Mitigating Climate Risk for Investors into Forestry

Phil Cottle of ‘ForestRe’

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Banking, Financial Services & Insurance Sector
Rotterdam, the Netherlands; 2 – 5 May 2023

Forestry wind damage, cyclone Gabrielle
February 2023, New Zealand
UK-based **Forestry insurance Agency (MGA)**

- **Insure managed forests Globally**
  - We have our own ‘capacity’
  - Access international reinsurers

- **Provide risk profiling**

- **Risk transfer solutions**

Clients with values from: **US$ 0.5m to US$ 10bn**
Reach

- Insuring in 30 countries & 6 continents
- 30-years experience in forestry risk analysis, pricing & management

Global reach of ForestRe

Map: forest risk analysis sites
Climate perils insured

Wind and fire are the major catastrophic perils representing 95% of all our insured losses.
What does climate-related risk look like in forestry (frequency & severity)
Patterns & severity of losses – example 1

1. Large forestry investment – Australian Fire
Value 2022 = US$256m

Forest impacts of a warming climate?

10 yr area AVERAGE lost cost%
- Old Av. annual loss 0.21%
- New Fire average annual loss at 1.19%

Year of Ash Wednesday
- 1.83%
- 1.04%

Year of Black Saturday fires
- 10.23%

10 yr means loss costs as % area
(loss cost % = area burned/area exposed)
Beware the average & extreme events

Area Fire Damaged – Spain
Area: 94,164 ha; with 171% volatility

Mean Annual Loss 762 ha = 0.81%

Fire catastrophes occur when... **the improbable coincides with the improbable.**

**Extreme events are impossible to prevent or predict.**
Patterns & severity of losses – example 2

Large forestry investment – USA Hurricane

Value 2010 = US$430m

‘As-if’ hurricane US$ losses at constant 2010 prices

About 15-20-year gaps between major loss events

Mean annual loss = 0.65%

highly volatile from year to year.

A US timberland portfolio
4 hurricanes would have hit the portfolio in 1886

Source: ForestRe 2010 with JLT.
USA hurricane frequency trends

Number of combined tropical storms, subtropical storms, and
hurricanes each year from 1878 to 2020.

Loss patterns are changing;
increasing frequency of events
Atlantic, Pacific and across Europe
Increased temperature is a factor

SRe Corporate Solutions  Oct. 2022
A +1C rise in sea-surface temps generates: + 5% wind speed & + 50% destructive potential
Our use of geospatial data
1. To 2019:

- Used empirical data of forest losses from a private company or public authorities.
- Often data incomplete so would source substitute data recorded by ForestRe.
- So, data often **NOT** representative of true risk.
- The data may not include a major event but reflected its ‘volatility’ – an indicator of major loss potential.
- Ran Monte Carlo simulations for **MEAN** and **1:250 event worse case**.

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**ForestRe data source transition**

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<tr>
<th>Year</th>
<th>Cataluna</th>
<th>Galicia</th>
<th>Castilla La Mancha</th>
<th>Extremadura</th>
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<td>0.353%</td>
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<td>1999</td>
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<td>1998</td>
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<td>1997</td>
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<td>0.038%</td>
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<td>0.025%</td>
<td>0.017%</td>
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<tr>
<td>Total</td>
<td>0.187%</td>
<td>0.560%</td>
<td>0.153%</td>
<td>0.177%</td>
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</table>

‘Loss cost’ = hectares burnt / all forestry hectares
2020 ForestRe transitioned to EO data

2. Engaged **Earth Blox** to produce:

   • Very user-friendly tool to access & process earth observation databases

   • To examine:
     a. Land use cover
     b. Burn scar time series/d-NBR
     c. Soil moisture
     d. Weekly rainfall
     e. Flood
     f. Wind damage and much more.
Data cost is a factor:

- We generate income only when insurance is completed.
- However, the costs of assessing an insured loss do get paid by insurers.

**EO data resolution requirement**

- Landscape scale: 1km² - 1000km² for risk pricing for insurance
- 500m X 500m or better resolution
- Fire / wind loss assessment: 10m X 10m resolution
Comparing fire risk client Vs environment

We can now compare:

- the fire loss ‘performance’ of the insured’s locations

with

- the general fire incidence in the region in which it is located
Forest Manager loss assessment vs Earth Blox

This capability already helping forest managers following a storm loss

Without technology wind assessment costs could be >$200/ha

Figure 1 Forest Manager initial assessment after H. Laura

Figure 2 Earth Blox wind damage assessment
Mapping fire impact: - burn scars

Forestry burn scar indemnity product

- Based entirely on satellite burn scar measurements
- A loss is required to make a claim
- The forest manager will assess his fire loss
- The burn scar analysis provides independent verification check
- Images comparing pre and post fire data
Assisting clients with their Climate risks in forestry
1. **Analysis of portfolio fire risk – ‘know your risk’**
   - 20 year burn scar analysis
   - Modelling for volatility and projected size of severe events as 1 in 250
   - Indicating the quantum of an extreme event

2. **In-forest fire management & plans**
   - **Prevention** – daily fire weather index x site
   - **Identification** – fire detection cameras
   - **Rapid suppression** – crews and equipment

3. **Transfer of risk to insurers**
   - Policy structuring
   - Risk sharing and
   - Minimising premium costs
Increasing client’s wind risk awareness

1. Analysis of historic wind risk - (‘know your risk’)
   - Hurricane frequency – good data from NOAA
   - Extra-tropical storms
   - Localised wind storm impacts - poor data

2. Mapping client’s historic wind risk - (‘know your risk’)
   - Mapping past wind damage over last 5+ years

3. Transfer of risk to insurers – policy structuring
   - Risk sharing and
   - Minimising premium costs

Storm Eunice sweeps over UK with hurricane-strength winds affecting some invested forestry portfolios of several $bn

Storm Eunice - possibly the strongest since 1990 with speeds >106 knots (Cat 3 hurricane)
Summary & Contact Information

1. Rapid improvement in data capability in recent years
2. Much closer relationship with clients adding value to their business
3. Clients becoming far more aware of their exposure to climate change

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