Global Peatland Hotspot Atlas:
The State of the World's Peatlands in Maps
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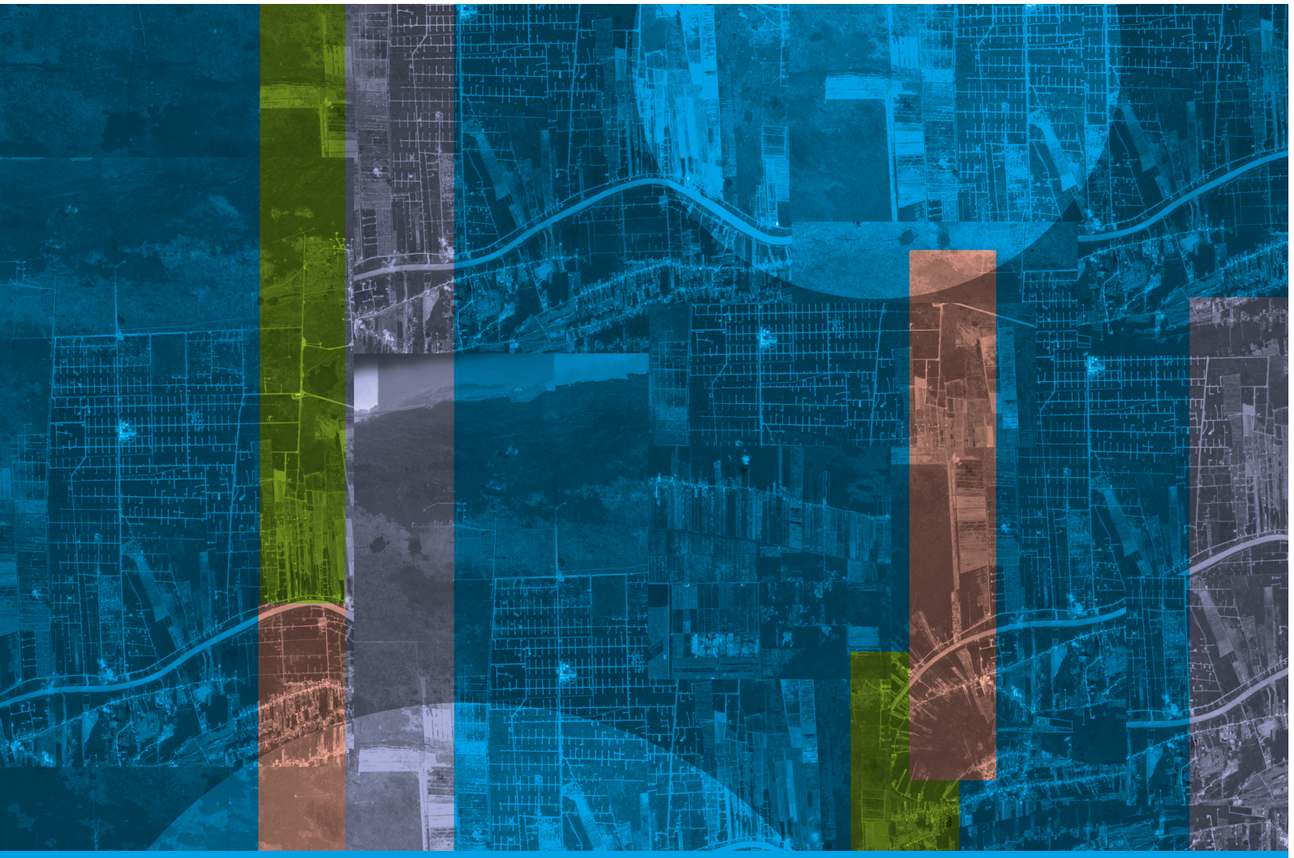
UN environment programme

Transport infrastructure on peatland

The construction of road, railway, and drainage infrastructure enable exploitation and land use changes, involving soil degradation, habitat fragmentation, pollution, and increased GHG emissions worldwide.



Global Peatlands Initiative

© 2024 United Nations Environment Programme
ISBN: 978-92-807-4197-1
Job Number: DEP/2684/NA
DOI: https://doi.org/10.59117/20.500.11822/46635

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Suggested Citation
United Nations Environment Programme (2024). Global Peatland Hotspot Atlas: The State of the World's Peatlands in Maps. Visualizing global threats and opportunities for peatland conservation, restoration, and sustainable management. Nairobi.

Production
United Nations Environment Programme (UNEP).
https://www.unep.org/resources/report/global-peatland-hotspot-atlas-2024

Supported by:
The Global Peatland Hotspot Atlas is a product supported by the Michael Succow Foundation, partner in the Greifswald Mire Centre, under the umbrella of the Global Peatlands Initiative: Assessing, Measuring and Preserving Peat Carbon project (GPI project) which is funded by the International Climate Initiative (IKI) of Germany.

Supported by:
Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety
based on a decision of the German Bundestag
IKI INTERNATIONAL CLIMATE INITIATIVE
Succow Stiftung

Acknowledgements
The United Nations Environment Programme (UNEP) would like to thank the Greifswald Mire Centre (GMC) for the access to their Global Peatland Database (GPD) and for the production of the Global Peatland Map and all Thematic Maps.

GREIFSWALD MIRE CENTRE

UNEP would also like to thank the Global Peatlands Initiative (GPI) Team for the overall coordination of this Atlas.

Authors
Alexandra Barthelmes (GMC/DUENE e.V.),
Cosima Tegetmeyer (GMC/DUENE e.V.), Hans Joosten (GMC/University of Greifswald), Patrick Scheel (UNEP).

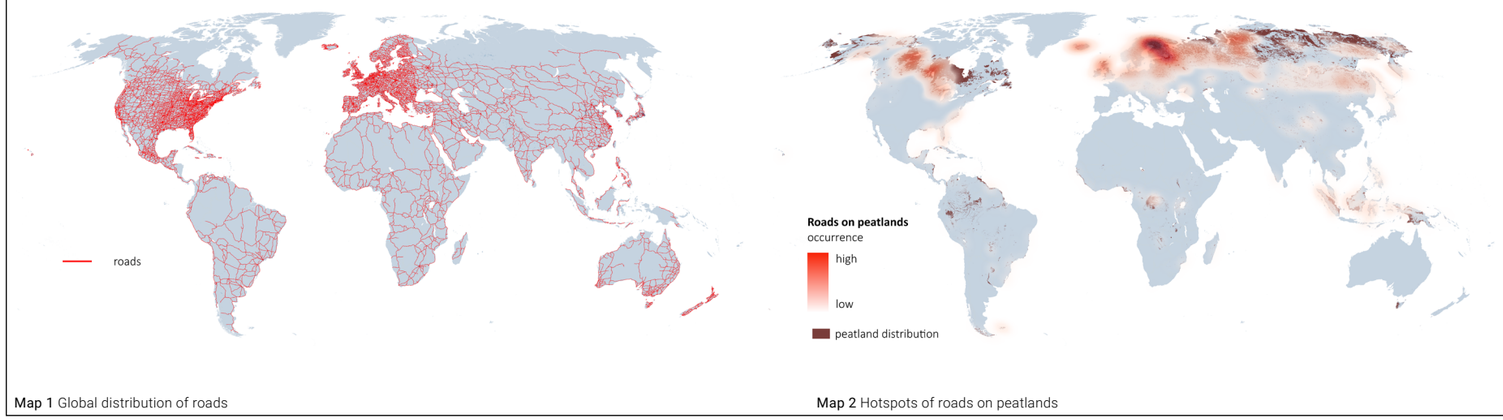
Production, Coordination and Review
Patrick Scheel (UNEP), Jan Peters (GMC/MSF),
Dianna Kopansky (UNEP).

Design and layout
igel+ente, Büro für Gestaltung, Fotografie und Kommunikation Greifswald, Germany
Anna Knüppel & Michael Schröder (www.igelundente.de)
Nora Prinz (www.noraprinz.de)

Thanks also to:
Caroline Borowski, Martha Burckhardt, the Global Peatland Database mapping team, the contributors of the UNEP 2022 Global Peatland Assessment, Susan Gardner, Jane Muriithi, Mónica López Conlon, Cisca Devereux, and Fabrice Inkonkoy

Transport infrastructure on peatland

Roads on peatlands



Map 1 Global distribution of roads

Map 2 Hotspots of roads on peatlands

Wherever roads are constructed in previously remote areas, they facilitate human access, exploitation and land cover change. In the case of peatlands, these changes often begin with vegetation removal and drainage. Other direct and indirect environmental impacts include habitat fragmentation, chemical pollution, noise disturbance, increased wildlife mortality due to collisions and poaching, changes in population gene flow, and facilitation of biological invasions. Furthermore, the initial roads open up remote areas to further infrastructure proliferation, including more roads.

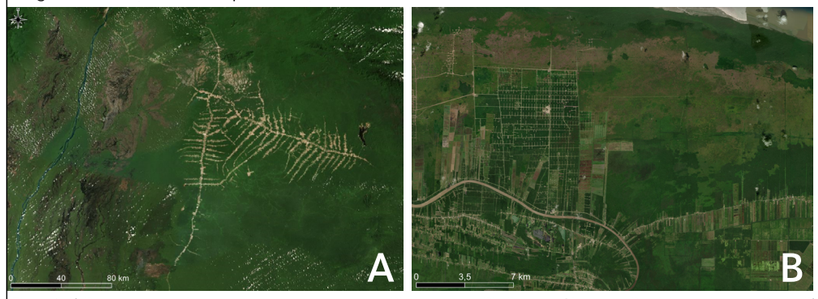
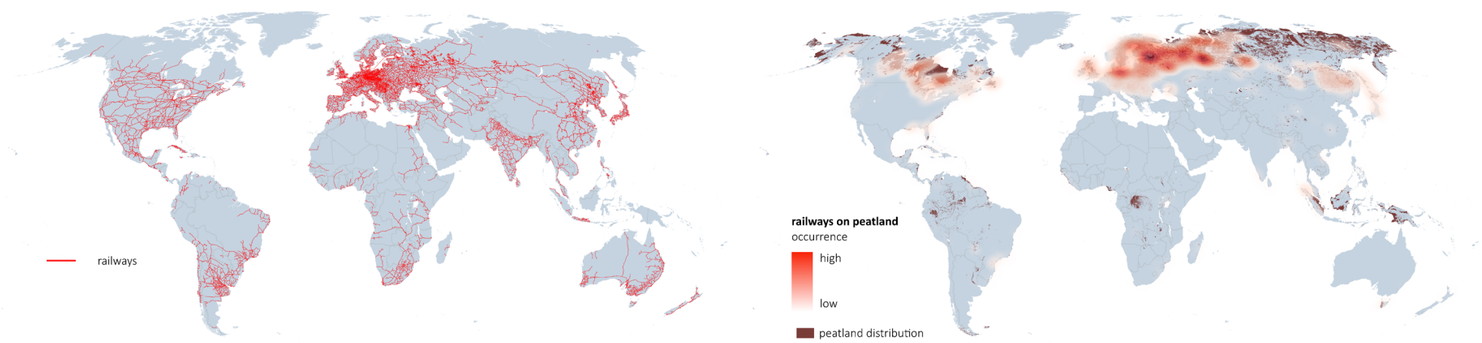


Figure 1 A) Roads approaching the vast peatlands along the Rio Negro and Rio Branco of Northern Brazil in the Amazon Basin; B) Roads already enabling peatland and wetland exploitation in Suriname (West of Paramaribo; satellite image by BING AERIAL).

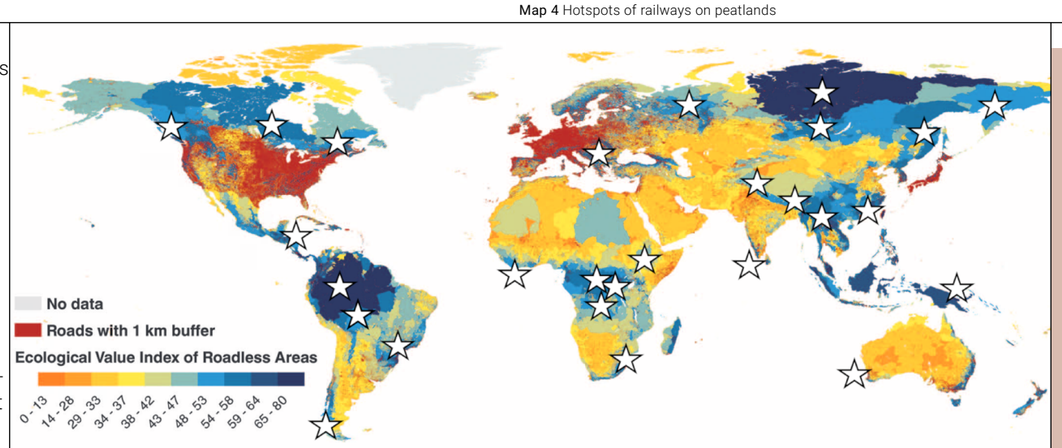
Railways on peatland



Map 3 Global distribution of railways

Map 4 Hotspots of railways on peatlands

About 80 % of Earth's terrestrial surface remains roadless, but this area is heavily fragmented into approximately 600,000 patches [4]. More than half of these patches are smaller than 1 km², and only 7 % are larger than 100 km². The remaining roadless areas on the planet (blue colors in figure left) are crucial for sustaining habitats for biodiversity conservation and for providing globally significant ecosystem services. Intriguingly, many of these remaining roadless areas on the planet also contain - not surprisingly - vast expanses of (partly understudied) peatlands, indicated with the stars in Map 5.

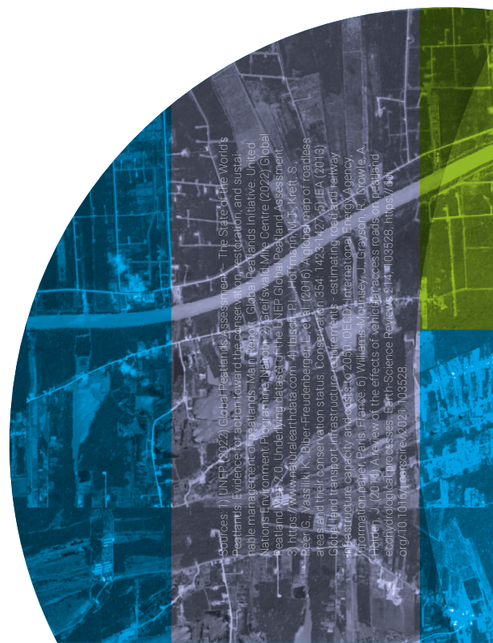


Map 5 Ecological Value Index of roadless areas

☆ occurrence of (partly understudied) peatlands in roadless areas [2, 4]

Interestingly, the global hotspots of roads [3] in peatlands are not situated in the intensively built-up areas of Europe and the eastern USA as Map 1 would indicate, but rather in north-eastern Europe (Finland) and Canada (Map 2). The abundant presence and cohesion of peatlands in the boreal zone [1, 2] probably influences this hotspot pattern (see Chapter 7: Methods using the QR code) and maybe roads can not be built while avoiding peatlands in those regions.

Railway lines are typical indicators of industrialization and transportation of goods and rawmaterials. A dense rail network is located in Europe and parts of Asia (Map 3 [3]), with hotspots of their occurrence comparable to the hotspots of roads on peatland – while expanding slightly further towards central Europe (Map 4)

It is anticipated that nearly 25 million km² of paved roads and 335,000 km² of rail tracks will be added by 2050 globally (baseline 2010). In addition, between 45,000 and 77,000 km² of new parking spaces will be added to accommodate passenger vehicle stock growth. Approximately 90 % of this infrastructure is expected to be built in developing nations [5]. Given this, some knowledge gaps are evident, particularly considering the rapid and exuberant expansion of traffic routes into remote regions. Research priorities include investigating: 1) the effects of roads on tropical peatlands, 2) the influence of peat erosion and pipe formation processes, 3) the hydrological effects of seismic trails, 4) the ecotoxicological effects of plastic tracks, 5) chemical pollutants on peatlands resulting from vehicular access, and 6) ecological recovery after temporary roads are removed from peatlands [6].

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