Location Analytics for Forestry Insurance

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&

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Senior Underwriter & Principle Analyst at Orvia Underwriting [agency].

Geospatial World Forum GWF) 2026

'Financial and Risk Intelligence Panel'

Amsterdam, the Netherlands; 1 May 2026

Source: Nina Hindmarsh (@stuff.co.nz) Dec 2025; NZ storm damage

Worldwide Forest Risk Analytics

- **‘ForestRe’ (FRe)**
  Consult on nature of forest risks, loss mitigation & adaptation strategies for forest managers.

  95% of threats are **Fire and Wind**

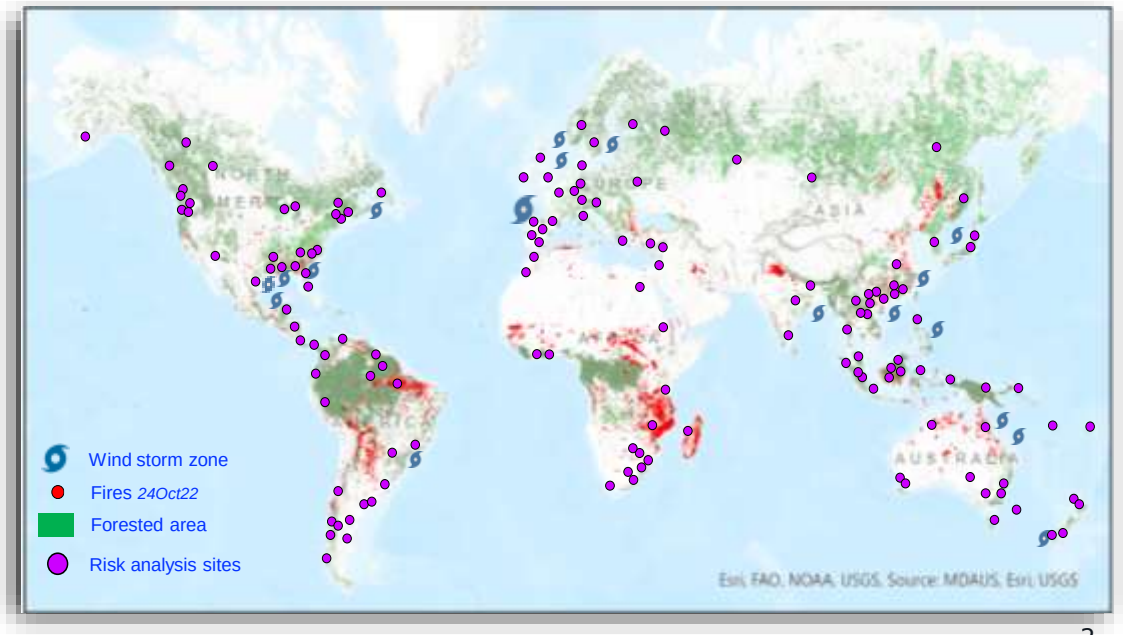
- Here to talk about EO data & the <u>methodology to profile forestry risk</u>

- With **Yuming Zhi,** the Principle Analyst within Orvia Forestry Team

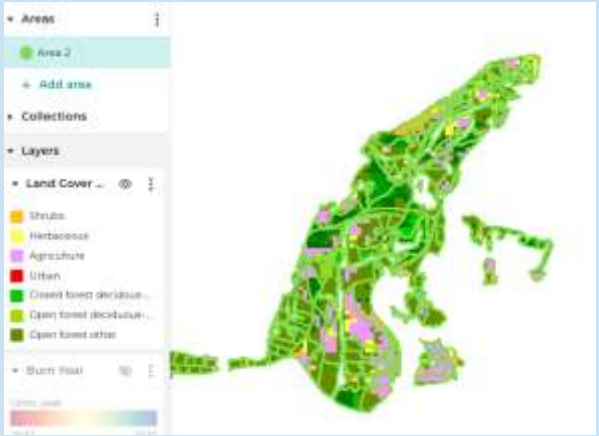
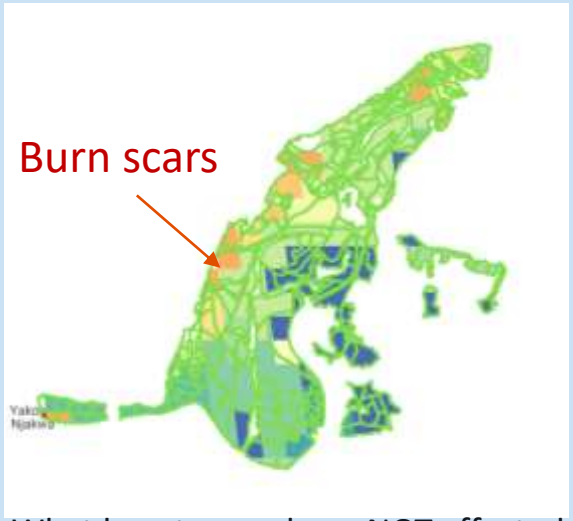
- **Orvia** Forestry Team is supported by:

  A) Lloyds of London
  B) Liberty Mutual, Paris

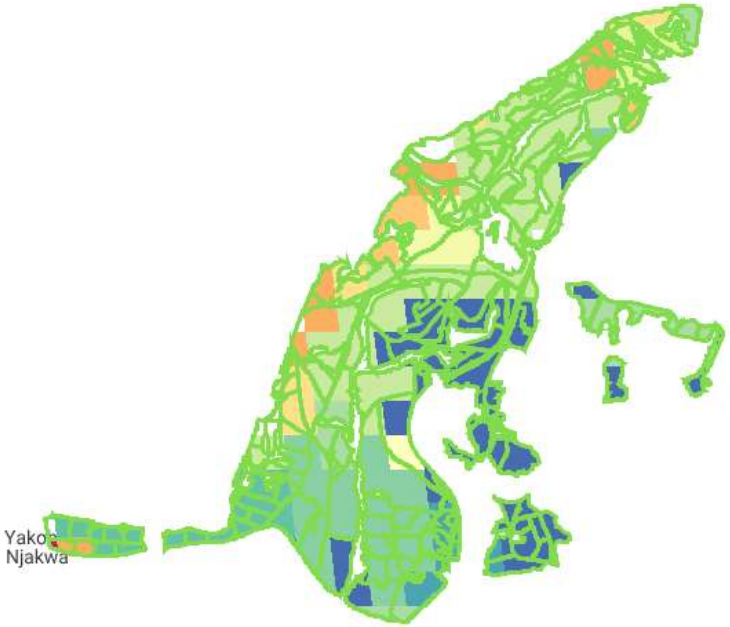
Forest risk analysis sites



What Do We Measure With Geo-spatial Data ?

Area of the plantation	Landcover Type	Historical Burn Scar
	 Exclude non forested areas	 What burnt areas have NOT affected forest stand?

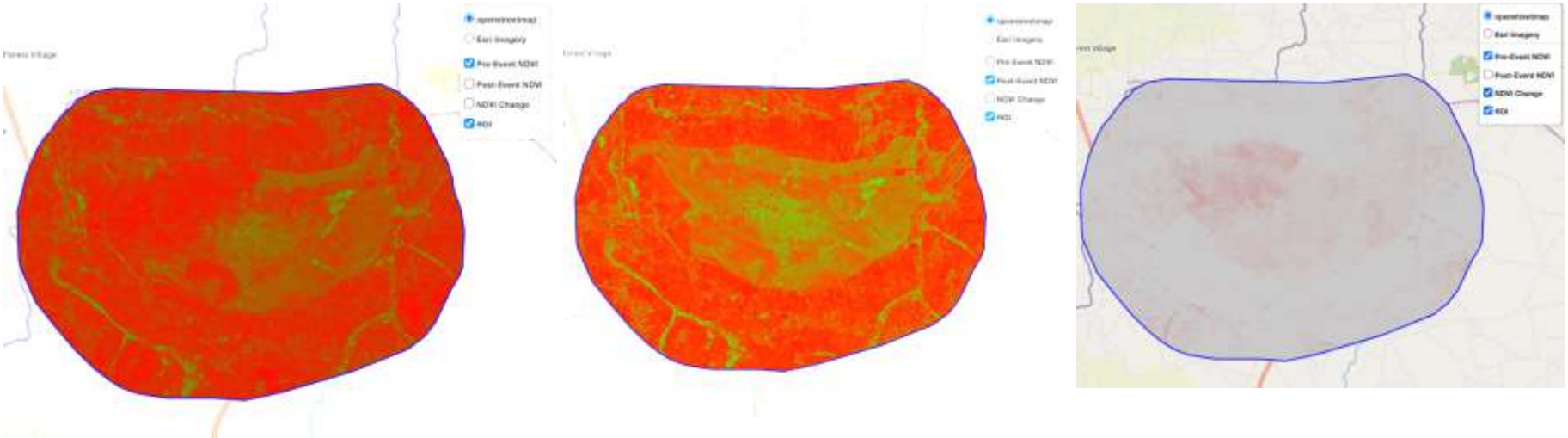
How to interpret historical burn scar? – good and bad fires



- Our aim is to measure fires that damaged the value of the forest since 2001
- From that to determine:
  - Severity
  - Frequency
- Not all fires are ‘bad’
  - Some fire prevent bigger fires – ‘good’ fires such as fuel reduction – burning off ground fuel such as weeds, shrubs, invasive tree species
  - Burning along fire breaks so fires do not pass.
- We need good geo-spatial data to help us do this.

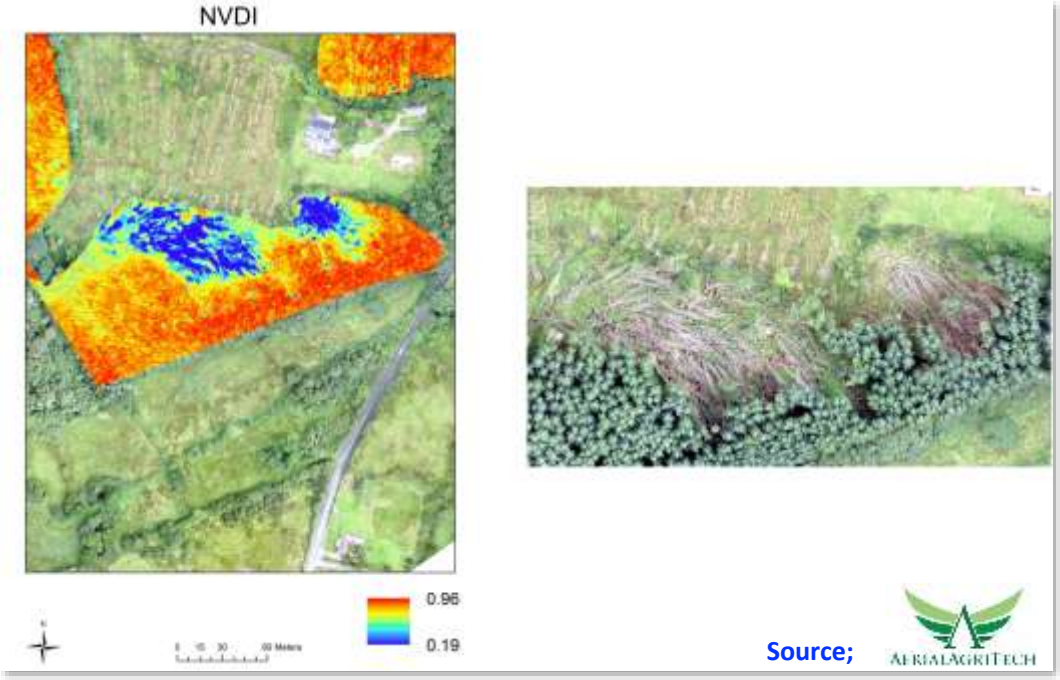
Damaging fires - NVDI

Good Fire (fire to reduce fuel load to prevent bigger fires in future) or Bad Fire?



*NDVI Justification: reflects the reduction in live vegetation and the exposure of charred surfaces, compared to the pre-fire measurements that indicated healthier and denser vegetation cover.

Wind damage – NVDI also useful



NDVI Justification:
Reflects the reduction in live vegetation and the exposure of wind-blown trees…

Compared to the pre-storm measurements

Essential for us to help acquire empirical wind damage data for any client.

Other tools:
Surface depression of forest canopy due to wind.

How Do We Analyse The Risk?

Shapefile Validation

Is the boundary (.kmz) file complete?:

- File Integrity
- Geometry Validation

Attribute Consistency

ArcGIS Data Review

Workflow Creation

Geospatial Dataset Selection

Data Filter Engineering

Analysis Process Modelling, incl. calculating, classifying and vector processing

Data Analysis & Input

Landcover Type Detection

Burn Scar Mapping and Burn Data Validation

Landcover and Burn Scar Mapping

Pricing Model

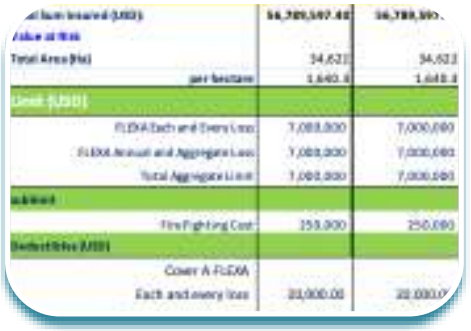
Loss cost calculation:-

Monte Carlos Simulation for Loss iteration

Loss Distribution Fitness Check

Generating Technical Pricing

Risk Assessment Report



Indication Quote

What Geospatial Data Do We Use?

Land Cover Data

- **Copernicus** Global Land Cover (2019)
- **Dynamic World Landcover (10m)**
- **Planet** – NICFI tropical regions

Burn Scar Data

- **FIRMS**: Fire Information for Resource Management System (1km)
- **Modis** Burned Area Monthly Global (500m)

Land Image Data

- **Landsat** 4/5/6/7/8/9 Combined (30km)
- **Sentinel-2** MultiSpectral (10-60m)
- **NDVI ….**

Weather Data

- **ERA5** Land Daily Aggregated Reanalysis
- **ERA5** Land Monthly Aggregated Reanalysis (11km)

Image from the Alberta ‘Chisholm fire’ May 2001

ForestRe

ORVIA
UNDERWRITING

Take-Away Messages

• The forestry insurance sector requires highly granular EO data to accurately price risk and assess claims

• Accurate geospatial data is essential to acquire empirical wind and fire damage data for clients

Wish List / What Are We Looking For?

• Fire Type Classification
• Historical Data Consistency
• Targeted Vegetation Masking
• Refined NDVI Analysis
• Wind Damage Metrics