



WORLD
RESOURCES
INSTITUTE

**GLOBAL
FOREST
WATCH**

GLOBAL FOREST WATCH & EUDR FOREST MONITORING

23 October 2024

SARAH CARTER, RESEARCH ASSOCIATE WRI & MANY COLLEAGUES

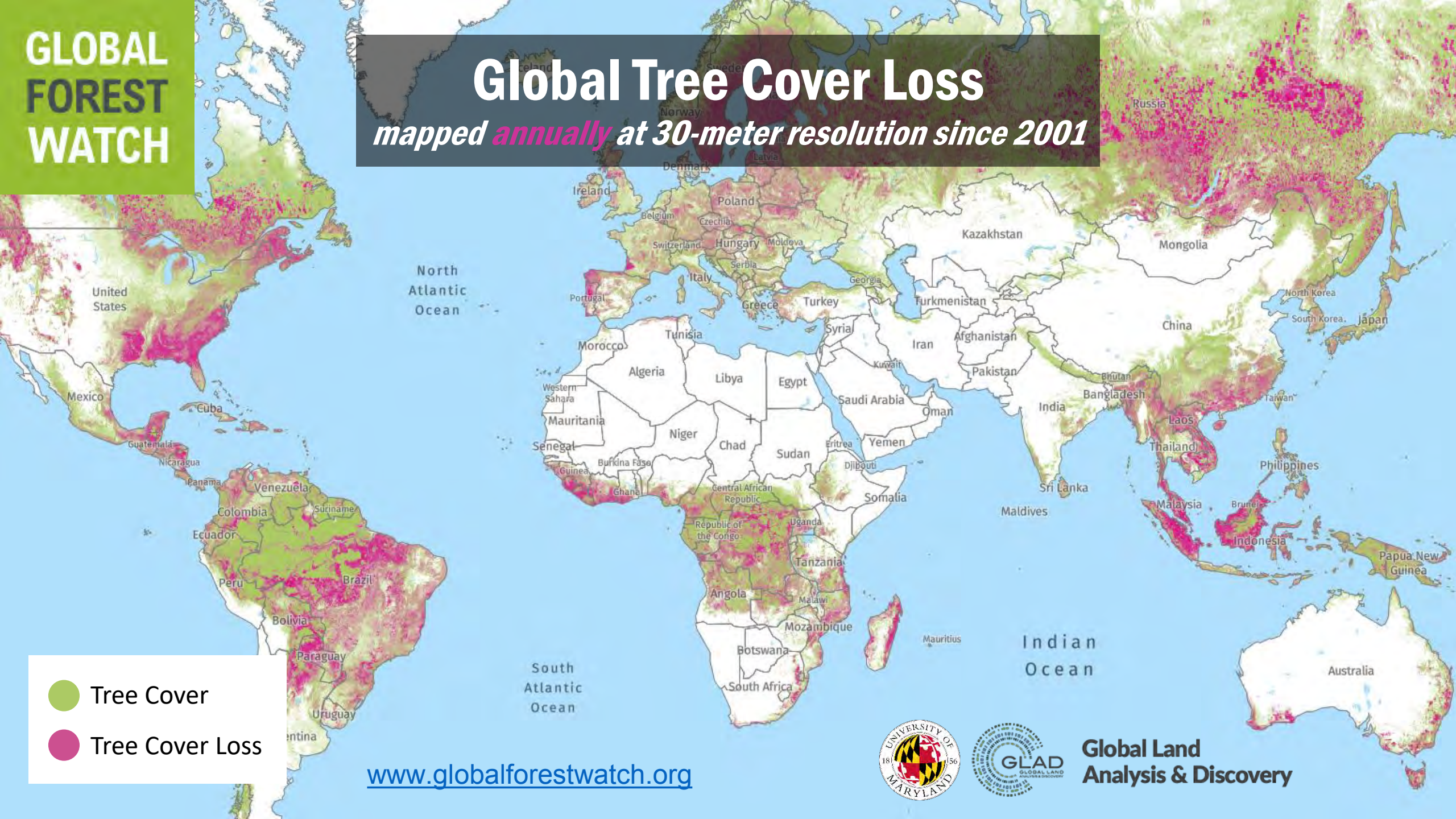
GLOBAL FOREST WATCH (GFW) AND EU FOREST MONITORING NEEDS





- Wall-to-wall information (every location is covered)
- Frequent updates (annually and soon in near-real-time)
- Open for everyone to use, for varied user and policy needs
- Comparable across countries (same definitions and methods)
- Used to understand shared progress to regional/ global goals
- Every dataset has strengths and limitations, however combination of satellite derived information with ground data allows continuous improvements

Global Tree Cover Loss

mapped annually at 30-meter resolution since 2001



-  Tree Cover
-  Tree Cover Loss

www.globalforestwatch.org



**Global Land
Analysis & Discovery**

FOREST CHANGE

TREE COVER CHANGE

- Tree cover loss** ⓘ
(annual, 30m, global, Hansen/UMD/Google/USGS/NASA)
- Tree cover gain** ⓘ
(12 years, 30m, global, Hansen/UMD/Google/USGS/NASA)
- Gran Chaco deforestation** ⓘ
(monthly, 30m, Gran Chaco, Guyana)
- PRODES deforestation** ⓘ
(annual, 30m, Brazilian Amazon, INPE)

TREE COVER LOSS ALERTS (near real-time)

- GLAD alerts** ⓘ
(weekly, 30m, select countries, UMD/GLAD)
- FORMA alerts** ⓘ
(monthly, January 2006–August 2015, 500m, humid tropics, WRI/CGIAR)
- Terra-i alerts** ⓘ
(monthly, 250m, tropics, CIAT)
- SAD alerts** ⓘ
(monthly, 250m, Brazilian Amazon, Imazon)
- VIRS active fires** ⓘ
(daily, 576 m, global, NASA)

LAND COVER

- Tree cover** ⓘ
(2000, Landsat/UMD/Kaogo/Terra/NASA)
- Intact Forest Landscapes** ⓘ
(2000/2013)
- Aboveground live woody biomass density** ⓘ
- Mangrove forests** ⓘ
- Land cover (2000)** ⓘ
- Tree plantations (2013–2014, select countries)** ⓘ
 by type
 by species

LAND USE

CONCESSIONS

- Managed forests** ⓘ
(select countries)
- Mining** ⓘ
(select countries)
- Oil palm** ⓘ
(select countries)
- Wood fiber** ⓘ
(select countries)

INFRASTRUCTURE

- Major dams** ⓘ
- Congo Basin logging roads** ⓘ

CONSERVATION

- Protected areas** ⓘ
- Biodiversity hotspots** ⓘ
- BirdLife Endemic Bird Areas** ⓘ
- Alliance for Zero Extinction sites** ⓘ
- Tiger Conservation Landscapes** ⓘ

PEOPLE

- Resource rights** ⓘ
(select countries)
- Land rights** ⓘ
(select countries)
- Population density (2000)** ⓘ

STORIES

- User stories** ⓘ
- Mongabay stories** ⓘ
- Earth Journalism Network stories** ⓘ

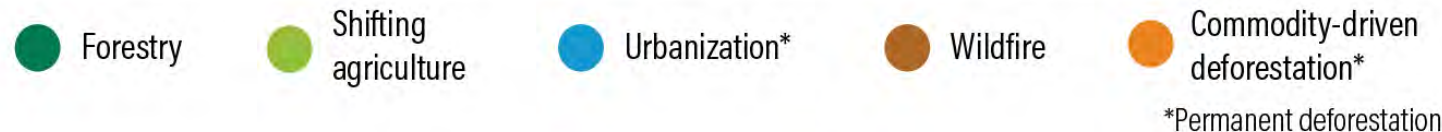
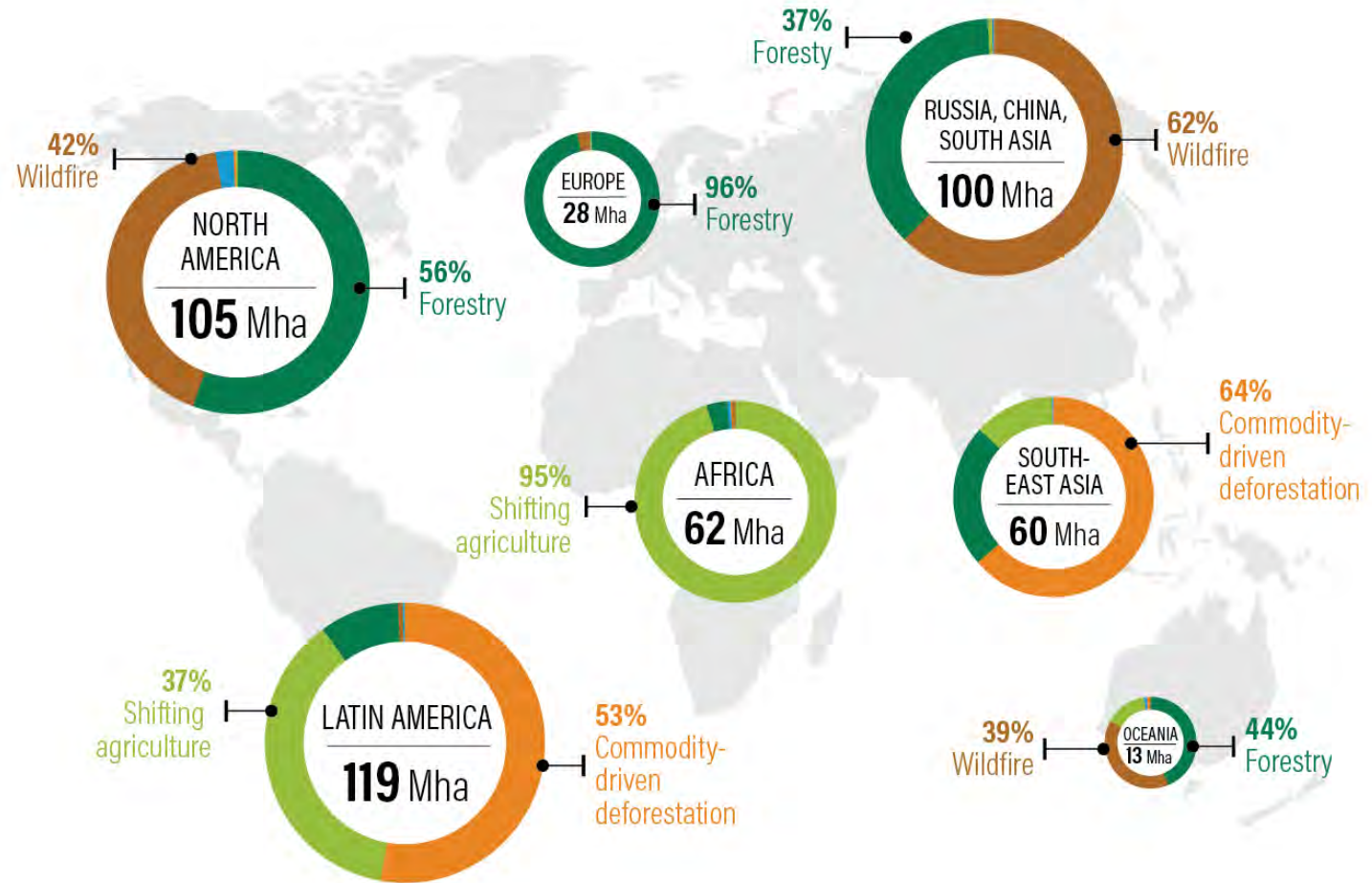
UGANDA

- Uganda protected areas** ⓘ

Putting forest change in context, such as:

DRIVERS OF TREE COVER LOSS BY REGION 2001-2023

Drivers of tree cover loss by region, 2001-2023



CUSTOMIZABLE DATA

LOCATION OF TREE COVER LOSS IN FINLAND



In **Finland**, the top 2 regions were responsible for **60%** of all tree cover loss between **2001** and **2022**. **Western Finland** had the most tree cover loss at **1.51 Mha** compared to an average of **876 kha**.

1	Western Finland	1.51 Mha
2	Eastern Finland	1.12 Mha
3	Oulu	830 kha
4	Lapland	491 kha
5	Southern Finland	425 kha

2000 tree cover extent | >30% tree canopy

TREE COVER LOSS IN FINLAND COMPARED TO OTHER AREAS



From **2001** to **2022**, **Finland** lost **4.38 Mha** of relative tree cover, equivalent to a **20%** decrease since **2000** and **0.95%** of the global total.

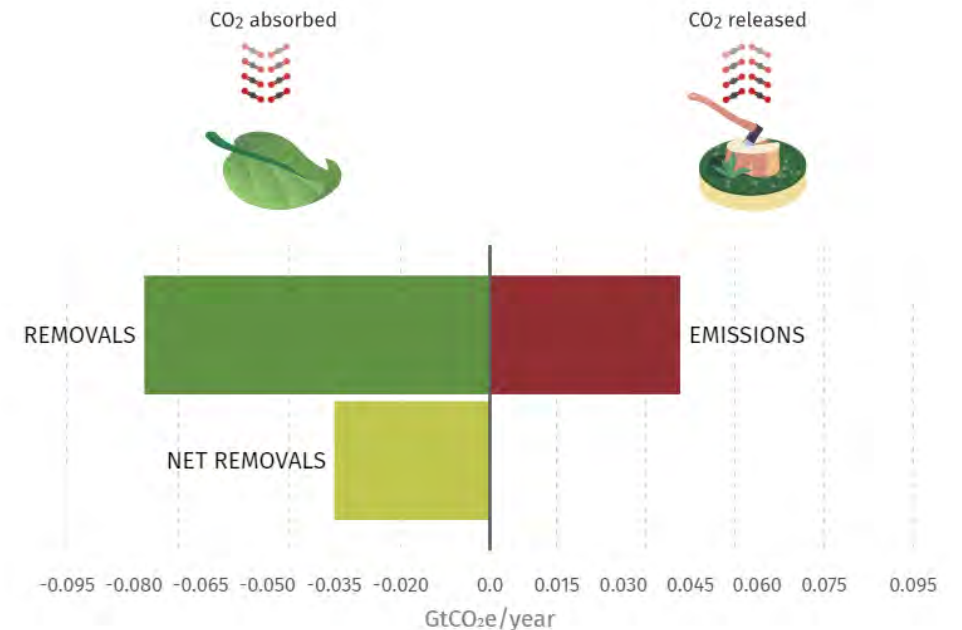
16	Madagascar	4.62 Mha
17	Myanmar	4.56 Mha
18	Finland	4.38 Mha
19	Laos	4.37 Mha
20	Mozambique	4.03 Mha

2000 tree cover extent | >30% tree canopy | these estimates do not take tree cover gain into account

FOREST-RELATED GREENHOUSE GAS FLUXES IN FINLAND



Between **2001** and **2022**, forests in **Finland** emitted **42.7 MtCO₂e/year**, and removed **-77.6 MtCO₂e/year**. This represents a **net carbon sink** of **-34.9 MtCO₂e/year**.



>30% tree canopy and tree cover gain

Which GFW tool is right for you?



GFW map and dashboards

Explore hundreds of spatial data sets and interactive charts that summarize key statistics about forests across the globe.



Forest Watcher

A free mobile and web app that enables you to take GFW data offline and into the field.



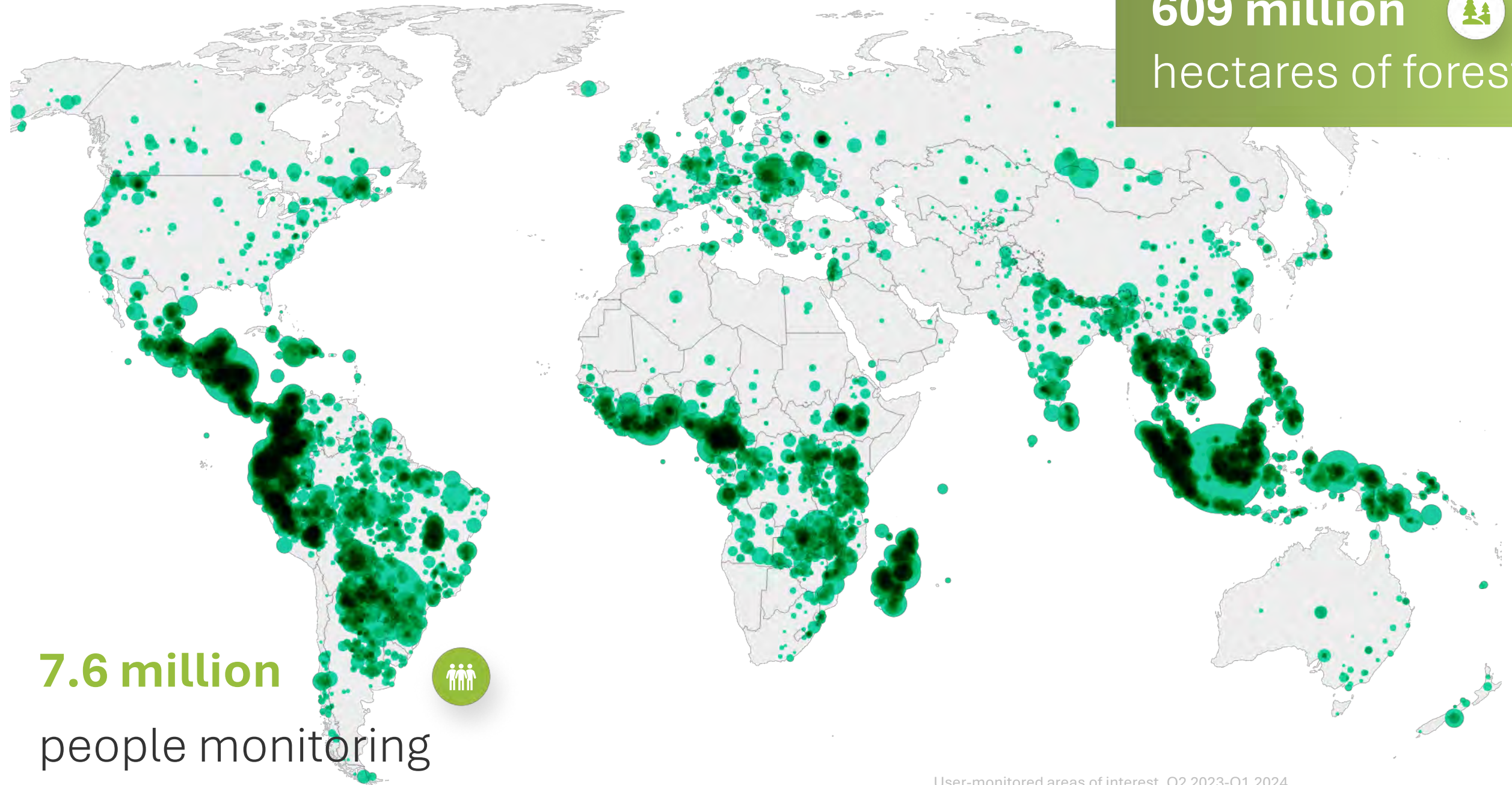
GFW Pro

The enterprise version of GFW, enables companies and financial institutions to securely monitor and manage deforestation in their supply.

609 million
hectares of forest



7.6 million
people monitoring



EU DEFORESTATION REGULATION



GFW data must be adjusted using other open source data

NRT disturbance information

What is Considered a “Forest?”

FOREST RESOURCES ASSESSMENT (FRA) adopts the FAO's definition of "forest" to provide global forest area and area change information based on biophysical and land use criteria.
















GLOBAL FOREST WATCH (GFW) provides core data sets on tree cover, gain and loss based on biophysical criteria, and uses the term "tree cover" instead of "forest." Contextual data sets available on GFW such as planted forests can be used to align tree cover with the forest definition used in the FRA.














EU DEFORESTATION REGULATION

- [GFW and EUDR Deforestation](#)
 - Setting baselines
 - Identifying deforestation
 - Mapping commodities
- [GFW and EUDR Forest Degradation](#)
 - Identifying primary and naturally regenerating forests
 - Tracking conversion
 - Identifying planted forests, plantations (and other wooded lands)

EU DEFORESTATION REGULATION

FOREST TYPE 2020	FOREST TYPE POST-2020	WOOD REMOVAL AND RESULTING LAND COVER OBSERVED AT POINT OF DUE DILIGENCE	EUDR DEGRADATION OR DEFORESTATION STATUS
	 PRIMARY FOREST	 E.G. CLEARCUT OR SELECTIVE LOGGING	CONVERSION FREE
	 NATURALLY REGENERATING FOREST	 E.G. CLEARCUT OR SELECTIVE LOGGING	CONVERSION FREE
	 PLANTED FOREST	 E.G. CLEARCUT OR SELECTIVE LOGGING	DEGRADATION
 PRIMARY FOREST	 PLANTATION FOREST	 E.G. CLEARCUT	DEGRADATION
	 OTHER WOODED LAND	 E.G. CLEARCUT OR SELECTIVE LOGGING	DEGRADATION
	 AGRICULTURE E.G. SILVOPASTORAL LAND	 E.G. CLEARCUT OR SELECTIVE LOGGING	DEFORESTATION

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	 OTHER WOODED LAND	 E.G. CLEARCUT OR SELECTIVE LOGGING	DEGRADATION
	 AGRICULTURE E.G. SILVOPASTORAL LAND	 E.G. CLEARCUT OR SELECTIVE LOGGING	DEFORESTATION

MAPPING FOREST TYPES



What is Considered a “Forest?”

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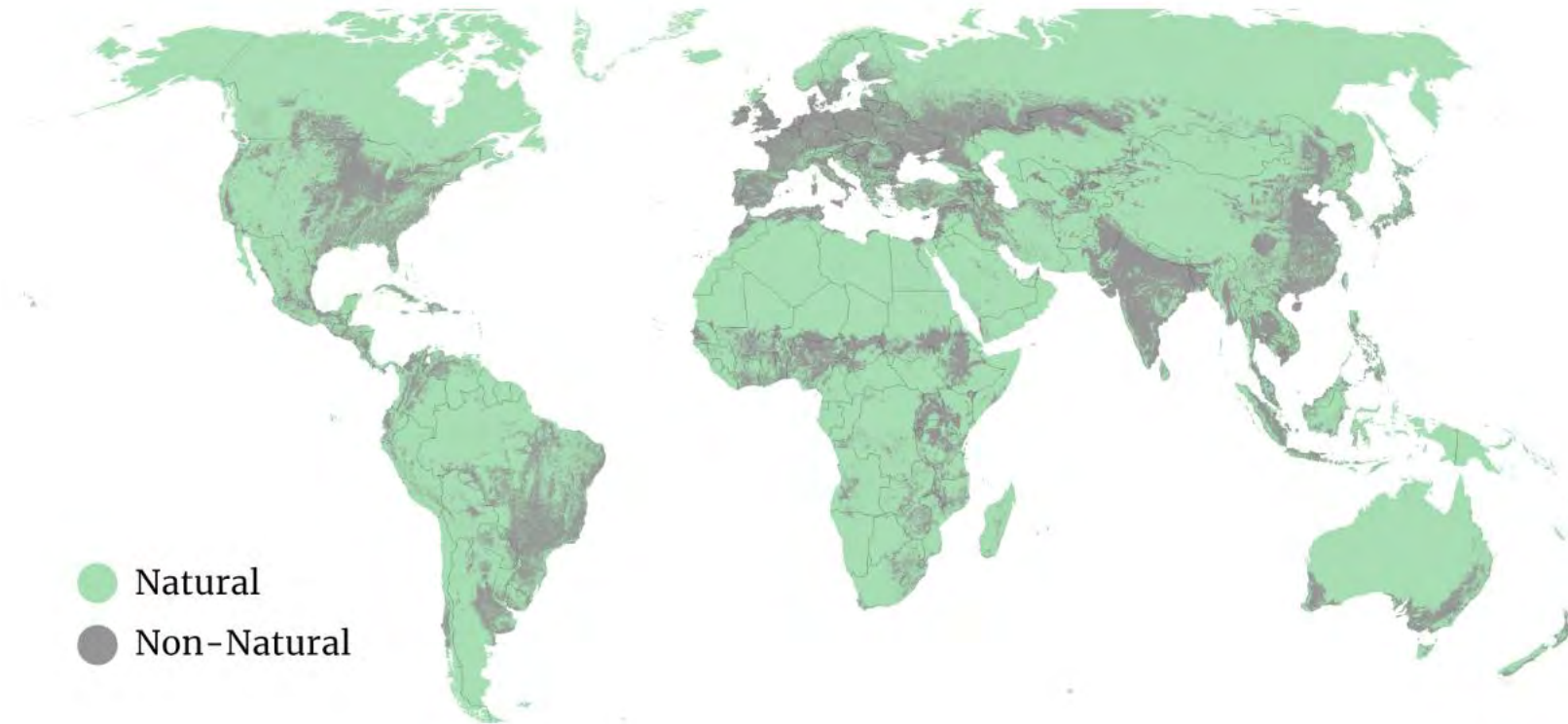
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MAPPING FOREST TYPES: SBTN NATURAL LANDS MAP



SBTN NATURAL LANDS MAP



sciencebasedtargetsnetwork.org/wp-content/uploads/2024/09/Technical-Guidance-2024-Step3-Land-v1-Natural-Lands-Map.pdf

LAND TARGETS



Target 1 No Conversion of Natural Ecosystems

Stop direct and indirect conversion of all natural, terrestrial ecosystems



Target 2 Land Footprint Reduction

Reduce the global occupation of production systems and liberate land, ideally for ecosystem restoration



Target 3 Landscape Engagement

Engage in materially relevant landscape initiatives to support actions and enabling conditions that lead to substantial improvements in nature

*For Forest, Land and Agriculture (FLAG) companies: to set land targets you must additionally set an SBTi FLAG target.



SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

SBTN NATURAL LANDS MAP

- **Goal:**
Companies set targets to have zero deforestation & conversion of natural ecosystems in their supply chains since 2020*

Challenge:
Companies need to know

1. what land was natural in 2020,
2. where they have sourced their products

Creating a data product to help companies set a baseline for measuring deforestation/conversion

*Or earlier if the company has previous deforestation-free commitments

ACCOUNTABILITY FRAMEWORK INITIATIVE: NATURAL FORESTS – A FOREST THAT IS A NATURAL ECOSYSTEM

Forest: land spanning >0.5 hectares with trees higher than 5 meters and a canopy cover of >10%, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or other land use (FAO definition).

- *Quantitative thresholds (e.g., for tree height or canopy cover) established in legitimate national or sub-national forest definitions may take precedence over the generic thresholds in this definition.*

Natural ecosystem: substantially resembles– in terms of species composition, structure, and ecological function– one that is or would be found in a given area in the absence of major human impacts

REGIONAL DATA

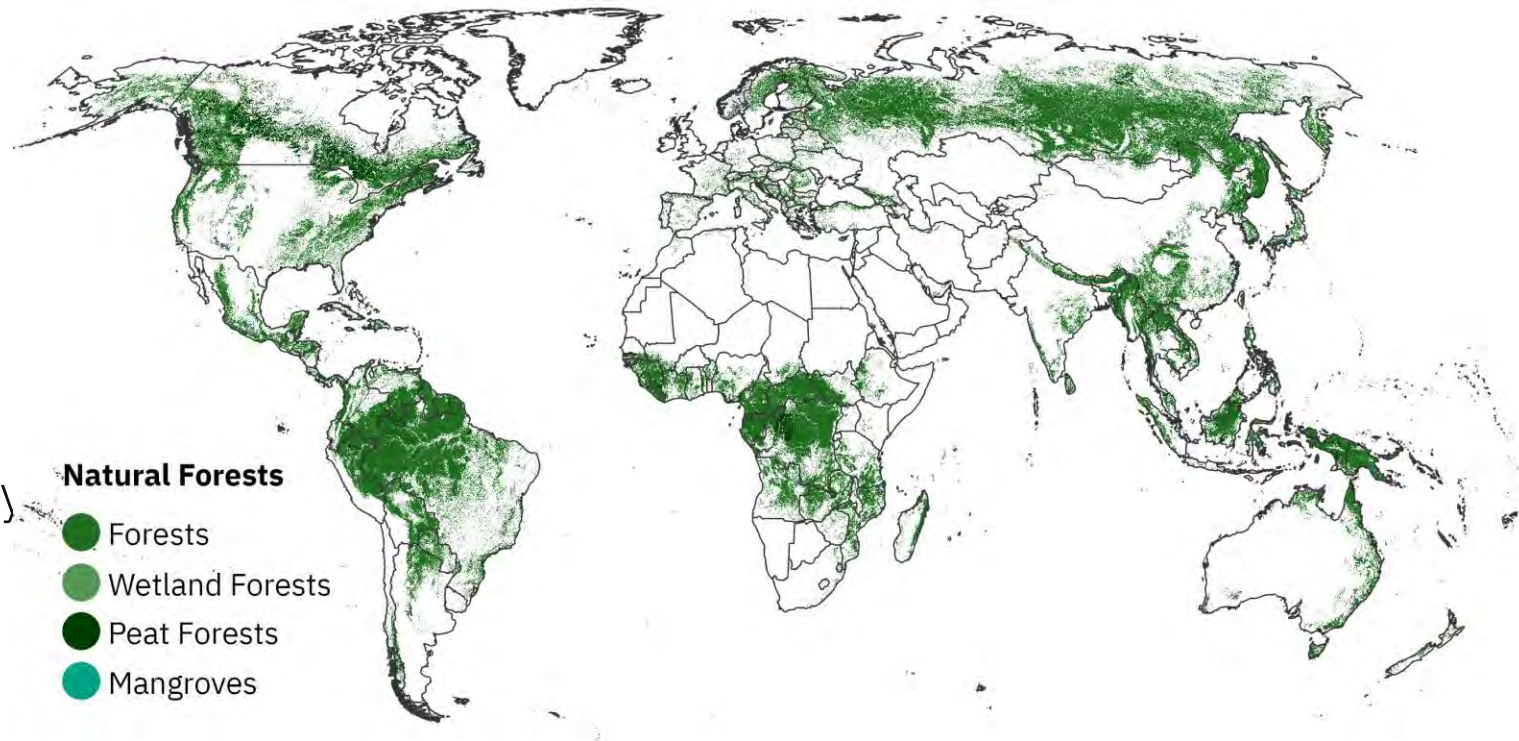
Regional data bring local knowledge and locally relevant land cover/use classes

- MapBiomass Brazil, Amazon, Atlantic Forest, Chaco, Pampa, Venezuela, Colombia, Ecuador, Peru, Bolivia, Paraguay, Uruguay, Chile, Argentina, Indonesia
- ETH/EcoVision Cocoa Map in Côte d'Ivoire & Ghana
- South Africa National Land Cover
- New Zealand LUCAS Land Use
- European Primary Forest Database
- CORINE Land Cover – grasslands
- US National Land Cover Database – agriculture & built classes
- Digital Earth Africa - cropland



OPERATIONAL DEFINITION OF NATURAL FORESTS:

Tree cover greater than 5 meters in height and more than 0.5 hectares, excluding planted forests grown for wood or wood fiber production or perennial tree crops. Height or minimum mapping thresholds may vary based on local definitions.



VALIDATION AND ACCURACY

Independent accuracy assessment of natural/non-natural designation by IIASA
Overall accuracy of 91.2%



Validation data set

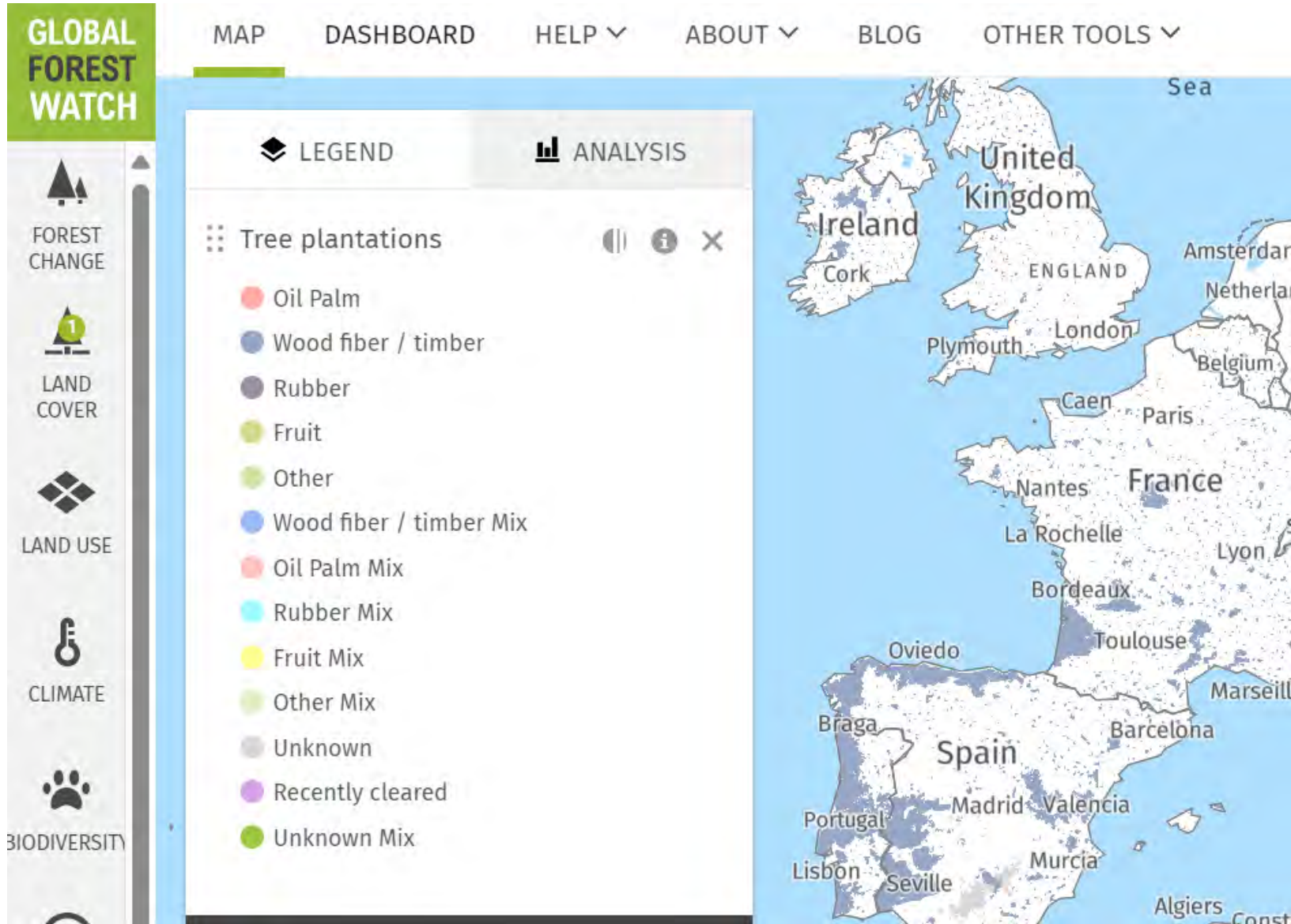
		REFERENCE			
		Natural	Non-natural	Total	User's Accuracy
MAP	Natural	3540	135	3675	96.3%
	Non-natural	281	770	1051	73.2%
	Total	3821	905	4726	
Producer's Accuracy		92.6%	85.1%		91.2%

Coming soon:
validation of Natural
Forests!

MAPPING FOREST TYPES: SPATIAL DATABASE OF PLANTED TREES (SDPT)



SDPT



SDPT

Global spatial database of planted forests and tree crops Created by harmonizing national and regional sources

- V1 launched in 2019
- V2.0 set to be on GFW in Nov 2024

Improvements	V1.0	V2.0
Mode year	2015	2020
Coverage	82 countries	158 countries
# countries with species info	43 countries	52 countries

SDPT

Reaches near-global coverage

90% of total planted forest area reported by FAO FRA

- SDPT v2.0 264 million ha

- FAO FRA 2020 293 million ha

New planting year information

Carbon removal factors for newly added data

SDPT

How is it used?

- JRC 2020 forest extent map
- In forthcoming JRC 2020 forest type map
- Expediting inspections of timber shipments
- Estimating carbon sequestration rates

Future:

- V2.1 out soon – incorporates more species-specific data sources 'likely-species' attribute
- SDPT v3.0 in 2025

MAPPING FOREST TYPES: FOREST MANAGEMENT



IIASA FOREST MANAGEMENT

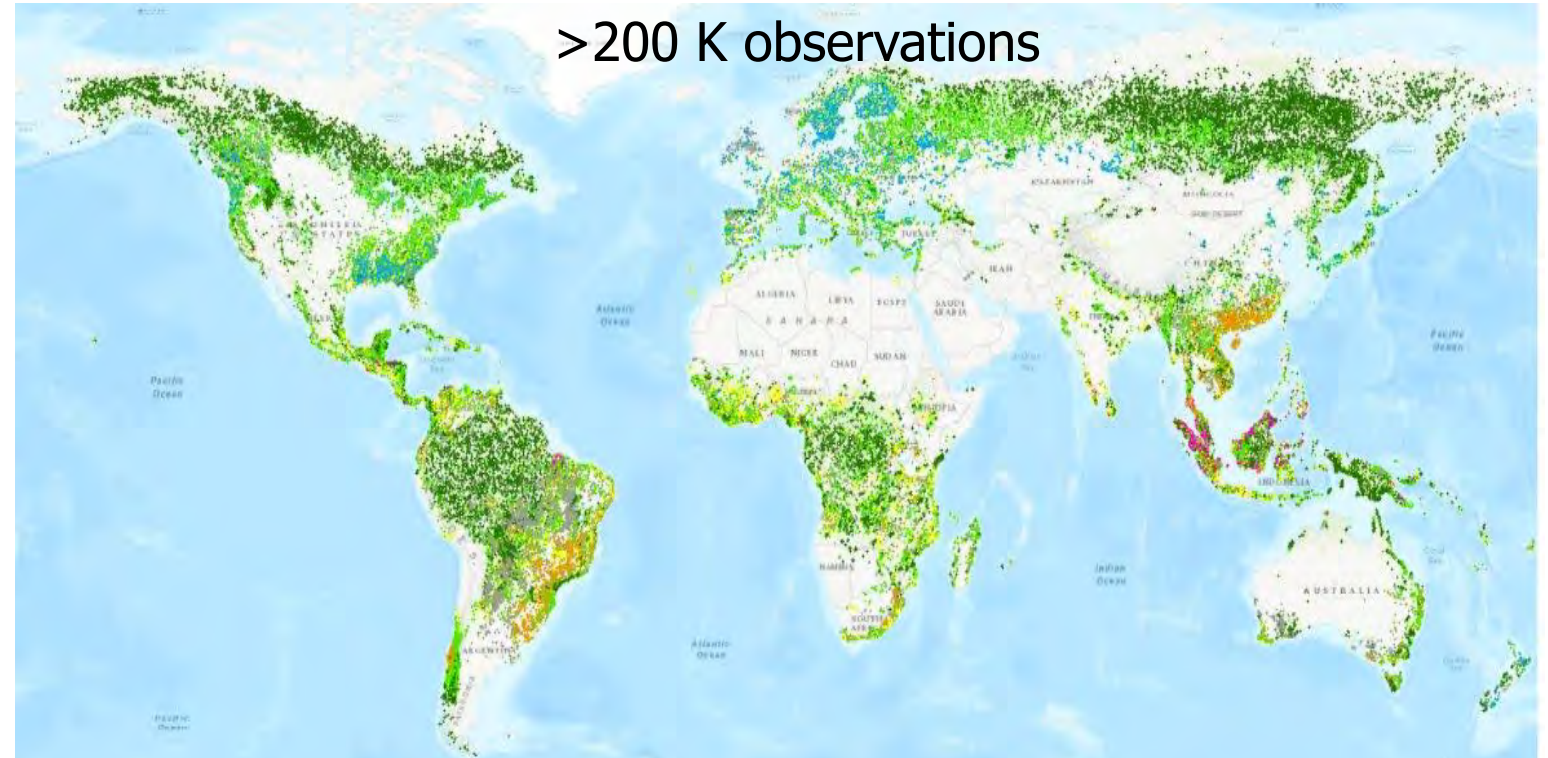


Lesiv et al. (2022). Global forest management data for 2015 at a 100 m resolution. *Scientific Data*, 9(1), 199.)

Past work	Current work
<p>Global Forest management map at 100m 2015</p> <p>Legend (main FAO forest categories)</p> <p>Input RS: Proba-V 100m</p> <p>Training and validation data collected by experts and in the crowdsourcing campaign (Geo-Wiki tools)</p> <p>Methodology: per biome, random forest</p>	<p>Global Forest management map at 100m 2020</p> <p>More classes: rubber and fruit tree plantations (in compliance with EUDR)</p> <p>Input RS: Sentinel 1 and Sentinel 2</p> <p>Revised training data set for 2020 with additional classes collected mainly by experts</p> <p>Methodology: testing various models, including Cat Boost</p>

TRAINING DATA

- Revising the published training data set 2015 in change areas
- Adding two more classes:
 - Rubber and fruit plantations
- Collecting more data in low accuracy areas



- 11 Forest without any signs of management activities, including primary forests
- 20 Naturally regenerating forest with signs of management, e.g., logging, clear cuts
- 31 Planted forest
- 32 Plantation forest (rotation time up to 15 years)
- 40 Oil palm plantations
- 53 Agroforestry

FOREST MANAGEMENT NEXT STEPS

- New forest management map – May 2025
- The map and training data of open access
- Independent validation by the end of 2025

Geo-Wiki Webpage



MAPPING FOREST TYPES: NATURAL FOREST MAPPING



GOOGLE FOREST TYPES

- **Wall to wall forest types 2020 – for EUDR**
- **In development**
- **Validation using SBTN validation data**

WHAT'S NEXT?

COMING SOON TO EUROPE

- **Near-real time information: (sub)-weekly alerts showing changes in tree cover**
- **Enables quick action in response to unplanned changes**
- **Currently available in the tropics**

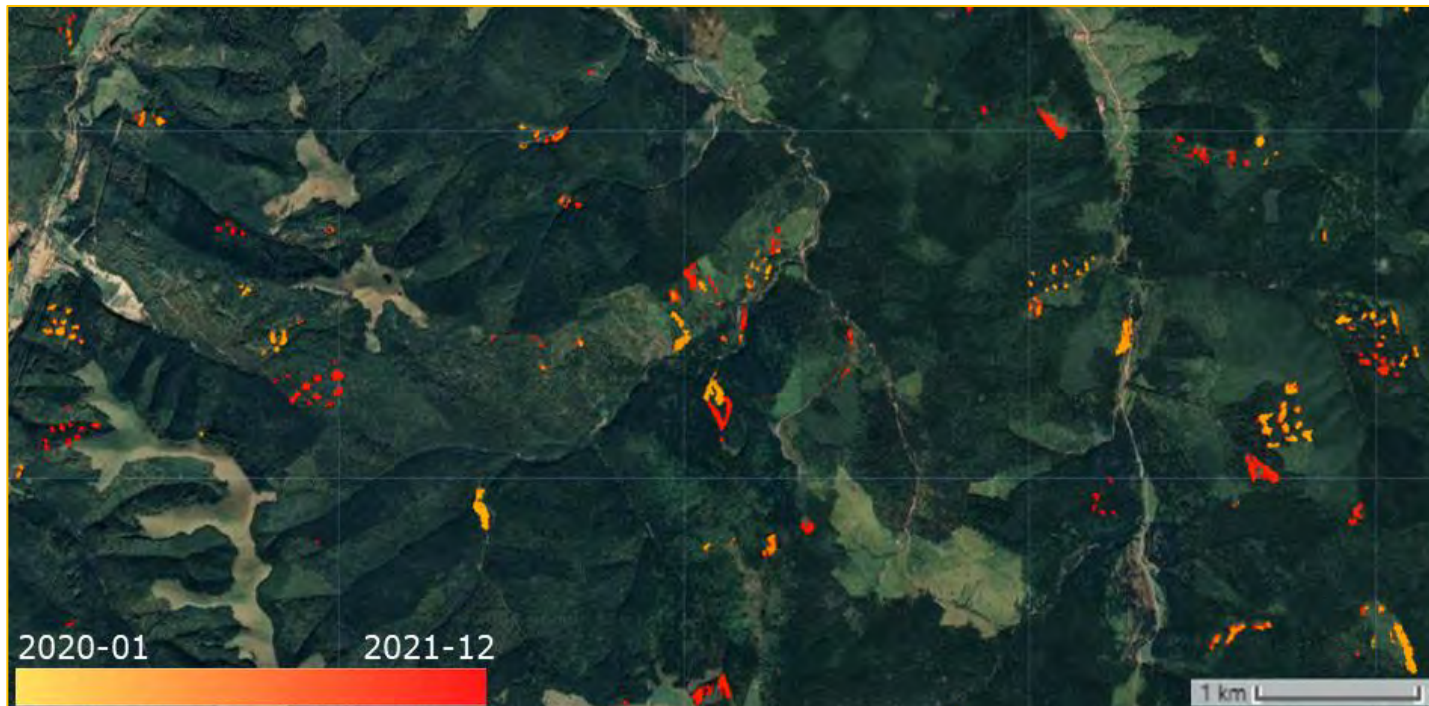
An aerial satellite map showing a landscape with a grid of fields. Numerous small red dots are scattered across the map, representing data points. A white crosshair is positioned in the lower right quadrant of the map. The text 'Actionable data' is overlaid on the left side of the image.

Actionable
data

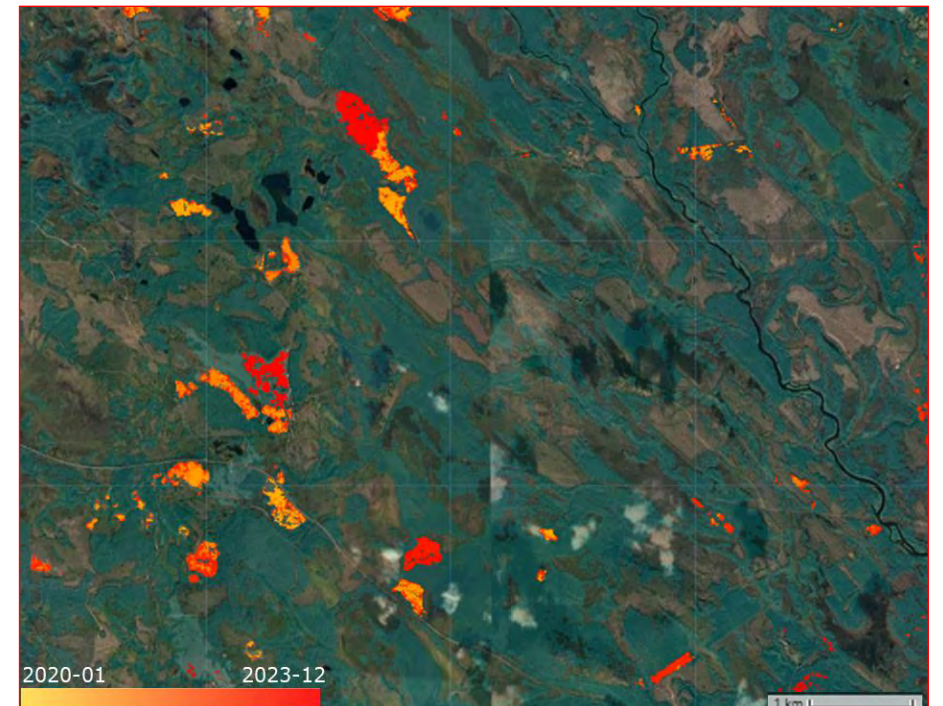
RADD EXPANSION TO EUROPE (WAGENINGEN UNIVERSITY)

- Covering all EU forest types at 10m
- Technical improvements include e.g. a seasonal model that can deal with droughts and frozen conditions
- Operational in early-2025 on GFW

Credit: van
der Woude,
Reiche
(Wageningen
University)



Small-scale logging in Romanian Carpathian Mountains

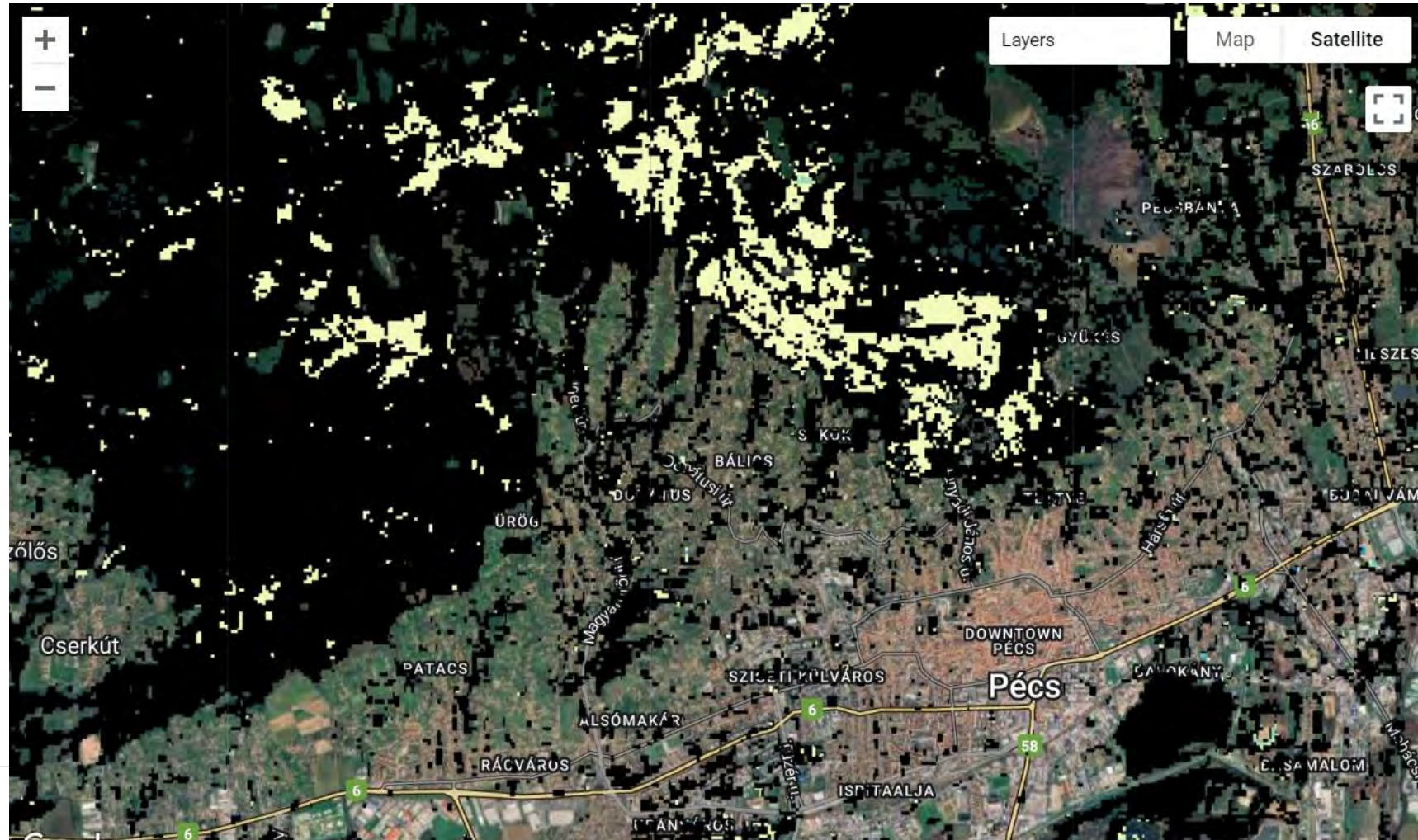


Large clearcuts in Northern Sweden

GLOBAL ALL LANDS VEGETATION ALERTS (UNIVERSITY OF MARYLAND)

- [New data from NASA/ University of Maryland \(UMD\)](#)
- Tracks vegetation fraction every 2-4 days
- Based on HLS, 30 m, from 1 Jan 2023
- Identifies anomalies compared to the average vegetation fraction for the same period (+/- 15 days) within the last 3 years
- Potential to monitor all lands and forest types – inc. OWL

Date of first disturbance detection



KEY TAKEAWAYS

- Satellite monitoring provides **wall-to-wall information** on status and changes of our forest resources –**comparable** across countries
- Open data have enormous potential to serve varied **EU forest monitoring needs** for all stakeholders
- Every dataset has strengths and limitations, **however combination of satellite derived information with ground data** allows continuous improvements
- **Local knowledge** is essential to interpret satellite derived information
- GFW is constantly evolving to incorporate the **best and latest global data** and is working with partners to acquire and generate new datasets that fill critical information gaps.
 - Near-real-time disturbance information coming soon to Europe...

THANK YOU

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