



Onrus Peat-Palmiet Wetland Ruin to Restoration

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2018/2019 Overberg Fire Season

Marked as most overwhelming in history of the Overberg. 30 wildfires burned during the season, 20 of these were extremely damaging to the our area.

1) Betty's Bay fire, started on New Year's Day due to a flare shot off early on the 1st of January 2019. It caused significant ecological and economic loss and contributed to loss of human lives. 11 January, the fire entered the town of Betty's Bay, destroyed 31 properties, and damaged 28 homes. The fire burned two thirds of the Kogelberg Nature Reserve - 12,800 ha's.

2) Hermanus fire came about when the Karwyderskraal fire of 13 December 2018 reignited in extreme windy conditions (on 11 January). The fire stormed into the Hemel-en-Aarde Valley and out the other side into the Fernkloof Nature Reserve. No structures were lost in Hermanus, but 1,300 ha's were destroyed.

3) The Franskraal fire on the same day, 11 January, started due to social unrest. Parts of the town of Franskraal were evacuated, with two structures lost in town, as well as a caravan park. Around 1,000 ha's were destroyed.

In total over 15000ha's of fynbos was lost but with it many other living things.





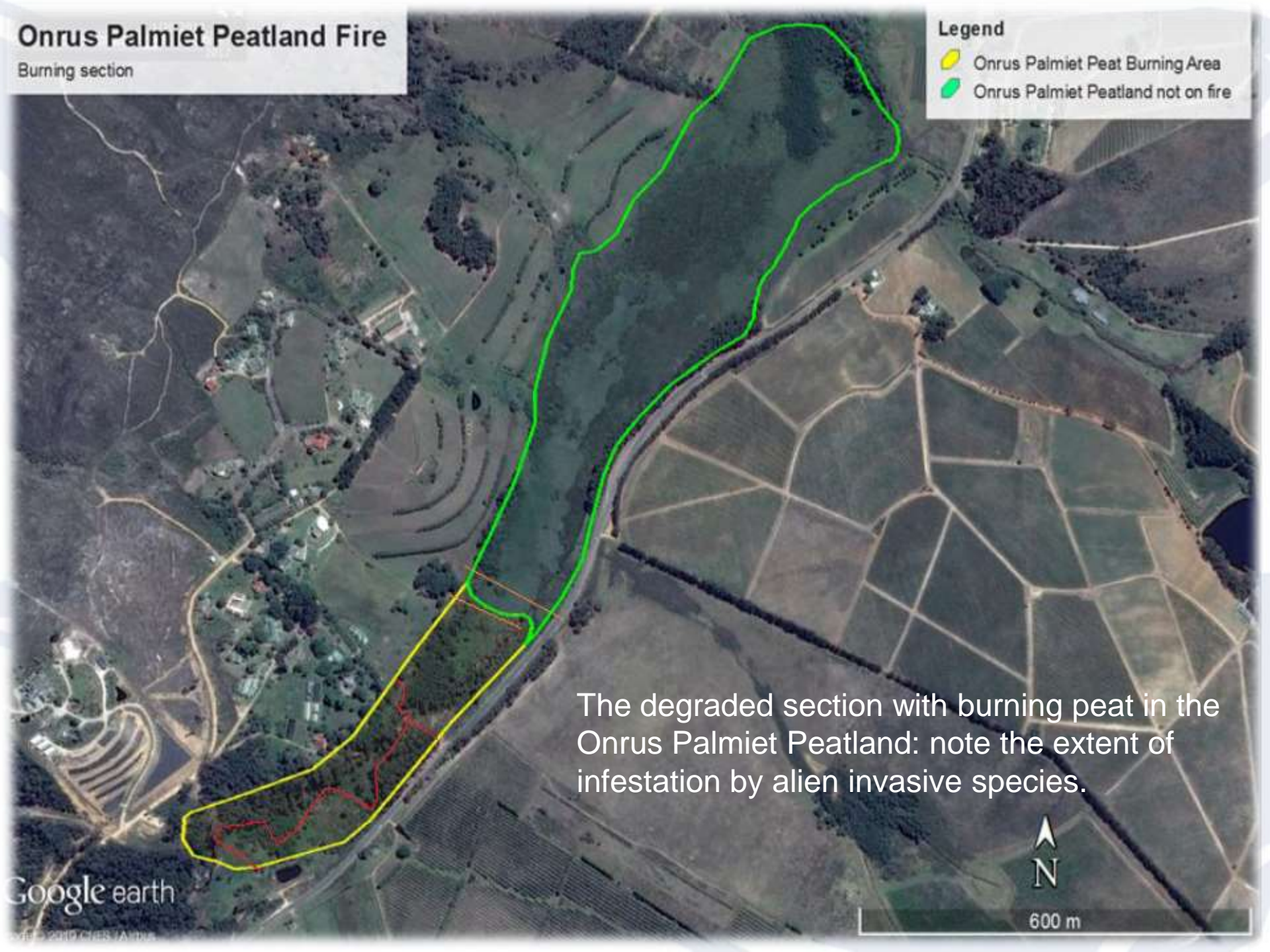


Onrus Palmiet Peatland Fire

Burning section

Legend

-  Onrus Palmiet Peat Burning Area
-  Onrus Palmiet Peatland not on fire



The degraded section with burning peat in the Onrus Palmiet Peatland: note the extent of infestation by alien invasive species.



Overstrand Fire & Rescue

- 30 Jan infield visit Fire and EMS
- Distinctive smell of sulphates and CO₂
- Smoke/steam rising up from ground
- Heat emanating from ground
- Blanket of smoke over the site



Peat-
Wetland
Fire



- Contacted the specialist, Dr Piet-Louis Grundling , WonWetlands and he visited the site on – 22 Feb and again on 4/5 March 2019
- He immediately noted the presence of peat – but it needed to be confirmed so it was measured with a Russian Peat Auger







- Onrus wetland consist of an unchannelled valley bottom wetlands comprising mainly of endemic Palmiet.
- Palmiet wetlands are endemic to the coastal provinces of SA and unique in their distribution as >10% of SA's wetlands.
- Normally peatlands are associated with flat bottom valleys with high sand content and underlain with rocks, but the Onrus contained a peat layer of > than 7m thick, dominated by a lower 4m thick sedge layer with basal sand layer at bottom and therefore very unique and unlike any other palmiet system.
- It was a necessity that immediate action be taken to contain the fire, protect intact, unburnt wetland and control the fire in the burnt wetland.
- The effect of the fire was causing serious air quality problems at Camphill school, farming community and the children had to be evacuated from their homes and school.
- It was clear that we did not understand the extent of the fire.

Thermal imagery credit: Rob Erasmus Enviro Wildfire Solutions





The *DJI Mavic Enterprise DUAL* drone with a thermal camera



We belong

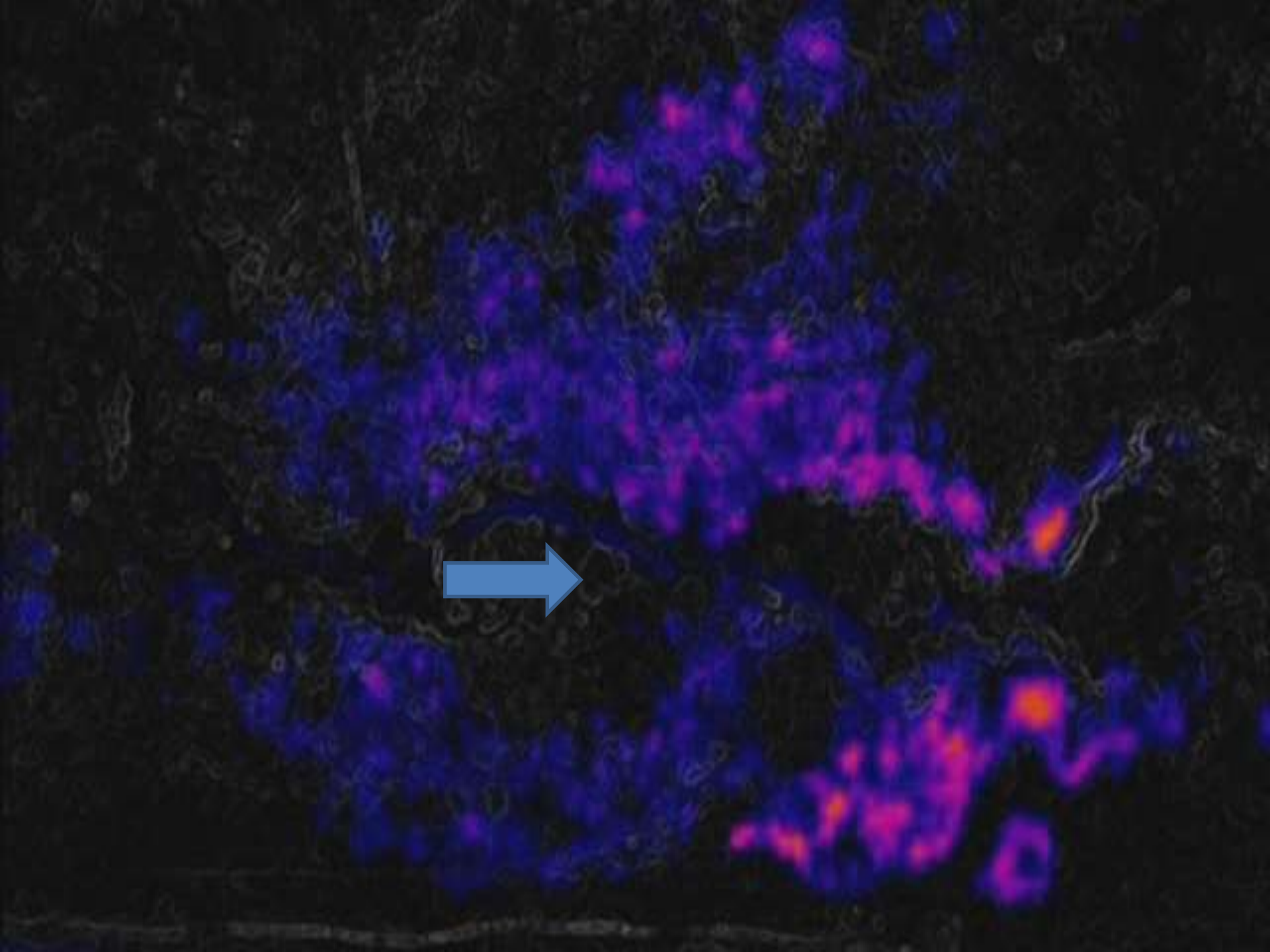


We care



We serve





- Serious trouble...needed to act quickly
- Old methods digging channels and damming up water to flood the wetland would not work, needed new approach.
- Structured approach with our primary objective to stop the fire spreading further underground.
- Phase 1: Ensure the fire extinguished
- Phase 2: Stabilize the head-cut erosion moving towards pristine wetland
- Phase 3: Rehabilitation Plan – Catchment to Coast
- Bring in all wetland, fire and environmental specialists
- Bring in all interested and affected parties from landowners, DWS, BGCMA, District Municipality, Wfor's etc.



We belong



We care



We serve



WonF partnership

- Mr Martin Bolton, Fire Specialist with WonFire
- Developed spike tool for Indonesian peat fires
- Pipe with holes (sprout) sprays water under pressure below and into peat surface to rewet the peat from the bottom up.
- Desiccated peat is hydrophobic, develop cracks and not rewet from surface.





Working on Fire moved on site on Monday 29 April 2019 where the teams received training in applying the spike tool infield



We belong



We care



We serve





- With this technique we were slowly but surely winning the fight against the subsurface fire by rewetting the peat below surface, cooling it down and dosing the fire by effectively drowning it.
- This was done applying 2 spikes and 1 nozzle spray on a 10x10m grid dosing the subsurface fire 1 square meter at a time up to 1.5 m deep.
- By 13 May 2019 5 grids was already completed.



- Progress varied depending on the intensity of the hotspots.
- Ground temperatures of up to 400 °C was measured at sites.
- 53 days allocated to the project
- 21 June WonFire officially declared work complete.
- Teams sustained no injuries/PPE and gas monitors.
- Osm Environmental and Fire Department are still monitoring site every day, immediately spiking any flare-ups.
- Fire incident cannot be closed until all underground fires are extinguished.
- Air quality improved, school children moved back.



The following dates indicate when thermal imagery was done.

- 08 Feb 2019: Conduct first thermal drone survey.
- 19 Feb 2019: Follow up survey # 2
- 05 Mar 2019: Follow up survey # 3
- 18 Mar 2019: Follow up survey # 4
- 24 April 2019: Follow up survey # 5
- **16 May 2019: Follow up survey # 6**
- **22 May 2019: Follow up survey # 7**
- **13 June 2019: Follow up survey # 8**
- **24 June 2019: Follow up survey # 9**

After work started
by WonF 1 May 2019



We belong



We care

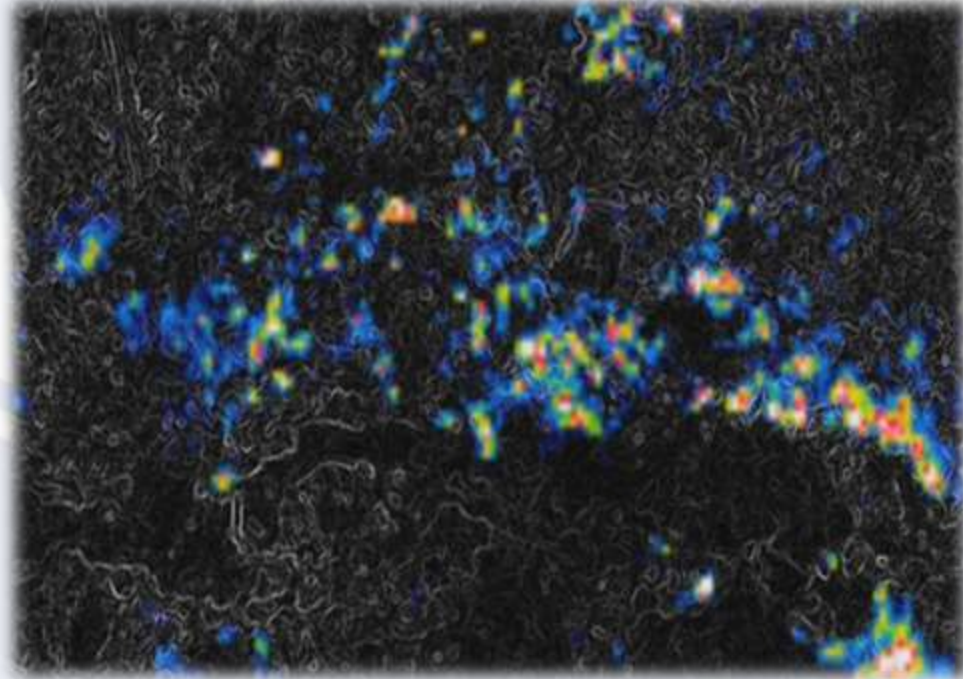


We serve

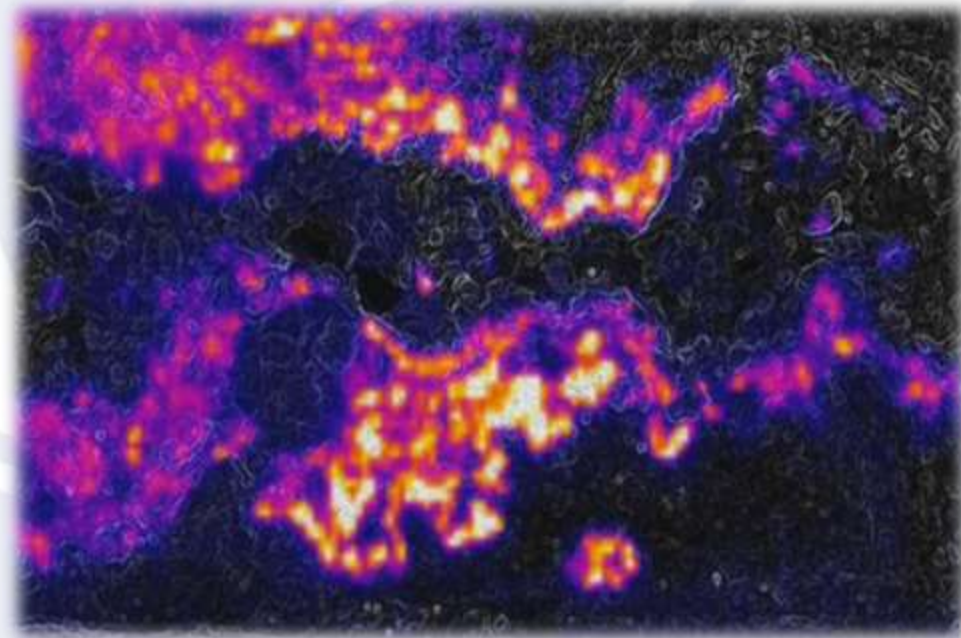


08 February 2019

**Using a surface temperature range
of 25° - 45° C**

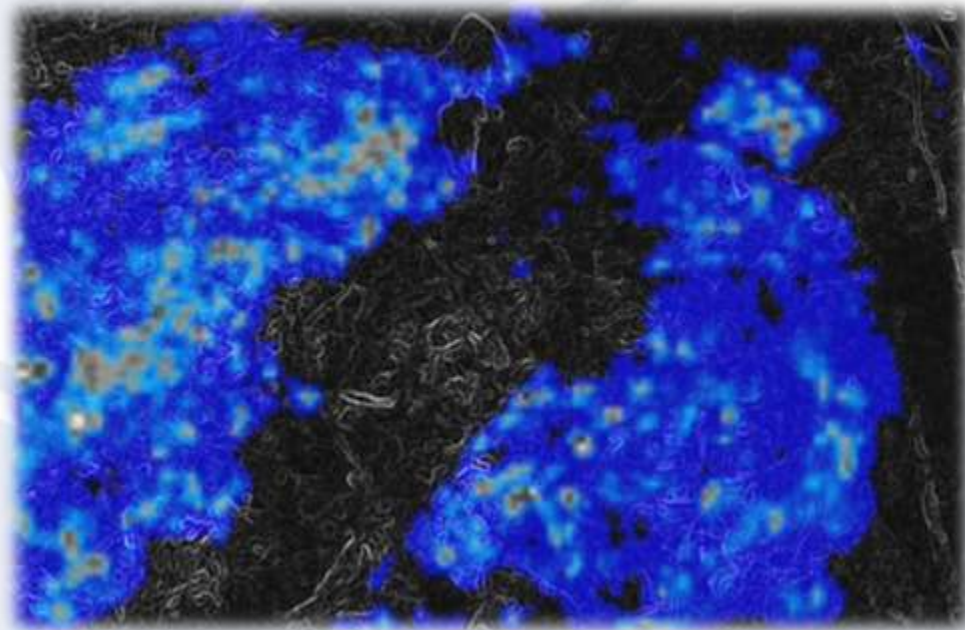


19 February 2019



19 February 2019

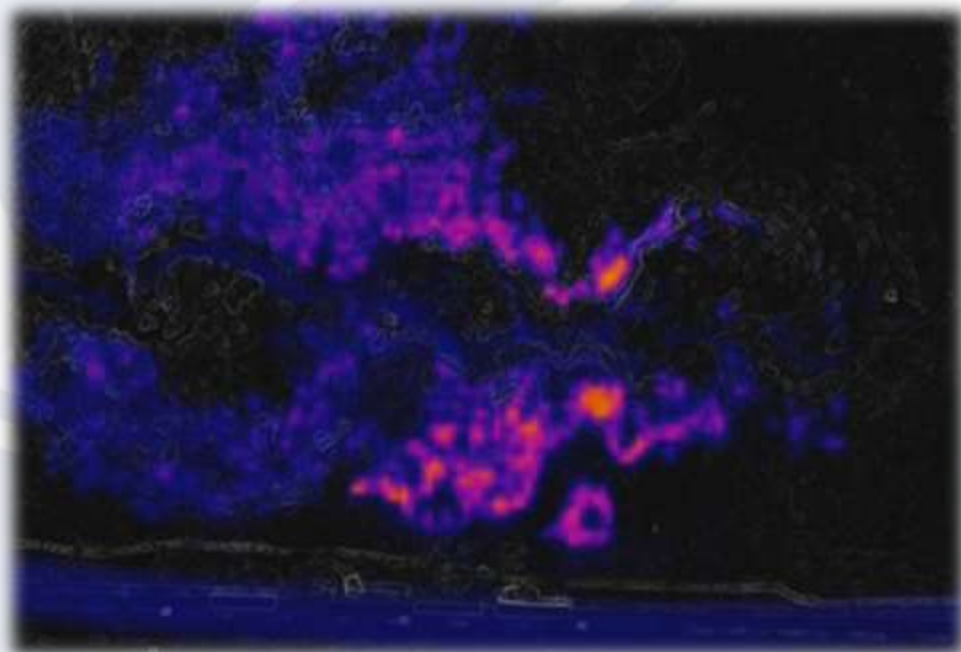
from a lower height and different angle



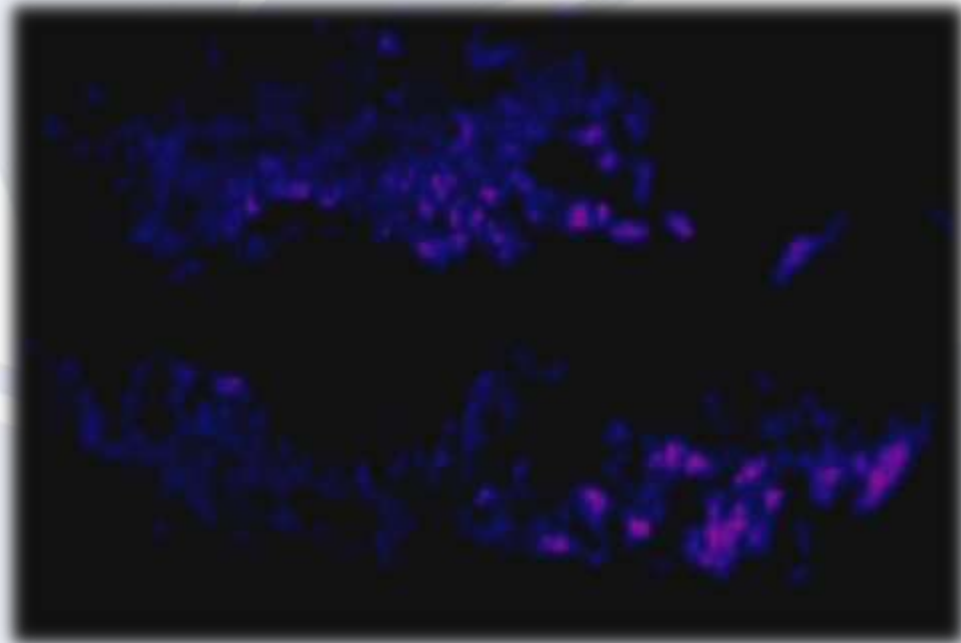
Temperature readings of 394° C
approx. 40cm below the surface



05 March 2019



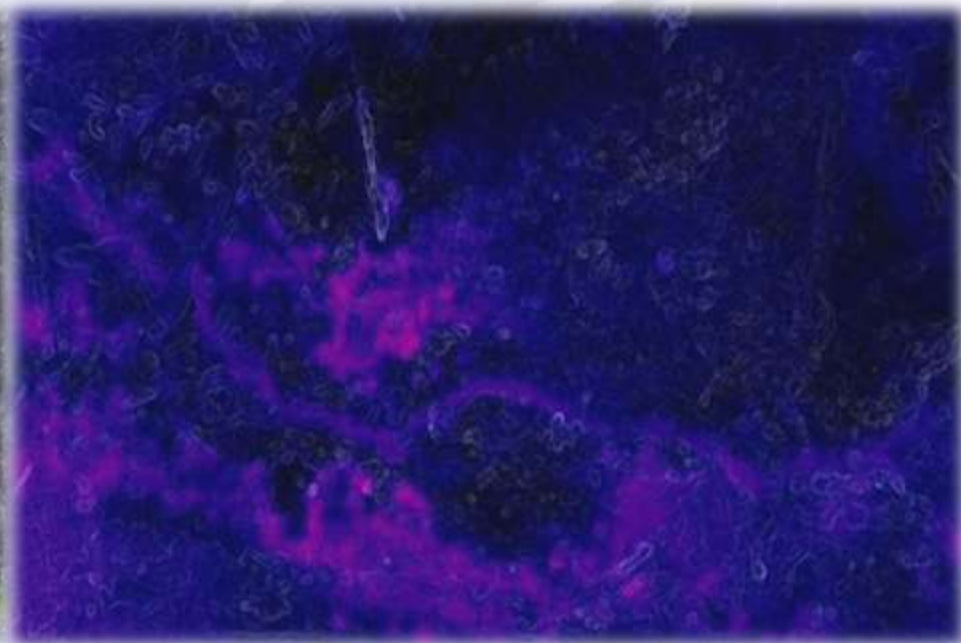
24 April 2019



22 May 2019



22 May 2019 with lowered temperature settings



13 June 2019 with lowered temperature settings



25 June 2019 with lowered temperature settings



Proposed protocols for future underground fire surveys using a thermal camera drone

- Survey burn site as soon as possible to determine the area affected for mapping and comparative purposes.
- Undertake the surveys at the coolest time of the day (i.e. just before sunrise) to achieve maximum contrast in ground temperatures.
- Record the temperature settings for each survey.
- The minimum setting will vary for the same area depending on the time of the year (e.g. summer vs. winter) due to the changing ground temperature.
- Be cautious when interpreting the data.



WHY PROTECT PEATLANDS?

- Peat wetlands sequester large amounts of soil carbon. They store 30% of the world's soil carbon and 10% of the world's freshwater.
- It therefore ensures positive carbon balance in the environment but when degraded, wetlands become net releasers of carbon.
- Degradation is mainly caused by incorrect landuse practices, ie water abstraction, incorrect farming practices and development causes erosion that further drains wetlands.



- Conservation strategies should therefore consider catchment and related landscapes management approach, especially those that could impact on water and sediment balance of peatlands.
- We applied for restoration funding in partnership with WonWetlands.
- Coordinating efforts to involve all Landowners along the Onrus system to buy into the “Catchment to Coast” approach to restore, manage and improve the function and value system.

ONRUS PARTNERS

**OSM FIRE AND RESCUE/OSM ENVIRONMENTAL
DEPARTMENT/WORKING FOR WETLANDS/
WORKING ON FIRE**

