THE JOINT FORCES OF CSIRO & SCION

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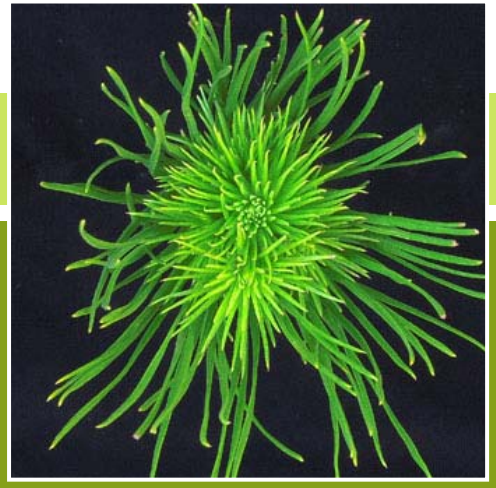
Charlie Low and Nick Ledgard



Ensis Genetics

Making Forestry Compatible with Conservation

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The New Zealand Background

- 1,000 years ago, the country was 80% forest
- Moa hunters burned some forest, but still 65% forested when European settlers arrived
- From 1840 to 1920, many forestlands were converted to grasslands

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Kauri

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Podocarps

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Rimu

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Red Beech

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NZ background continued…

- NZ Forest Service formed 1920 - pledged to create resource of exotic, plantation timber for when native forests could not sustain supplies of timber
- Planted European species – larch, Corsican pine + North American species

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NZ Background continued…

- 1930 Identified Pinus radiata as most site-tolerant and best growth, Douglas-fir as closest rival
- 1980 remaining native forests protected as plantations supplied domestic demand
- 1987 Govt Forest Service disbanded, forests sold, Department of Conservation to manage native forests

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NZ Background - present forest scene

- Native forest – 23% of land area, plantations 7%
- No timber harvesting from native forests, except on small area of private land – 90,000 ha
- No harvesting of native forests without a Sustainable Management Permit
- 99.9% of total NZ annual forest harvest comes from plantation forests of introduced species

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- Radiata pine
- Age 28
- Good site
- Good breeding

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Trees to fix weeds

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Larch plantation

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- Douglas-fir
- Age 77

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Douglas-fir cone

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Douglas-fir colonising

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P. nigra spreading

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Naturalised forest, Naseby

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- P. contorta
- Cones early
- Profusely
- Cones open on tree
- Small, winged seeds

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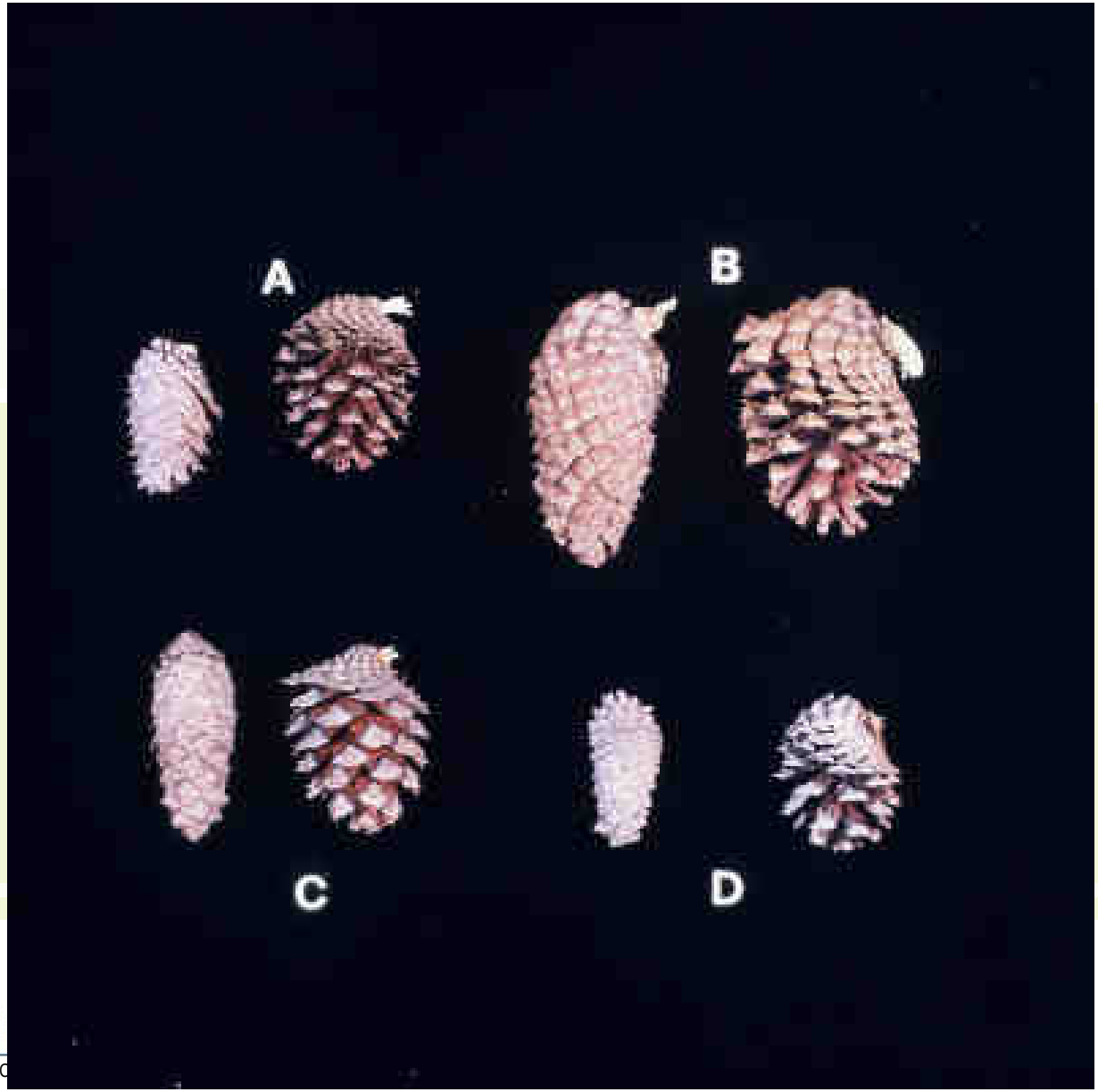
P. contorta cones



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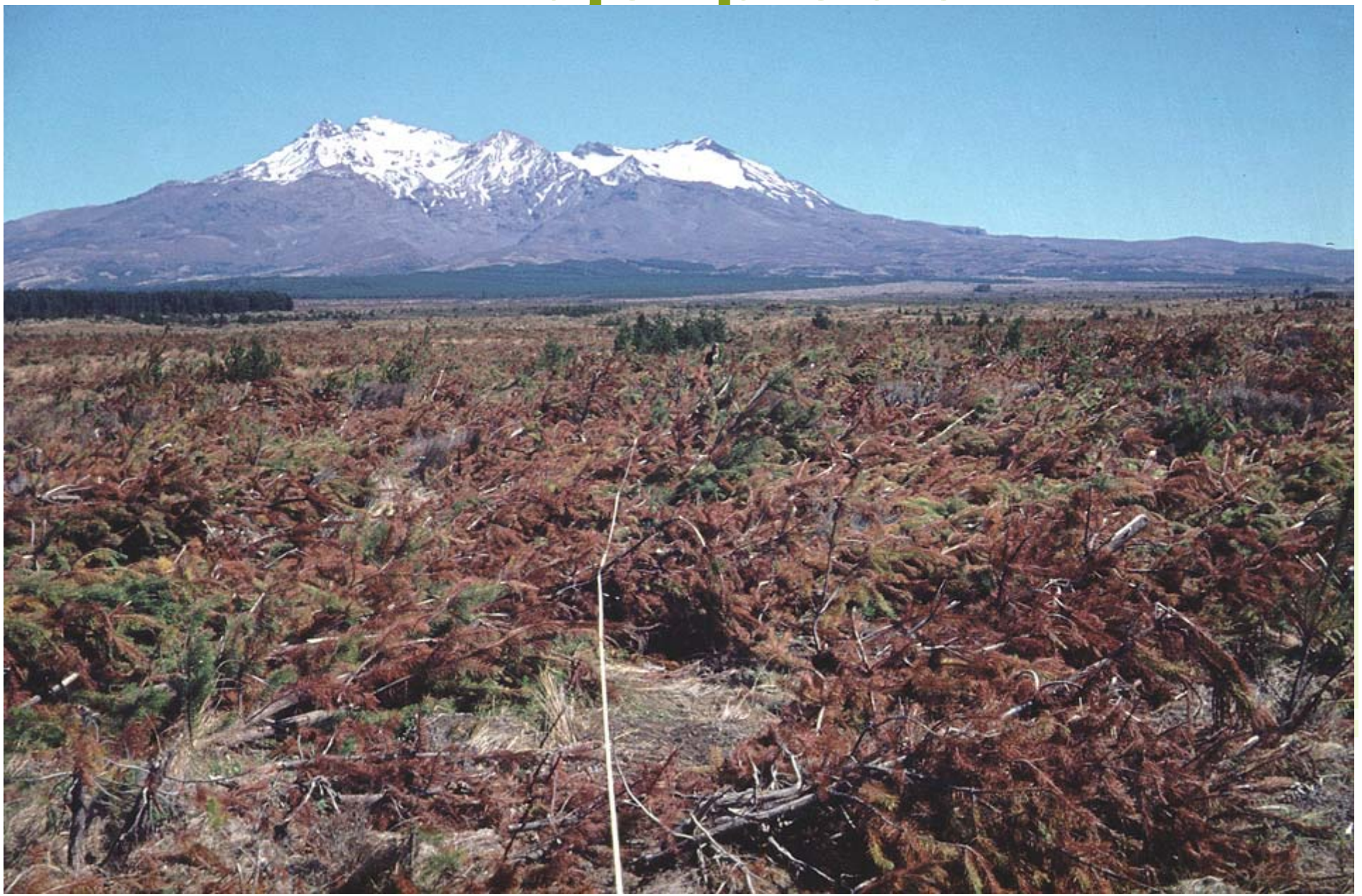
Major problem



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The crusher

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The engine

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Why worries?

Wildings are seen to threaten:

- **Landscape values**
  - ***disrupt existing open and often treeless landscapes***
- **Conservation values**
  - ***dominate/degrade native flora/fauna habitats***
- **Existing pastoral uses**
  - ***shade out grazing species***
- ***Future land use options***
  - ***often made more expensive***
- **Existing hydrology**
  - ***lower catchment water yield*** **(>20% catchment)**

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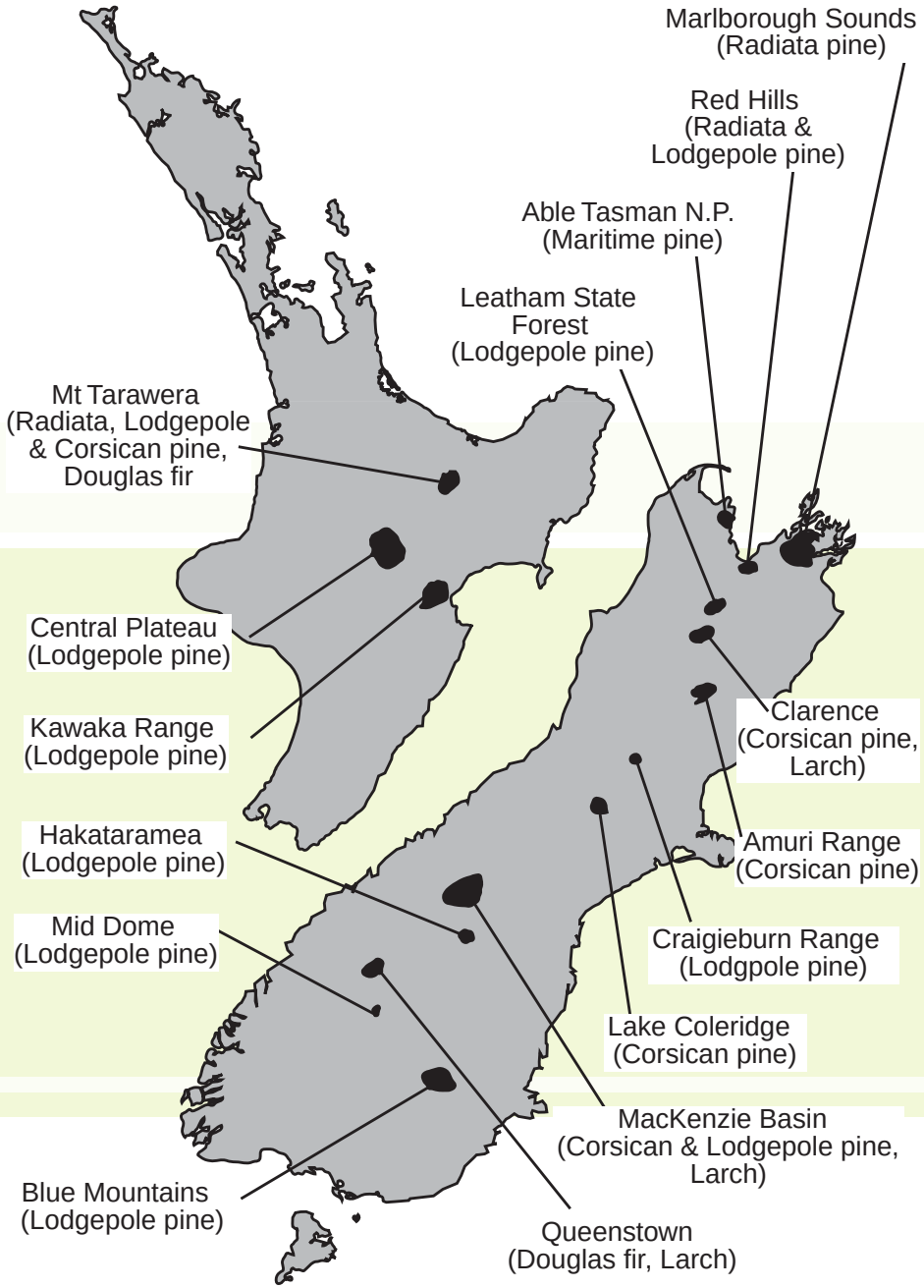
Major areas of conifer spread (>100/ha) in New Zealand

The majority of these sites involve species rarely planted today



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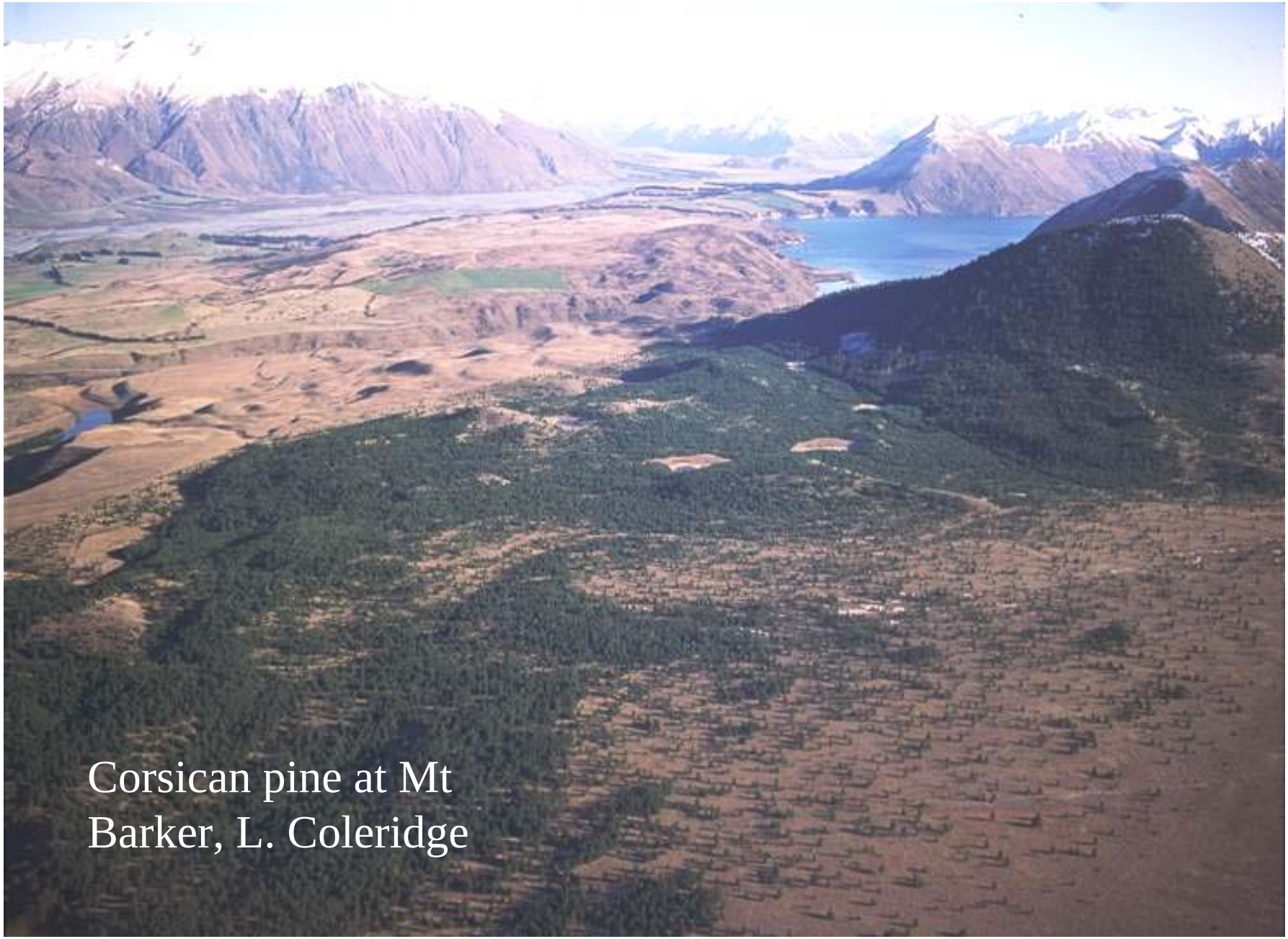

Corsican pine at Mt Barker, L. Coleridge

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Plantation design

Edge row of less spread-prone radiata pine around more spread-prone D-fir

Selwyn Plantation Bd

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Species – spreading vigour varies

(age of significant coning)

- Contorta pine (*Pinus contorta*) (8)
- Scots pine (*P. sylvestris*) (12)
- Dwarf mountain pine (*P. mugo*) (8)
- Douglas-fir (*Pseudotsuga menziesii*) (12)
- Corsican pine (*Pinus nigra*) (13)
- European larch (Larix decidua) (12)
- Radiata pine (*Pinus radiata*) (10)
- Maritime pine (*P. pinaster*) (10)
- Bishops pine (*P. muricata*) (10)
- Ponderosa pine (*P. ponderosa*) (13)

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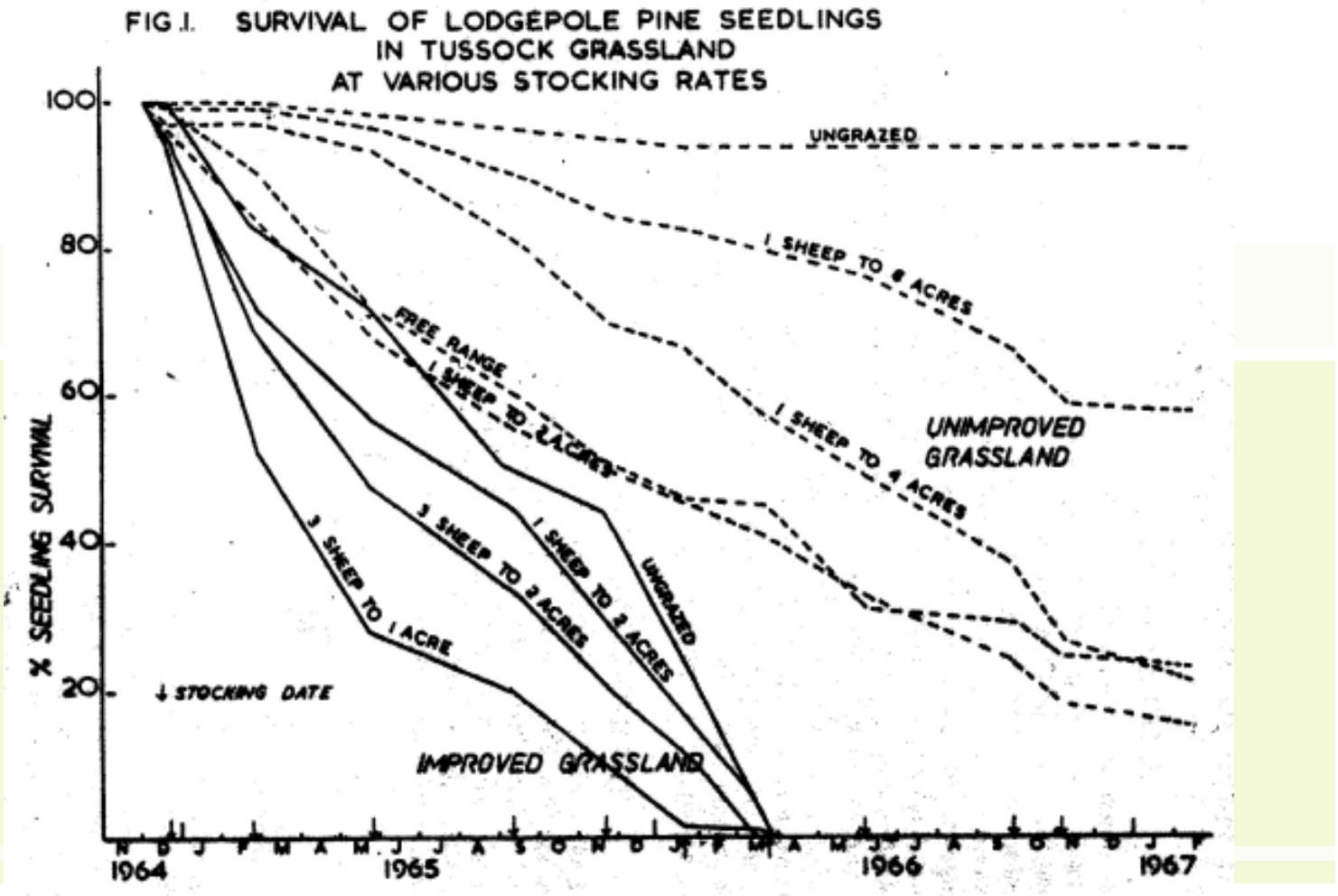
Surrounding land use - grazing

Grazing and seedling survival



Benecke, 1967

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Mitigating measures

- **Existing plantations**
  - Removal of spread before coning – particularly outliers
  - Plan for most cost-effective use of limited resources
  - Use of grazing and fertilisers
- **Future plantations**
  - Prevention - assess spread risk (assessment form)
    - Siting – beware of seed take-off sites
    - Surrounding land use
    - Design
  - Particular care with Douglas-fir
    - Improved seedling survival (mychorrizae), and display of cones

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Conclusions

- The risk of wilding spread from conifer plantations has to be taken into consideration
- Importance of being knowledgeable about spread and aware of the facts
- Good knowledge means that wilding spread mitigation will become the ‘norm’.
- To use a pastoral analogy – it should be as normal as the awareness of the need to have barriers (normally fences) to mitigate the risk of spread by domestic animals.

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Forest Stewardship Certification (FSC)

- Designed to stop clearance of threatened native species
- Impacts on plantations of exotics
  - Need species biodiversity
  - Need plans and actions for controlling tree spread

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