PEAT FIRES

How can we respond to a growing threat...

Peatlands are ecosystems of global climate and biodiversity importance

According to IUCN

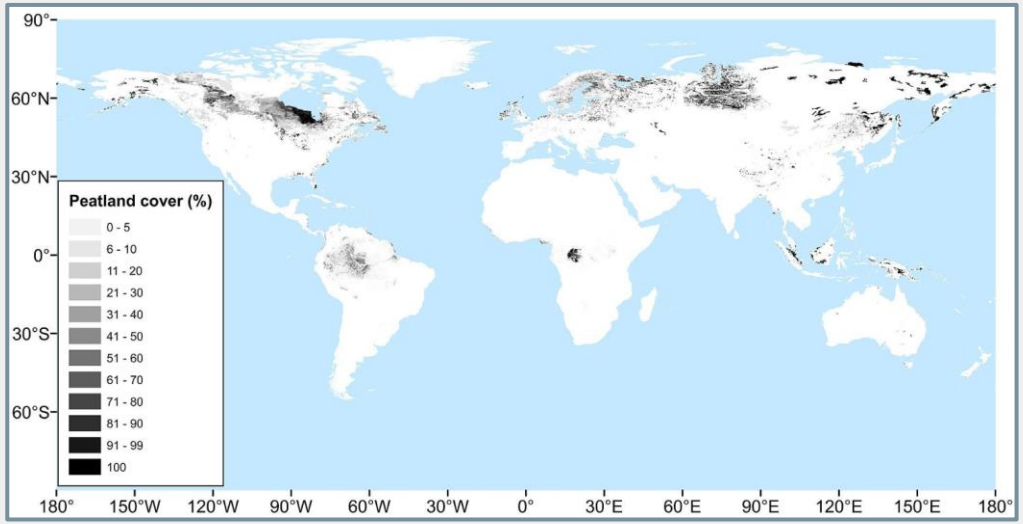
Peat soils in close to natural peatlands contain more than 600 gigatonnes of carbon = 44% of all soil carbon.

Emissions from drained peatlands are estimated at 1.9 gigatonnes of CO2e annually.

According to IPS

“Peatlands are carbon rich ecosystems that store and sequester more carbon than any other type of terrestrial ecosystem”.

4.23 million km2, 16% of peatlands are drained.



Xu, Jiren and Morris, Paul J. and Liu, Junguo and Holden, Joseph (2017) *PEATMAP: Refining estimates of global peatland distribution based on a meta-analysis.* University of Leeds.

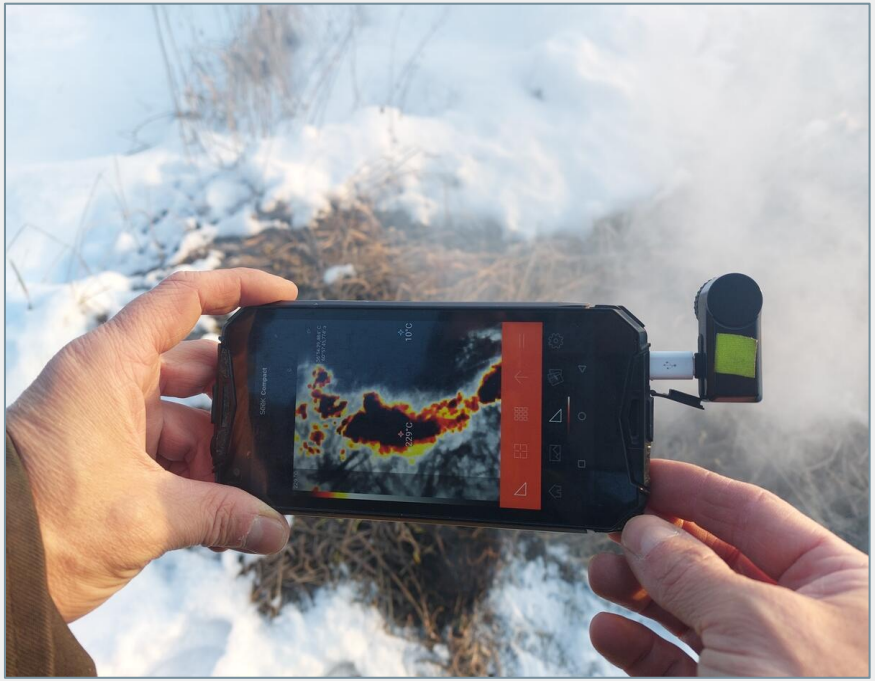
Deforestation fires in Brazil and Indonesia accounted for **3% and 7%**, respectively, of the planet's total greenhouse gas emissions (GHG) in 2019 and 2020, finds a new study in Frontiers in Climate. Of that amount, fires in peatlands contributed to between **40% and 60%** of the GHG emission impact, showing a severe underrepresentation by previous estimations. The researchers urge better forest and peatland protection policies.

Burning peat is the same as burning fossil fuels, but it is a burning for nothing

Why peat fires are going to grow in number

- Continuing deforestation and extensive draining
- Draughts caused by climate change
- Introduced fires

The new reality in Boreals is large-scale fires that ignite natural peatlands dried by draughts, survive winters and ignite new forest fires.



What to expect?

Peat fires that aren’t detected and suppressed on early stage grow to hardly-manageable large scale fires, emitting significant amounts of CO2, producing toxic haze, and destroying ecosystems.

Each of five most important forest - peatland ecosystems will be affected.

Challenges we have

No “Let it burn” option

High resource consumption rate

Combination with forest fires and WUI

Agricultural use and abandonment

System inconsistency - in many cases fire brigades aren’t organised and equipped for peat fires

What should we do?

We must act smart

£10’000 vs £3’000’000

- Prevention is a key - peatland restoration is the best option
- Specific strategy, tactics and tools to be in place
- Detect and suppress early
- Restructure resources according to the challenge

Prevention: more questions then answers

Peatland restoration is the best practice of peat fire prevention but still there are a few important questions:

- Limits of restoration - what share of moors could be properly restored?
- Scale of required processes - do we have enough resources to restore?
- Ability to restore - are we able to restore to natural conditions?
- Time horizon - what are we doing before a peatland is restored?
- Climate change - will it devalue to some extent our efforts?

For drained peatlands we also have an important discussion on critical points of prevention:

- To which extent we can limit owners of the land in their land-use?
- To which extent drained peatland are the part of existing ecosystem?
- **To burn or not to burn?**

SUppression: adjust ourselves

Peat fires have specifics and require specially trained, equipped and organized resources to respond

- Use satellite imagery and data together with GIS tools to improve early detection of peat fires;
- Keep track of previous years peat fires - this ‘criminal’ tends to come back to the ‘crime scene’
- Have specific tools to ‘see’ fire underground
- Be light-weight; maneuverable; all-terrain and self-sufficient
- Double tap

Understanding peat fire

What we know

- Peat is relatively easy to ignite and hard to suppress, it can smolder even with high moisture and under the snow with zero oxygen access
- Peat is very unlikely to self-ignite - in almost all cases it will be started by a surface fire

What does it mean for us

- We will need direct suppression that consumes large amounts of water or expensive engineering
- We can understand where peat is burning by following fires and burnings

Peatlands: drained vs. natural

DRAINED

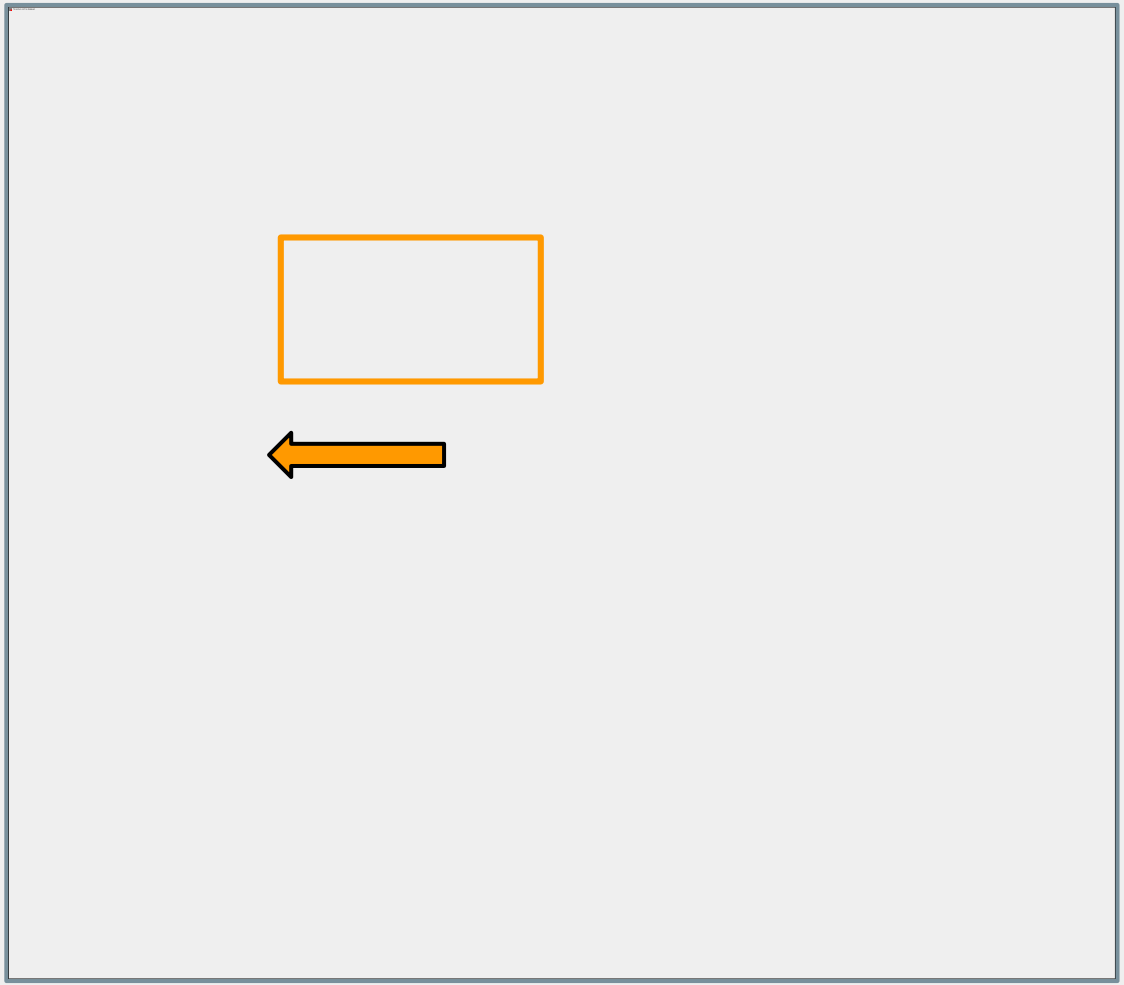
- Risk of ignition is relatively high
- Fire will tend to grow consistently
- Large amounts of available fuels

- Relatively high water availability
- Higher accessibility
- Beneficial conditions for reconnaissance and sizeup
- Water regime is more manageable

NATURAL

- Lower accessibility
- Questionable water resources
- Obstructed reconnaissance and size up
- Obstructed resource maneuverability
- Higher environmental risks

- Lower ignition risks
- Natural barriers for spread of fire

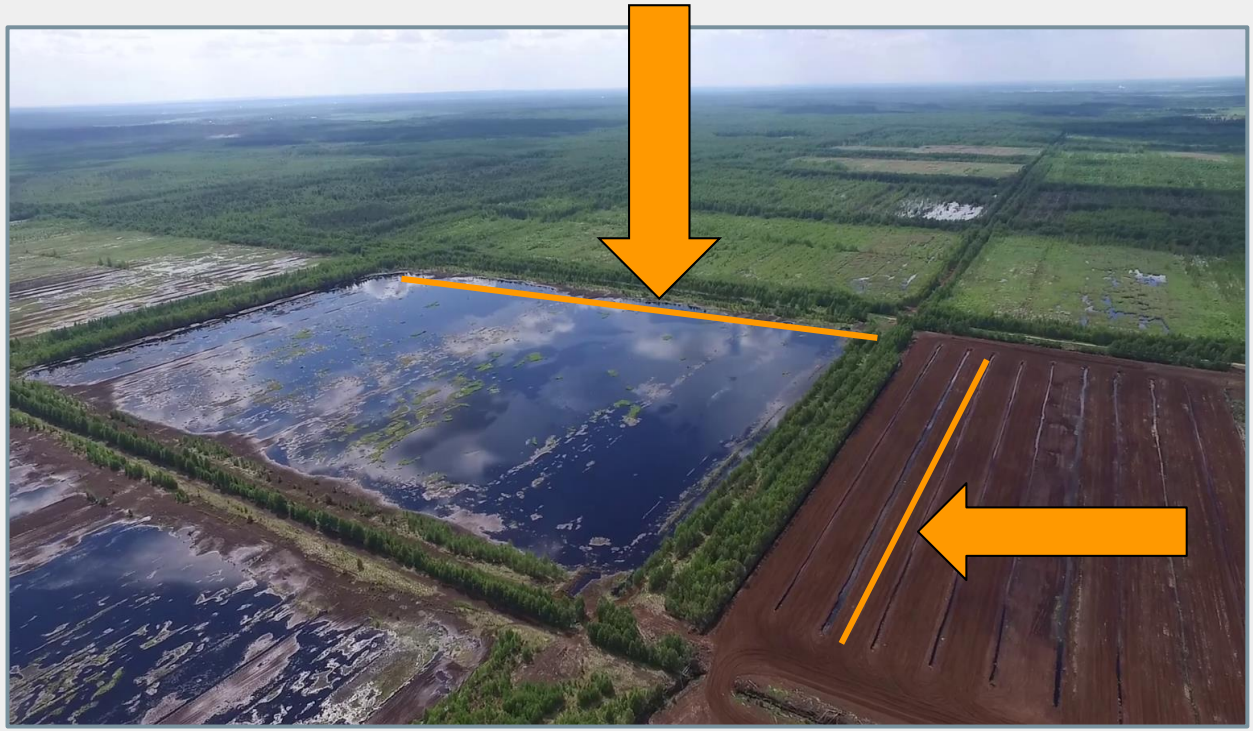


DRAINED PEATLANDS

Peatlands in Northern Europe, Indonesia were drained for harvesting peat or conversion of peatlands into agricultural lands and plantations.

They could be identified on sat images by the specific systems of drainage canals & ditches.

Majority of fires occur in drained peatlands

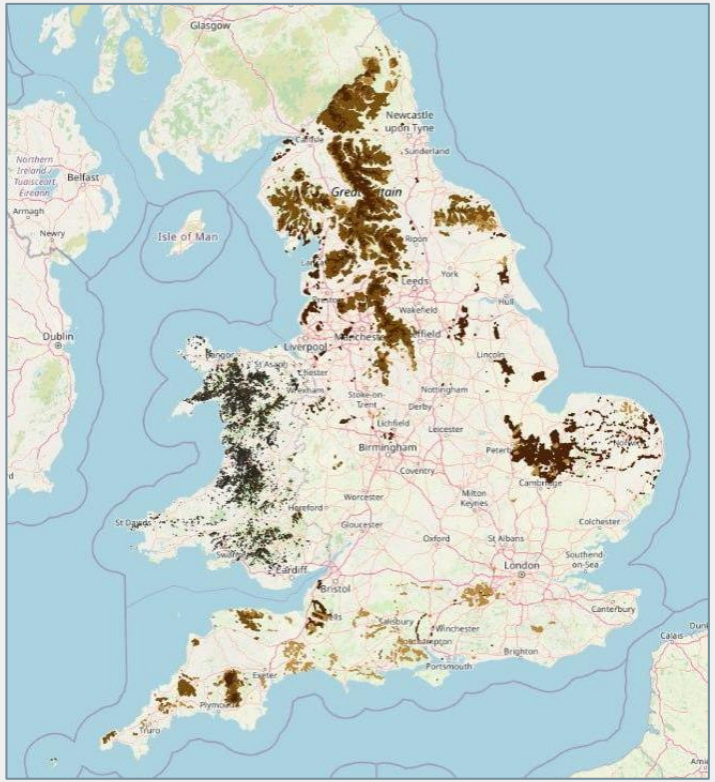


Drained peatland structure

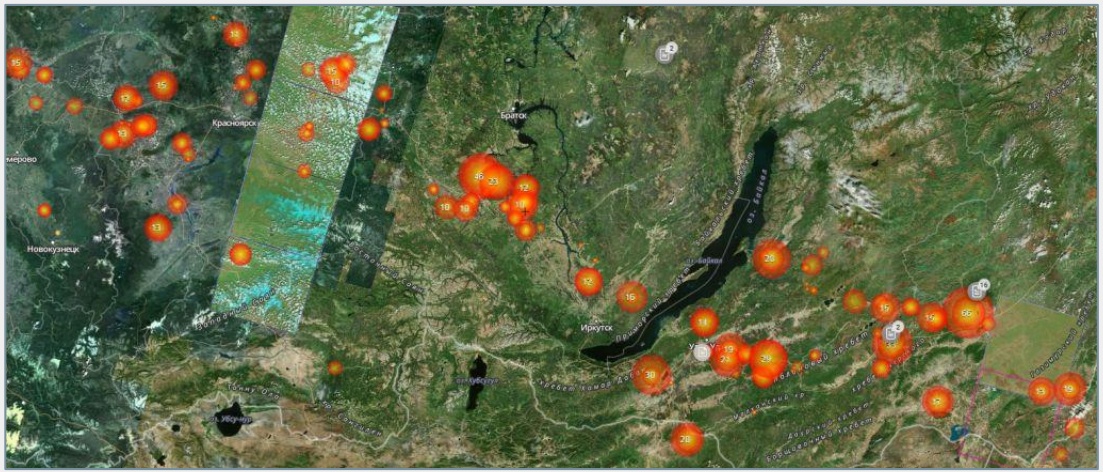
Canal grid is built in the way to gather water from the peatland and to prevent water supplies from outside to rewet the peatland.

In the Spring channels could provide enough water for suppression by will be dry later in Summer.

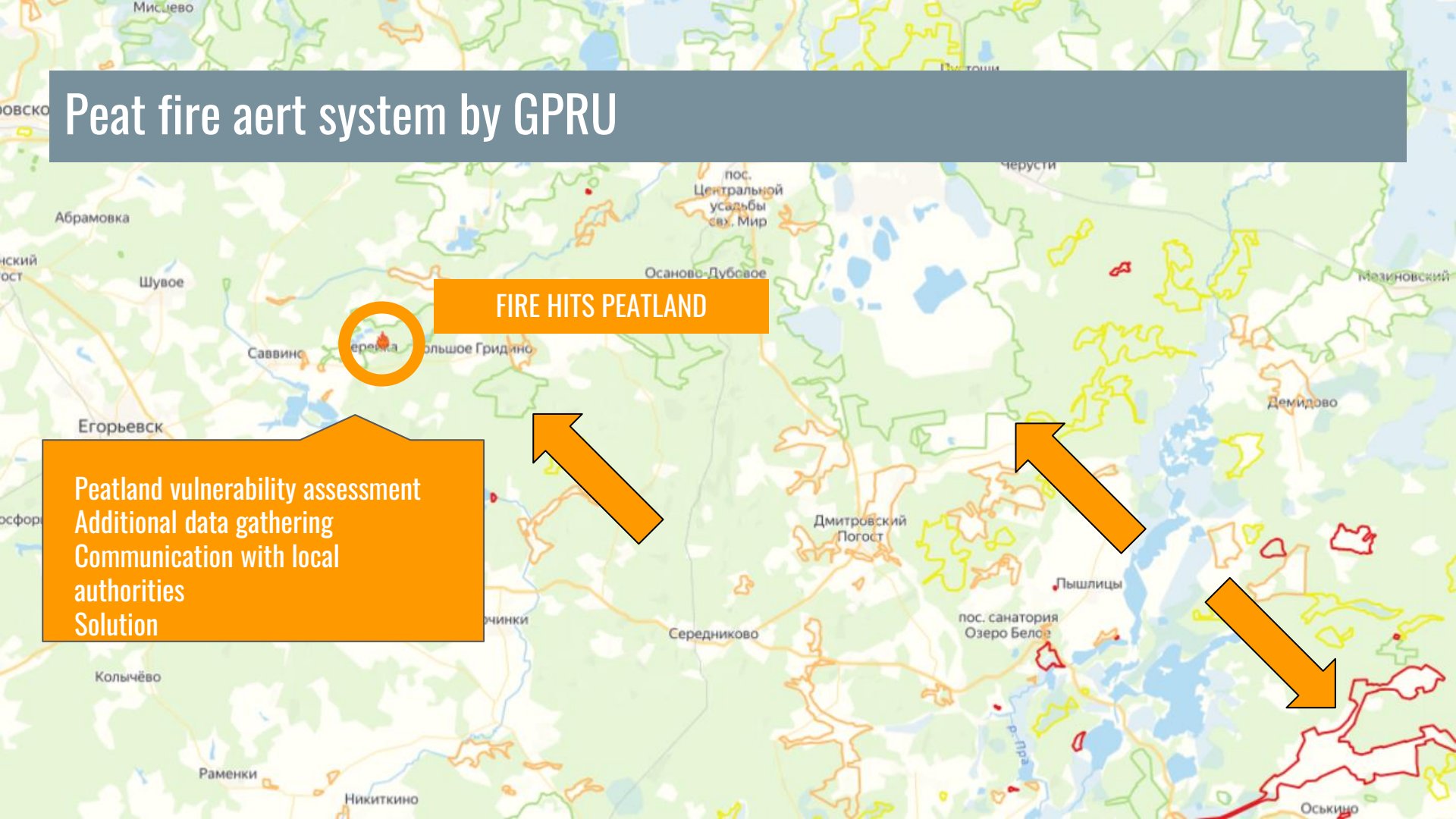
GIS tools is the “First line of defence”



Monitoring
Analysis
Solution



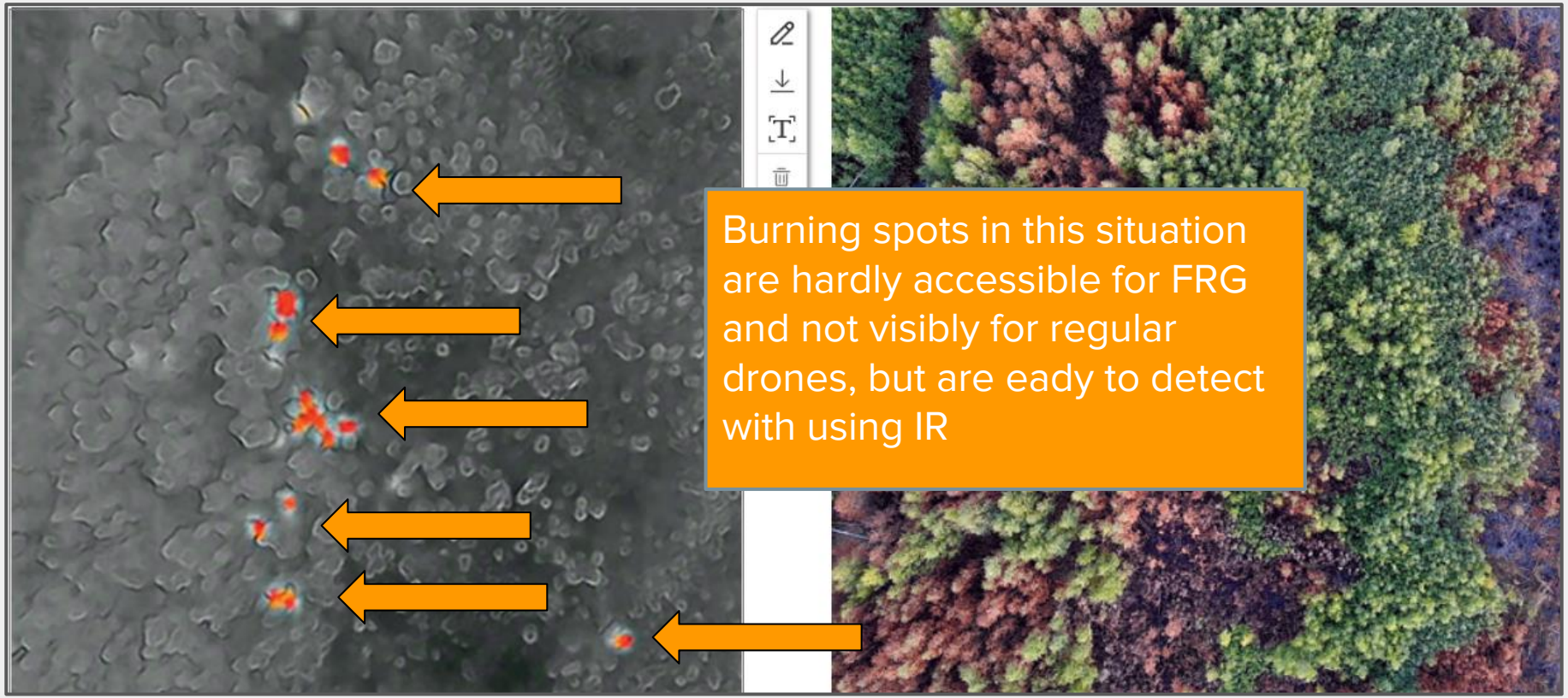
Peat fire aert system by GPRU



Reconnaissance

Identify fire risk zone	Sat.IMg; Drones; Foot Recce Groups (FRG)
Identify points of vulnerability	Data/map analysis; Sat.IMg; Drones; FRG
Plan recconaisance	Data/map analysis
FInd fire	IR tools; Drones; Foot Recce Groups (FRG)
FInd water	Recce information analysis; on-site assessment

IR Drones: the game-changer



FRG is still the main resource to find a fire

OMNIA MEA MECUM PORTO

Direct & Indirect suppression - 9/1 result but 1/9 resources

If you can not suppress it - drown it

Direct & Indirect suppression - comparison

DIRECT SUPPRESSION

- Effective on early stage
- Require trained FR/SG with portable equipment and high hiking capacities
- Special transport means: FVD; ATV; Moor vehicles
- Will exponentially increase resource consumption depending on fire size

INDIRECT SUPPRESSION

- Effective on late stage
- Require qualified hydro-engineering and proper assessment of various consequences
- Heavy gear;
- Expensive

Post suppression control (PSC) is the key element of effectiveness

Same tools must be used for PSC as were used for recon missions, but cold trailing is still an option

SAFETY: peat fire is a tricky bastard

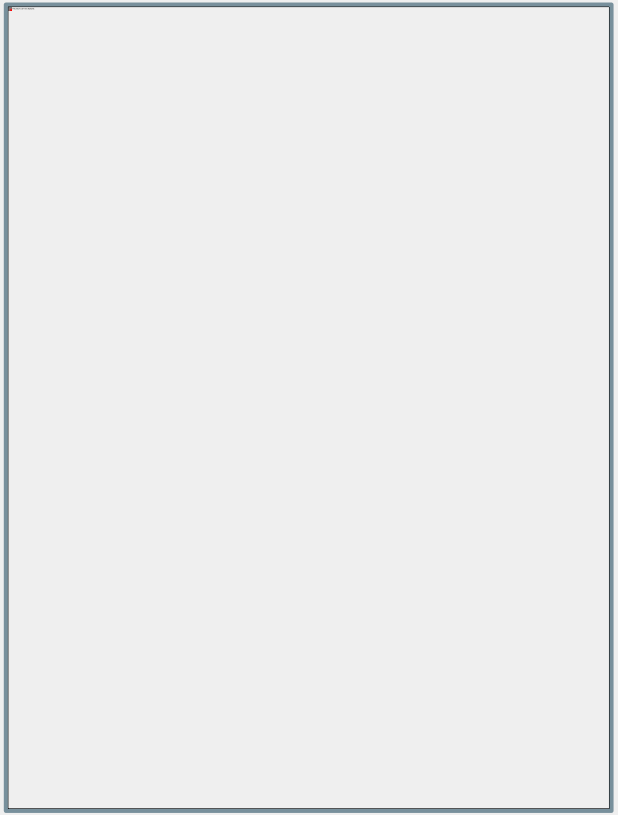
Factors increasing risks

- Peat fire spreads under the surface and therefore is less predictable
- Peat smoldering creates caverns that are heated up to 600C and are hidden - they are deadly traps for firefighters
- Peat fire can ignite surface vegetation unpredictably and create dangerous wildfire
- Smoke is toxic

The last but not the least: HAZARDS

ADDITIONAL HAZARDS

- Peatlands tend to accumulate and sink radioactive particles if peatlands were contaminated by fallout or by incoming polluted water
- Same is relevant for toxic substances
- Peat fires will excavate sunken particles and substances
- ‘In warfare zones peatlands tend to accumulate relatively higher amounts of UXO



Credits

All photos and illustrations that aren’t credited specifically are taken from Greenpeace sources according to Greenpeace policies of use

Acknowledgements

I’m grateful to all of my Greenpeace colleagues who were together with me in numerous paet fire assignments, who made this work possible. My heart with those of them who faces risk of political oppression due to their pacifist and civil positions.

I want to express gratitude to the wildland firefighting community and especially to the members of Mafra group who are helping me a lot to withstand difficulties of migration.

If you have any questions - ask this guy

Anton ‘Benny’ Beneslavskiy
anton.beneslavskiy@gmail.com

PYROCENE ALLIANCE