carbon emissions from fossil fuels.⁹ Global climate change is expected to increase the frequency of El Niño events.

What causes the peat fires and the 'Haze Wave'?

Tropical rainforests, including those on peat, do not typically burn. However, forest clearance and drainage increases the vulnerability of forests to fires, and burning is often used to clear such areas. While degraded tropical forests and peatlands might release their stores of carbon over decades, burning releases carbon into the atmosphere rapidly, as well as damaging the capacity of the ecosystem to recover and begin to absorb more carbon again. Once drained, peat dries out and can smoulder slowly whilst vegetation (especially in degraded forests) catches light easily and fires can spread rapidly.¹⁰ Fires may be accidental (for example being caused by lightning or human carelessness), or they may be started deliberately to clear land for cultivation or to increase its fertility.

Whether accidental or deliberate, fires on peat can easily burn out of control, especially in periods of drought years. Because the fire spreads deep into the soil such fires can be hard to extinguish, sometimes burning for months. They produce rapid and massive emissions of greenhouse gases, as well as smog. Peat drainage can affect the whole landscape, not just the area targeted. Greenpeace is calling for all peatland to be protected, no matter its depth or where it is located. Planting on peat over three metres deep is illegal in Indonesia,¹¹ though the law is widely flouted. Further, protecting deep peat alone is not enough; plantation development around the edge of a peat dome, even in areas where the peat depth may be one metre or less, threatens the whole system. Drainage, for example for oil palm plantations, drains off water from adjoining forested areas, and the general water table begins to fall.

What are the health impacts of peat and forest fires?

In Southeast Asia, forest clearance fires associated with deforestation, especially of peat forests, are the primary source of fire emissions in the region.¹² They add considerably to existing urban air pollution, particularly in El Niño years when drought increases the extent and longevity of fires.¹³ This smoke includes carbon particles smaller than 2.5µm in diameter (PM2.5), which are harmful to human health. Gases from fires also contribute to low-level ozone formation.

Smoke from these fires can affect people's health not only in neighbouring villages, but also in urban areas in the region. Modelling attributes an average of 110,000 deaths a year in the region to these fires, primarily associated with long-term seasonal exposure to smoke particles.¹⁴ This rose to nearly three hundred thousand (300,000) deaths for the 1997/8 El Niño year.

What are the solutions?

Indonesia's President Susilo Bambang Yudhoyono (SBY) frequently calls for his country's transition to a 'green' economy, but his legacy will go up in smoke unless stronger action is taken before his last term in office expires. The government must:

- Enforce the existing moratorium and expand it to ensure that all peatlands are off limits to new oil palm, pulp and other plantations.
- Ensure that the draft Peat Regulation is strengthened to guarantee the full protection of all peatlands, including those within concession boundaries.
- Develop and implement a government plan for protection, rehabilitation and sustainable management of forest and peatland landscapes including community-based solutions.
- Review existing concession permits and crack down on illegality. Failure to follow due process in licencing and failure to respect existing peatland regulations or regulations prohibiting burning should lead to revocation of the concessions of persistent offenders.
- Create a national public register of all concession types – including oil palm, pulp and coal – and publish the One Map.
- Develop an independent national deforestation monitoring system to bring greater transparency to the process, ensure effective monitoring and enforcement, and empower local communities and other stakeholders. Such a system would enable identification of those responsible for environmental destruction such as fires, and improve governance by enhancing enforcement efforts against those responsible for violations.
- Develop a database of low carbon lands potentially available for development. This would facilitate an effective land swap process, whereby legal concessions in forest and peatland areas could be exchanged for concessions in low carbon value areas unencumbered with social, environmental or economic concerns.

Greenpeace also calls on plantation companies, including palm oil and pulp and paper companies, to commit to a No Deforestation policy. Companies such as IOI, KLK and APRIL and Asian Agri (both part of the RGE Group) need to urgently follow the lead of more progressive industry players such as Asia Pulp & Paper, Wilmar International, Golden Agri Resources and members of the Palm Oil Innovation Group. Greenpeace will closely monitor those companies that have already committed to cleaning up their supply chains from deforestation and urge their policies be implemented immediately.

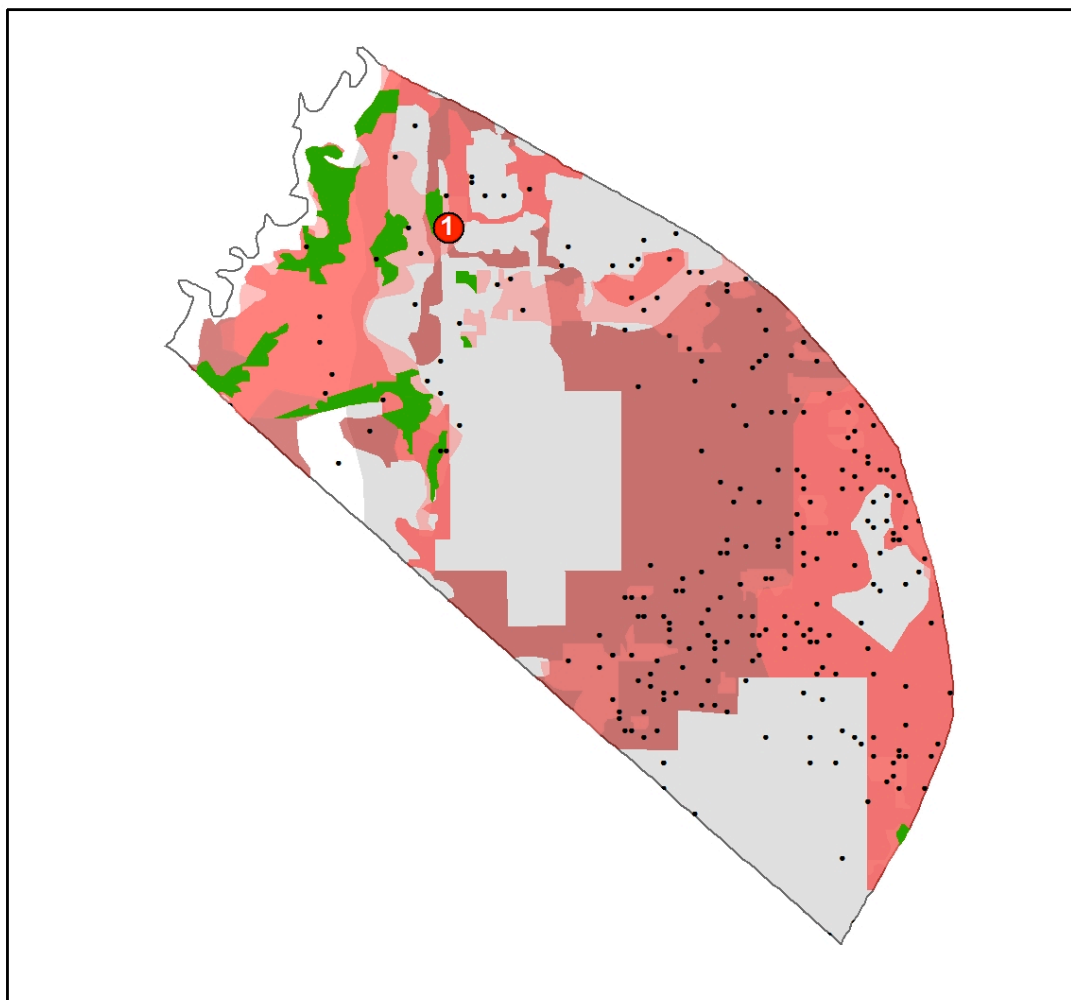
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APPENDIX 1

PT. ROKAN ADI RAYA FIRE HOTSPOTS 2013

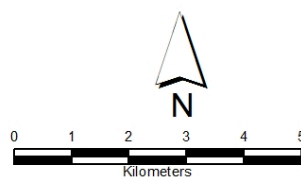


Legend

- Fire Hotspot 2013

- Peat
- Mineral soil

- Forest 12/2013
- Forest 01/2013
- Forest 2011
- Forest 2009



Source:

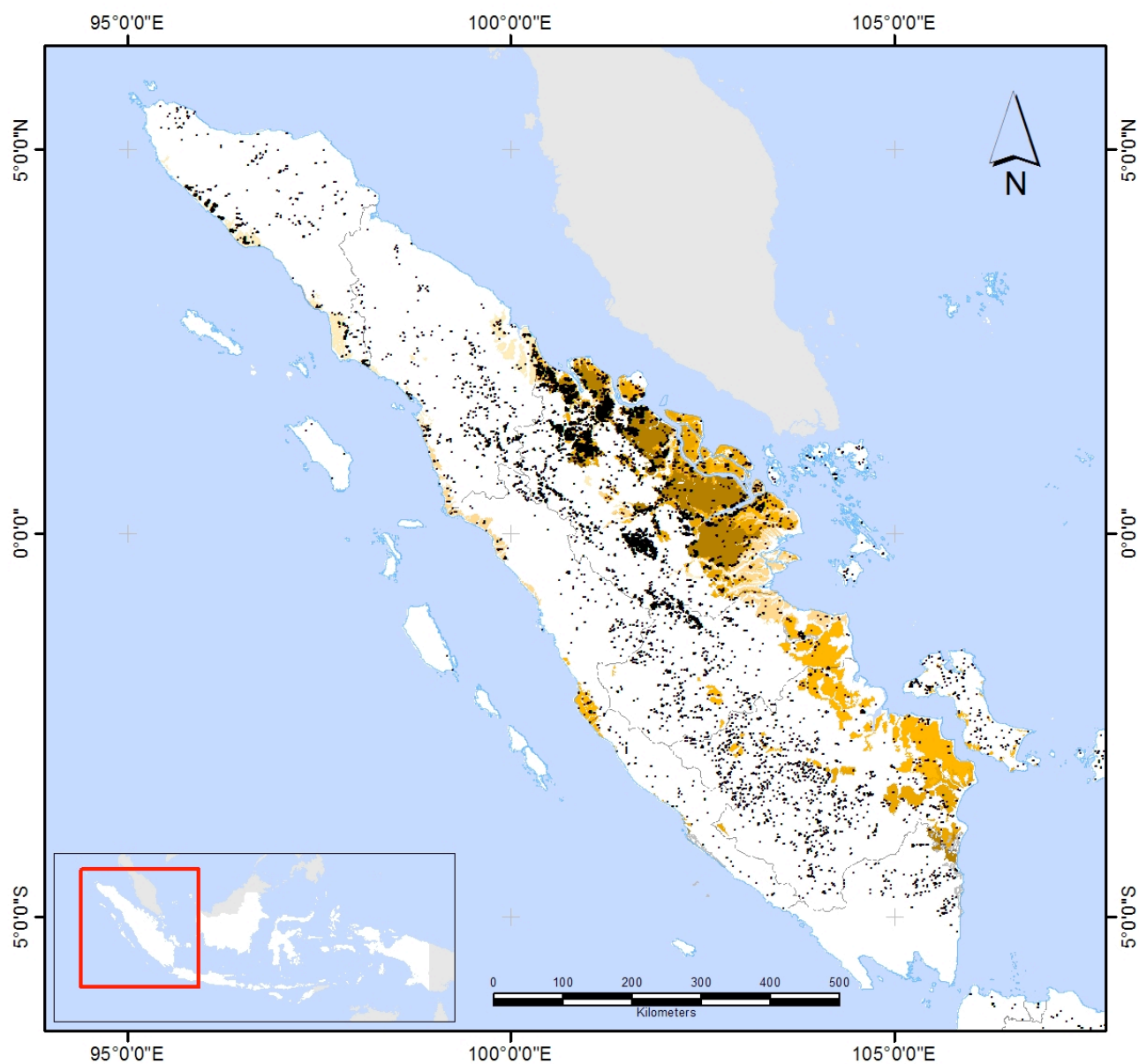
1. Fire Hotspots 2013, <https://firms.modaps.eosdis.nasa.gov>
2. Forest cover December 2013, Landsat 26/12/2013 analysis
3. Forest cover January 2013, Landsat 08/01/2013 analysis
2. Landcover 2009 and 2011, Ministry of Forestry
3. Peatland Map, Wetland International Indonesia Programme
4. Basemap, Geospatial Information Agency



1. PT Rokan Adi Raya: In June 2013, 151 fire hotspots were recorded within the concession.

Greenpeace field investigations in June 2013 documented an excavator continuing construction of a drainage canal through the peatland within the concession even as fires raged around it.

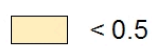

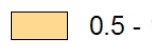
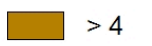

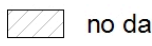
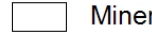
SUMATRAN FIRE HOTSPOTS 2013



Legend

- Fire Hotspot 2013

Peat (depth in meter)

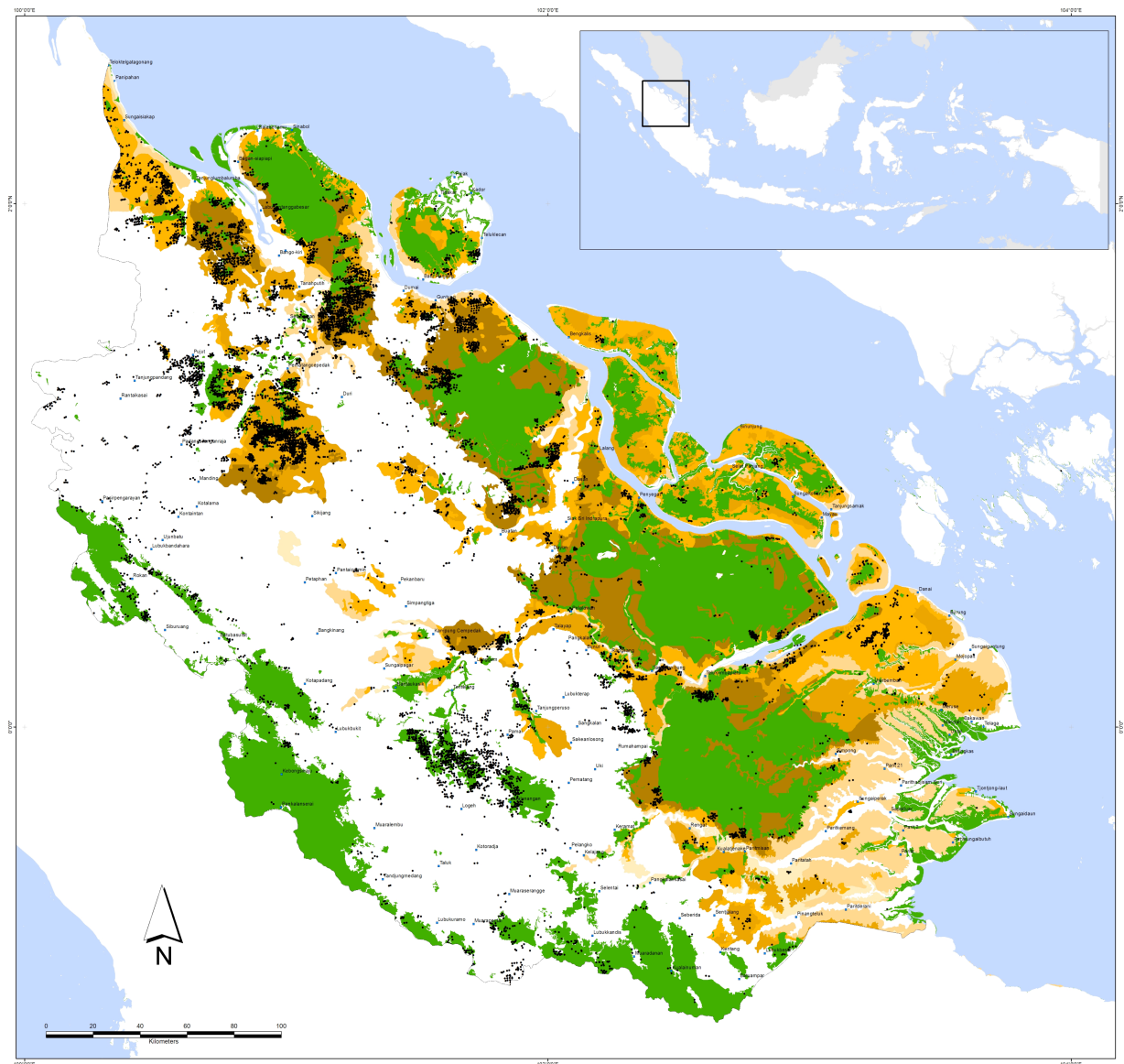
	< 0.5		2 - 4
	0.5 - 1		> 4
	1 - 2		no data
	Mineral soil		

Sumatra Island	
% of national FHS	54%
% of FHS on peat	58%
% of peatland FHS land not forested in 2011	78%

Source:

1. Fire Hotspots 2013, <https://firms.modaps.eosdis.nasa.gov>
2. Peatland Map, Wetland International Indonesia Programme
3. Basemap, Geospatial Information Agency

RIAU PROVINCE FIRE HOTSPOTS 2013



Legend

- Fire Hotspot 2013
- Forest 2011

Peat (depth in meter)

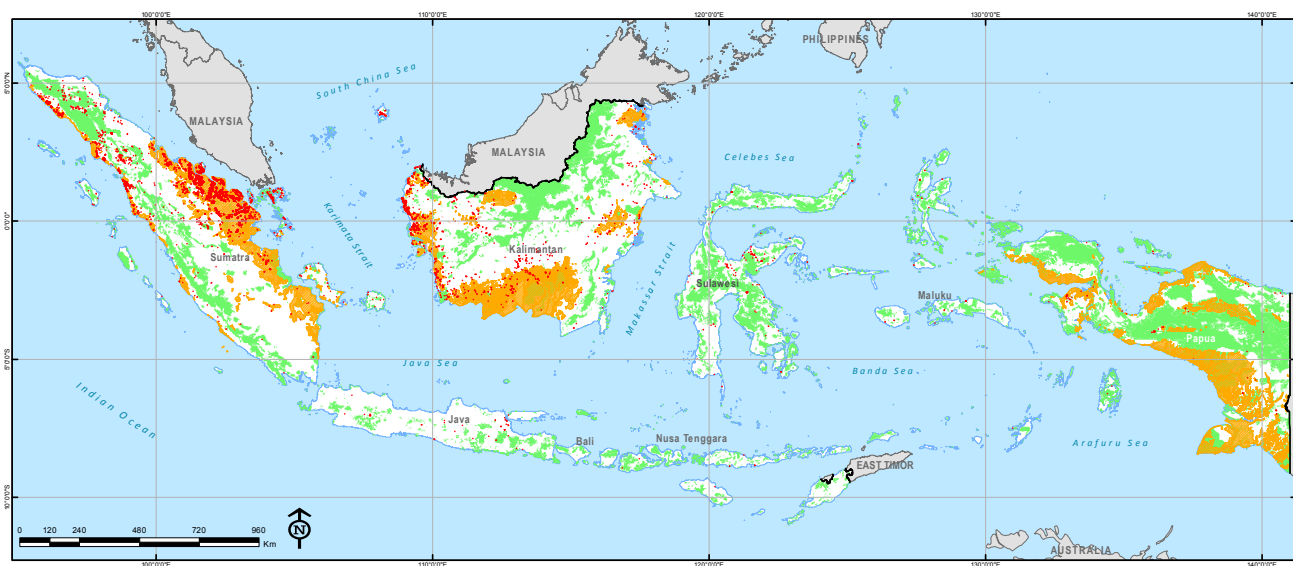
- < 0.5
- 0.5 - 1
- 1 - 2
- 2 - 4
- > 4
- no data
- Mineral soil

Riau Province	
% of national FHS	40%
% of FHS on peat	73%
% of peatland FHS land not forested in 2011	78%

Source:
1. Fire Hotspots 2013, <https://firms.modaps.eosdis.nasa.gov>
2. Landcover 2011, Ministry of Forestry
3. Peatland Map, Wetland International Indonesia Programme
4. Basemap, Geospatial Information Agency

Appendix 3

FIRE HOTSPOTS IN FEBRUARY 2014 IN PEAT LAND AND MORATORIUM AREAS



Legend:

- NATIONAL BOUNDARY
- COASTLINE
- PEAT (20.6 MILLIONS HA)
IN MORATORIUM AREA IS 11.21 MILLIONS HA
- MORATORIUM REV.5 :
 - PEAT (5.47 MILLIONS HA)
 - PRIMARY FOREST (59.14 MILLIONS HA)

● FIRE HOTSPOTS, Feb 1st - March 2nd 2014 :

- 1- Total of FHS in Indonesia : 11.288
- 2- FHS on peat land area : 8.542 or 75.7 % from total FHS
- 3- FHS on Moratorium area : 3.758 or 33,3% from total FHS
- 4- FHS on peat land inside Moratorium area : 3.247 or 86,4% from FHS in Moratorium area

Data sources :

1. Indonesia Peat Land
provided by Wetlands International 2006, updated on 2014 in locations:
Central Kalimantan, Jambi, and South Sumatera
2. Fire Hotspot
provided by NASA, digital data downloaded from website:
<http://earthdata.nasa.gov/data/near-real-time-data/firms/active-fire-data>
3. Moratorium Area
provided by Planology Directorate, Ministry of Forestry, Indonesia 2013, digital data downloaded from website:
http://www.ukp.go.id/informasi-publik/cat_view/20-geospasial

Analysis and map produced by Greenpeace Indonesia, March 2014

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Map projections using World Mercator with parameters :
Central_Meridian: 117.0
Standard_Parallel_1: -2.5

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- ² President of the Republic of Indonesia 2013. Instruksi Presiden Republik Indonesia Nomor 6 Tahun 2013 Tentang Penundaan Pemberian Izin Baru Dan Penyempurnaan Tata Kelola Hutan Alam Primer Dan Lahan Gambut, <http://sipuu.setkab.go.id/PUUdoc/173769/Inpres0062013.pdf>.
- ³ Page, S.E., Rieley, J.O. & Banks, C.J. 2011. Global and regional importance of the tropical peatland carbon pool. *Global Change Biology* 17: 798–818.
- ⁴ Anthropogenic fossil fuel emissions of were 9.5 GtC/yr in 2011 according to IPCC 2013. *Climate Change 2013: The Physical Science Basis*. Working Group I contribution to the IPCC 5th Assessment Report Ch. 6 <http://www.ipcc.ch/report/ar5/wg1/#.Um6XYDhFD5o>
- ⁵ 4.6Gt of carbon. Wahyunto S.R. & H. Subagjo 2003. Peta luas sebaran lahan gambut dan kandungan karbon di pulau Sumatera/ Maps of area of peatland distribution and carbon content in Sumatera, 1990 – 2002' Wetlands International – Indonesia Programme & Wildlife Habitat Canada (WHC)
- ⁶ Resources Institute CAIT 2.0, total emissions for 2010, <http://cait2.wri.org/wri>. Viewed 19 September 2013.
- ⁷ 18 Delft Hydraulics (2008) 'Kampar Peninsula Science Based Management Support Project *Summary Interim Report, April-December 2007* Introduction to the SBMS Project and preliminary results to date' Hooijer A (ed) April 2008
- ⁸ van der Werf, G. R. et al. 2008: Climate regulation of fire emissions and deforestation in equatorial Asia *Proceedings of the National Academy of Sciences* 105: 20350-20355.
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- ¹⁰ Field, R.D., van derWerf, G.R. & Shen, S.S.P. 2009. Human amplification of drought-induced biomass burning in Indonesia since 1960. *Nature Geoscience* doi: 10.1038/NGEO443.
- ¹¹ Presidential Decree Keppres no. 32/1990 (Gol (1990)) and Indonesian Government Regulation no. 26/2008 (Gol (2008))
- ¹² Johnston, F., Henderson, S., Chen, Y., Randerson, J., Marlier, M., DeFries, R., Kinney, P., Bowman D & Brauer, M. 2012. Estimated global mortality attributable to smoke from landscape fires. *Environmental Health Perspectives* 120: 695-701.
- ¹³ Johnston, F., Henderson, S., Chen, Y., Randerson, J., Marlier, M., DeFries, R., Kinney, P., Bowman D & Brauer, M. 2012. Estimated global mortality attributable to smoke from landscape fires. *Environmental Health Perspectives* 120: 695-701; Marlier, M., DeFries, R., Voulgarakis, A., Kinney, P., Randerson, J., Shindell, D., Chen, Y. & Faluvegi, G. 2013. El Niño and health risks from landscape fire emissions in Southeast Asia. *Nature Climate Change* 3: 131-136.
- ¹⁴ Johnston, F., Henderson, S., Chen, Y., Randerson, J., Marlier, M., DeFries, R., Kinney, P., Bowman D & Brauer, M. 2012. Estimated global mortality attributable to smoke from landscape fires. *Environmental Health Perspectives* 120: 695-701.