

# WILDING PREVENTION

Guidelines for minimising the risk  
of unwanted wilding spread from  
new plantings of introduced conifers.

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CHRISTCHURCH

*"The success of woody revegetation cultures forces land users  
to choose between forests and improved pastures ..."  
making that choice will be the*

*"... principal landscape planning issue for the tussock grasslands  
and mountainlands for the next 20 years."*

*(Prof Kevin O'Connor, 1981)*

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*This Guideline (No. 1) is the first of three guidelines on conifer wilding spread prevention, management and control. It focuses on wilding prevention from new plantings. Guideline No. 2 will deal with control strategies for existing spread. No. 3 will background the national scene, and describe case studies and the research which has contributed to Nos. 1 and 2.*

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FOREST OF SIRO

**Land managers and administrators must encourage the wise use of introduced trees, to minimise the risk of unwanted spread of wilding trees from new plantings.**

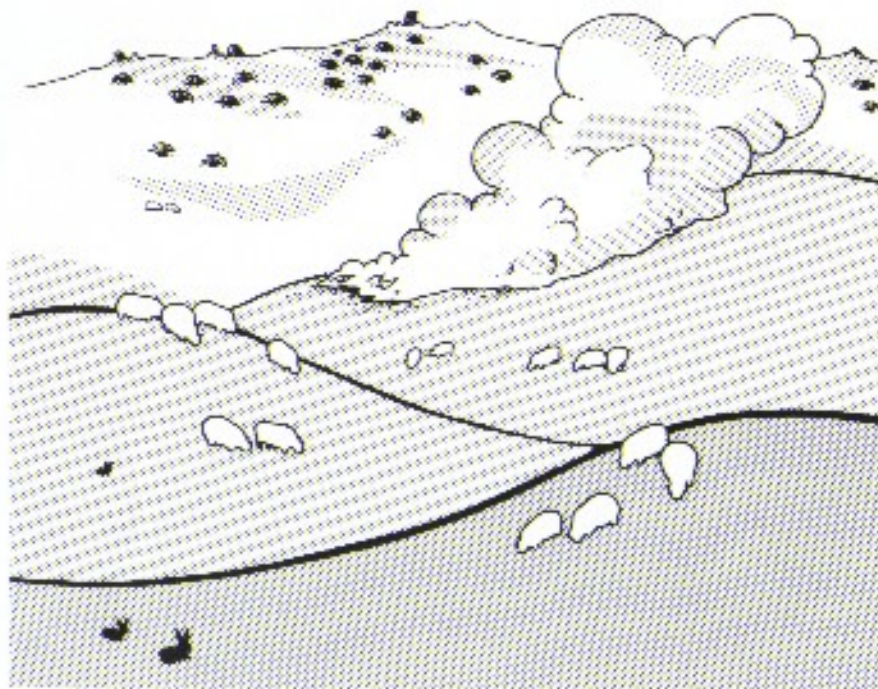
**Arguably, the greatest spread risk is in the South Island central and eastern hill and high country, where little planting has been undertaken to date.**

**Lindis Pass - no place for introduced trees**

Most of New Zealand is a natural environment for woody species.

In the past, woody species have been kept in check by:

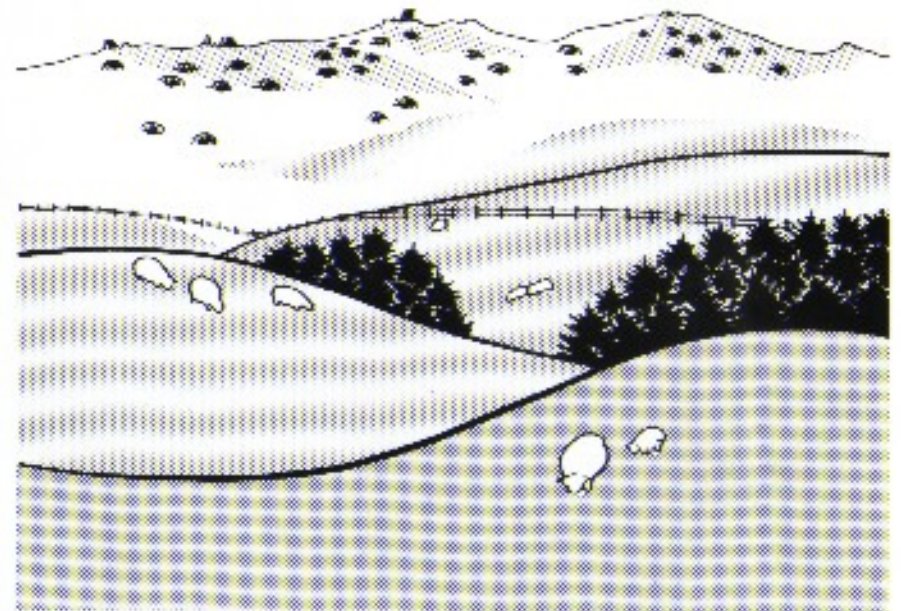
- *burning*
- *grazing*
- *lack of seed sources*



Now, and in the future, it is likely that there will be:

- *less burning* (actively discouraged)
- *less grazing* (by domestic and wild animals)
- *increasing sources of seed from woody species*

Therefore the incidence of woody species is likely to increase.



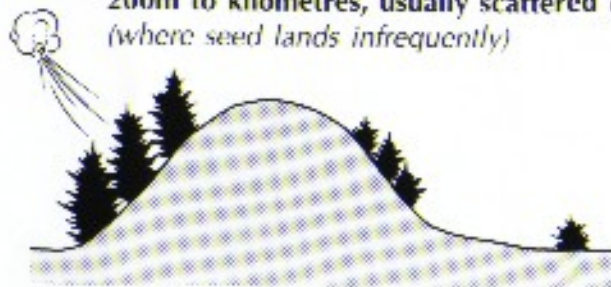
## WILDING DEFINITION

**Wildings** are the natural regeneration (seedling spread) of introduced trees. The term is usually applied to conifers, which represent most of the major spreading forestry species of concern.

Most wildings grow close to the parent seed source and are termed **fringe spread\***. Wildings further afield are termed **distant spread**. They grow from seed often sourced from **take-off sites\*\*** and usually occur as scattered **outlier** trees.



\* Fringe spread, from 1 m to 200 m, usually dense (where most seed falls)



\*\* Take-off site, a common source of distant spread, from 200m to kilometres, usually scattered outlier trees (where seed lands infrequently)

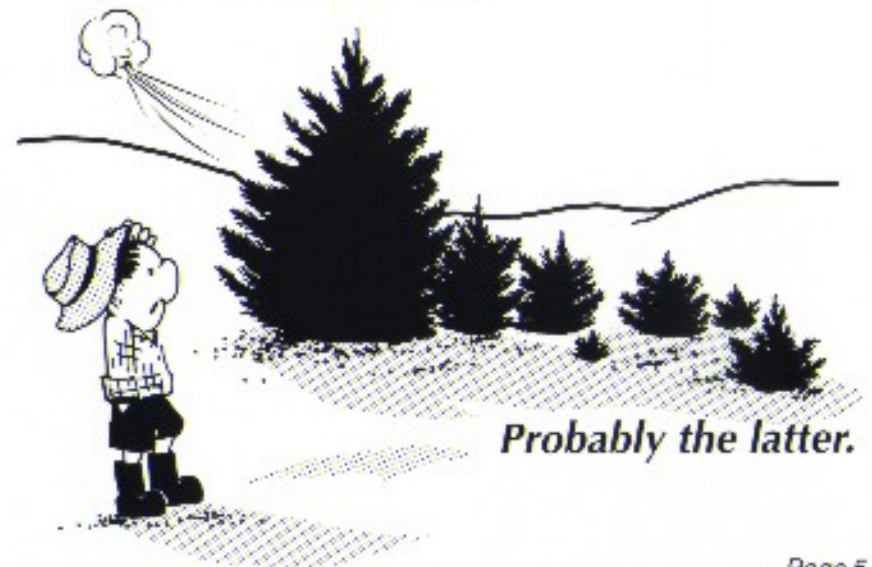
## WHAT IS THE MAJOR PROBLEM?

*Is it:*

- The inherent capability of introduced trees to disperse seed some distance and to outcompete existing local vegetation?

*or*

- The inability of land managers to recognise this capability, and hence their failure to amend management practices accordingly?



## Two factors make wilding spread more manageable than the spread of most other problem plants:

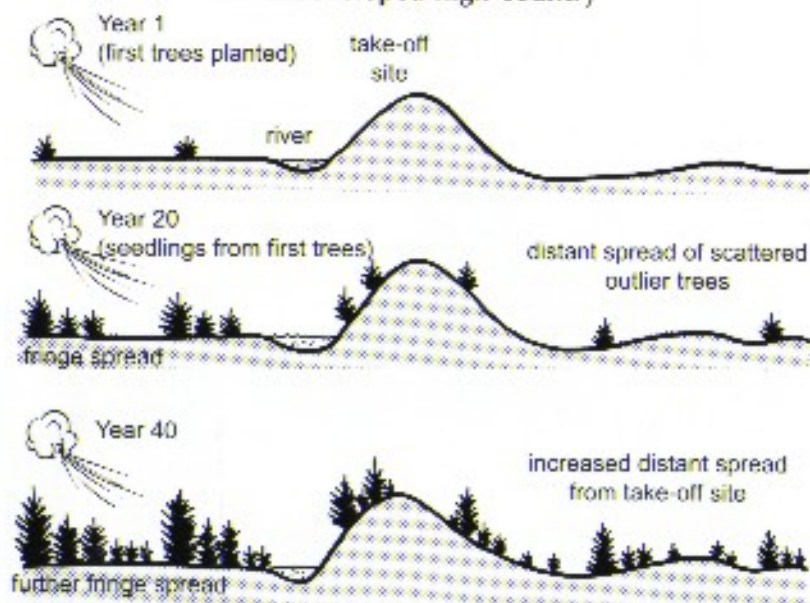
### a) Predictability

- direction of spread; mostly downwind
- age of seed production; generally 8-12 years
- sites where wildings are most likely to establish; light vegetation cover and light grazing

### b) Visibility

- conifers are usually very obvious, well before coning begins

### Typical sequence of wilding spread in undeveloped high country



## The wilding spread of introduced conifers is seen by many to threaten the following environmental and production values:

### • Landscape

- disrupts existing open and often treeless landscapes

### • Conservation

- dominates/degrades native flora/fauna habitats

### • Existing pastoral

- shades out grazing species

### • Hydrological

- lowers water yields

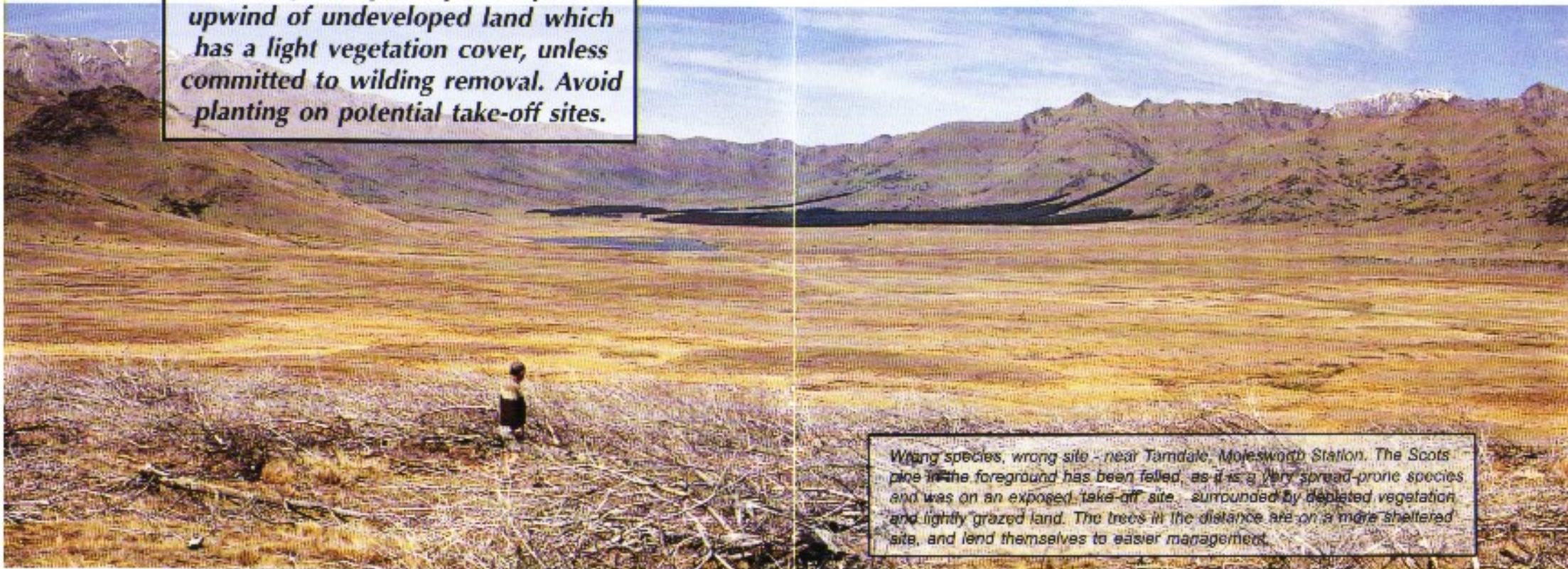


Lodgepole pine (*Pinus contorta*) spreading near Lake Pukaki

## FACTORS INFLUENCING SPREAD

- Species choice
- Siting
- Plantation design
- Surrounding vegetation cover, and land management  
(particularly grazing pressure)

*Do not plant spread-prone species upwind of undeveloped land which has a light vegetation cover, unless committed to wilding removal. Avoid planting on potential take-off sites.*



*Wrong species, wrong site - near Tamdale, Molesworth Station. The Scots pine in the foreground has been felled, as it is a very spread-prone species and was on an exposed 'take-off' site surrounded by depleted vegetation and lightly grazed land. The trees in the distance are on a more sheltered site, and lend themselves to easier management.*

## Species

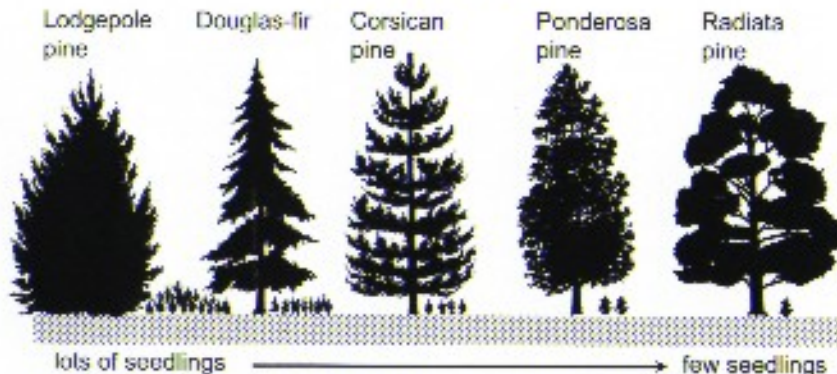
Spreading vigour varies according to species competitiveness, palatability and seed production and weight.

### SPREADING VIGOUR



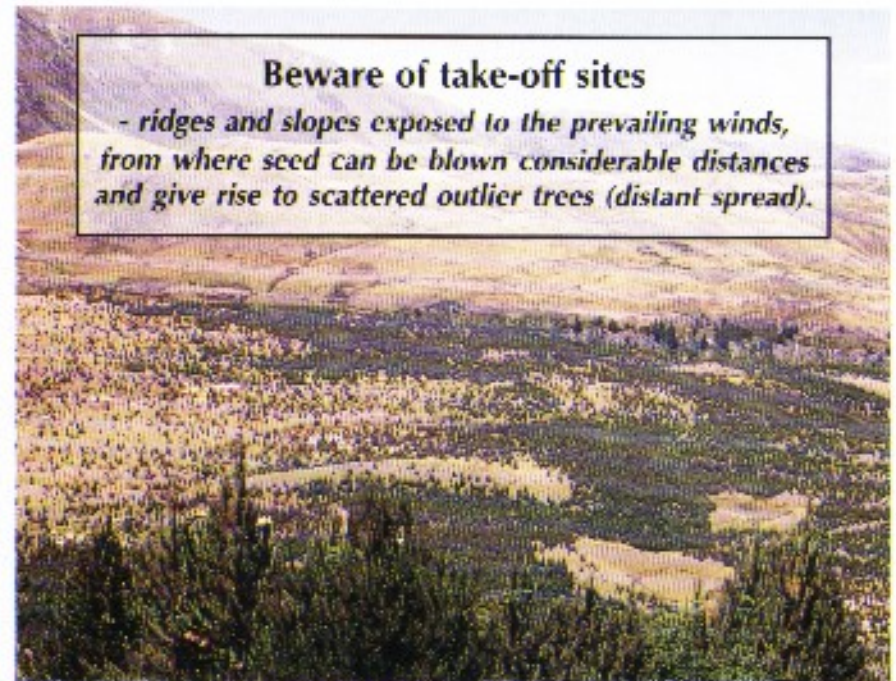
Species	(coning age - yrs)
Lodgepole pine - <i>Pinus contorta</i>	(8)
Scots pine - <i>P. sylvestris</i>	(12)
Mountain pine - <i>P. mugo/uncinata</i>	(8)
Douglas-fir * - <i>Ps. menziesii</i>	(12)
Corsican pine <i>Pinus nigra</i>	(13)
European larch - <i>Larix decidua</i>	(12)
Ponderosa pine - <i>Pinus ponderosa</i>	(13)
Muricata pine - <i>P. muricata</i>	(12)
Maritime pine - <i>P. pinaster</i>	(10)
Radiata pine - <i>P. radiata</i>	(10)

\* Douglas-fir (*Pseudotsuga menziesii*) is the most shade-tolerant of all these species, and can invade canopy gaps in forests/shrublands



## Siting

- Seed dispersal is mostly by wind, allowing direction (and, to a lesser extent, distance) to be largely predictable.
- Therefore, siting can determine the pattern of wilding spread.
- The main determinants are slope, aspect and exposure, relative to prevailing wind.



Corsican pine seedlings downwind from a 'take-off' site on the top of Mt Barker, near Lake Coleridge.

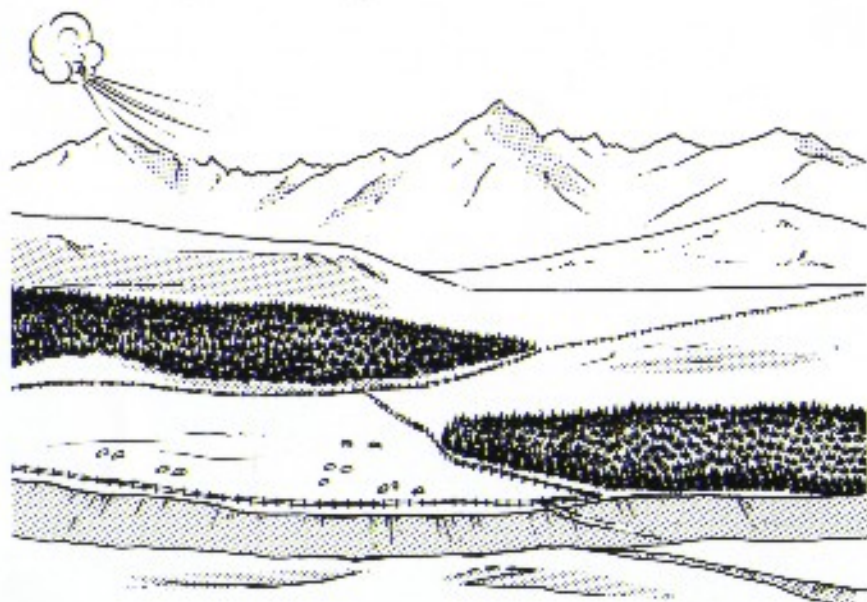
## Plantation design

- **Orientation**

- avoid having the longest axis of plantation at right angles to prevailing wind.

- **Species composition**

- use less spread-prone species around margins.



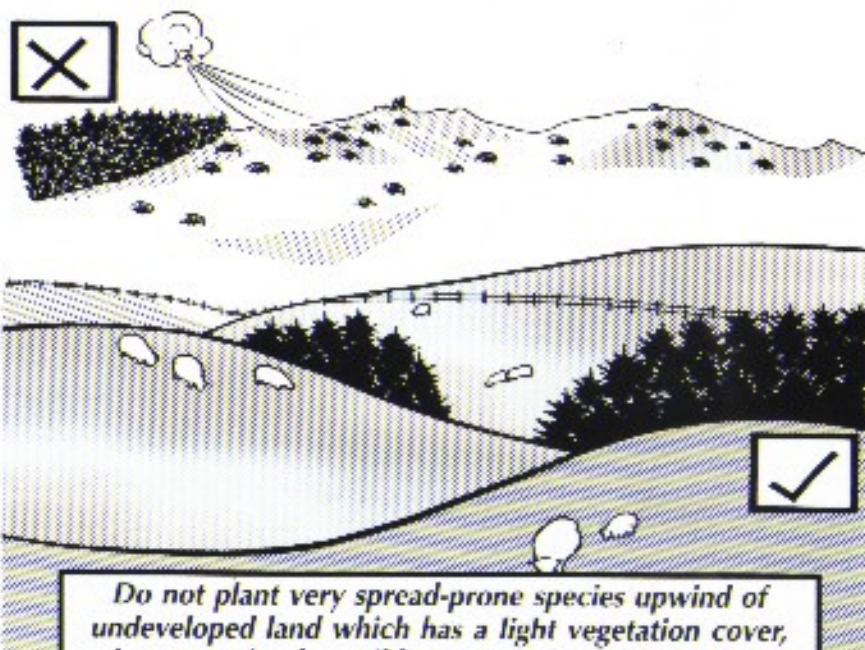
## Surrounding vegetation cover and land management

### Spread is *most* likely to occur on:

- undeveloped, lightly vegetated and/or lightly grazed land.

### Spread is *least* likely to occur:

- within closed-canopy shrublands or forest
- on improved pasture, annually mob stocked (by sheep).



*Do not plant very spread-prone species upwind of undeveloped land which has a light vegetation cover, unless committed to wilding removal. Avoid planting on potential take-off sites.*

In the past, sheep grazing has provided the most widespread and effective control.

Conifer palatability, in declining order is:

Radiata pine

Ponderosa pine

Lodgepole pine

European larch

Scots pine

Douglas-fir

Corsican pine



In many cases a small risk of unwanted spread cannot be avoided.

A small risk can be acceptable, as long as owners and managers make a long-term **commitment to regular checks** (about every 5 years) for **outlier trees**, and **remove them before coning age**.

*Such a commitment is not as onerous as generally thought. (Often just a ground search every 5-8 years, to remove wildings before they start coning)*



*Wilding eradication is only successful if ALL green foliage is removed. An axe is used to remove ground-level branches from wildings near Lake Coleridge.*

## Calculating Wilding Tree Spread Risk from New Plantings - Part I

(Answer all sections)

### 1. SPECIES

#### (a) Spreading vigour varies with species:

- Radiata and muricata pine 1
- Ponderosa pine and larch 2
- Corsican pine and Douglas-fir 3
- Scots pine and Lodgepole pine (*P. contorta*) 4

Enter score (1,2,3 or 4) here

#### (b) Palatability:

- Radiata and ponderosa pine 1
- Lodgepole pine and larch 2
- Scots pine and Douglas-fir 3
- Corsican pine 4

Enter score (1,2,3 or 4) here

### 2. SITING

- Flat (<10°)/sheltered, or slopes facing NE to SSW 1
- Flat (<10°), partially exposed to N and W 2
- Flat (<10°), fully exposed to N and W (200° to 45°) 3
- Take-off site - i.e. ridgetops, on or at base of slopes (>10°) or undulating land fully exposed to N and W 4

NB: < = less than, > = greater than

Enter score (1,2,3 or 4) here

## Calculating Wilding Tree Spread Risk from New Plantings - Part II

### 3. DOWNWIND LAND MANAGEMENT

#### (a) Within 200m:

- Developed pasture/regular mob stocking (sheep) or closed canopy scrub/forest 1
- Semi-improved grazing/occasional mob stocking 2
- Extensive grazing only 3
- No grazing 4

Enter score (1,2,3 or 4) here

#### (b) Within 200m - 400m,

#### OR, if 3 or 4 scored in 'Siting', out to 2 kilometers:

- Developed pasture/regular mob stocking (sheep) or closed canopy scrub/forest 1
- Semi-improved grazing/occasional mob stocking 2
- Extensive grazing only 3
- No grazing 4

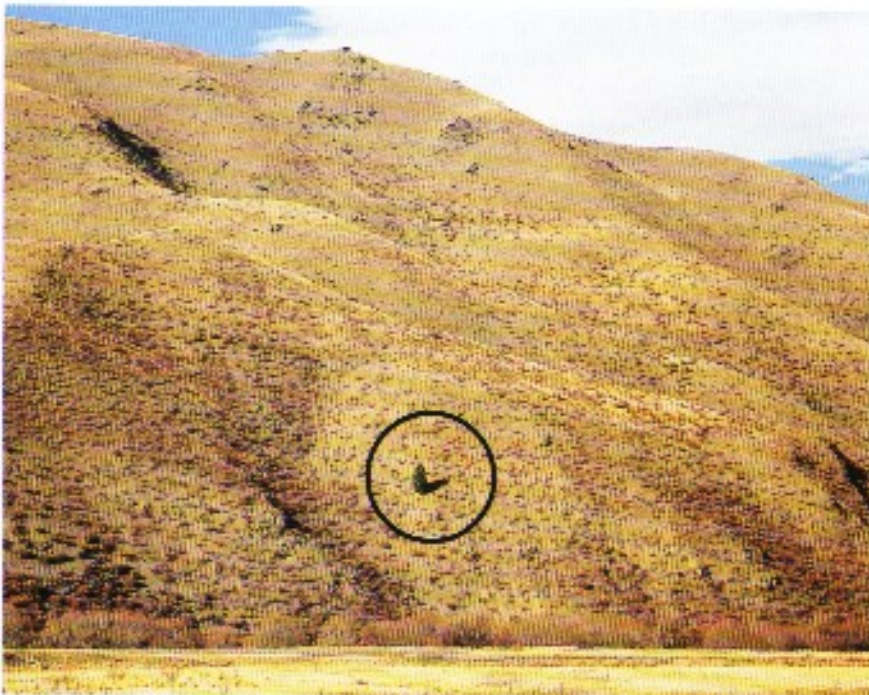
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**TOTAL SCORE**

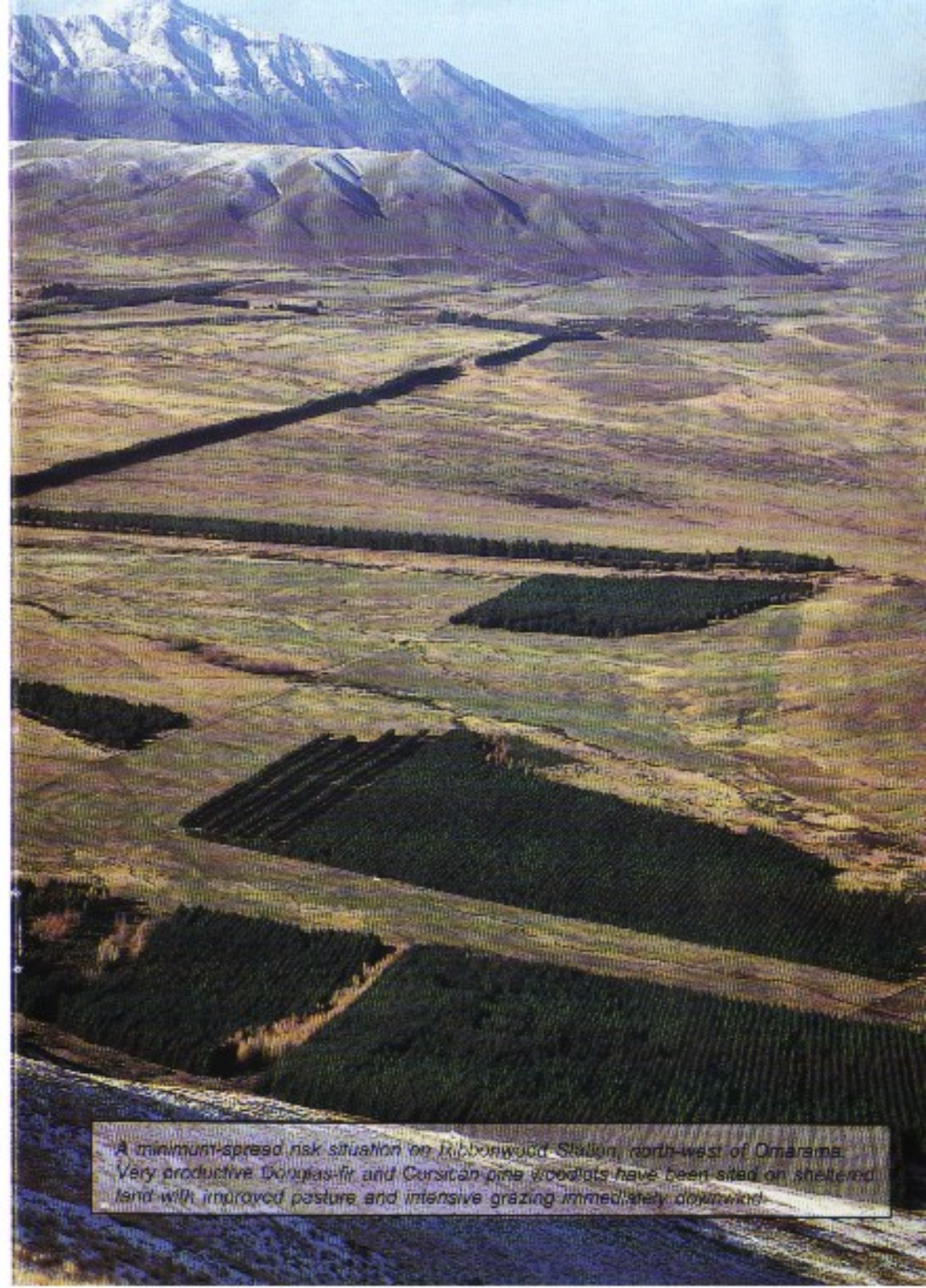
NOTE: • A score of 12 or more means high spread risk.  
 • A high risk is also likely if a score of 3 or 4 in 'Siting' is followed by a 3 or 4 in 'Downwind land management' (a) or (b)  
 • A high risk does not necessarily mean that tree planting is ruled out. A change of species or siting, or downwind land management can significantly lower spread risk OR, a commitment to wilding removal can be made - this need not be onerous

Owners of *existing* conifer shelterbelts and plantations should pay particular attention to:

- **surrounding land management**
  - to minimise chances of wilding establishment
- **removal of outlier trees**
  - before they produce cones



*A lone outlier pine in the Mackenzie Basin. Further spread is easily avoided if outlier wildings are removed before coning age.*



*A minimum-spread risk situation on Ribbonwood Station, north-west of Oamaru. Very productive Douglas-fir and Corsican pine woodlots have been sited on sheltered land with improved pasture and intensive grazing immediately downwind.*



*Douglas-fir wildings invading a canopy gap in beech forest on the slopes behind Queenstown. Unlike the pines, Douglas-fir is very shade-tolerant, and there is a risk of the species invading light wells in native forests where other understorey species are not well represented.*

## Summary

### **Prospective planters should pay particular attention to:**

- **species choice**
  - use less spread-prone species in contentious areas
- **siting**
  - avoid take-off sites (exposed to prevailing winds)
- **plantation design**
  - orientation relative to prevailing wind
  - edge planting of less spread-prone species
- **surrounding land management**
  - manage pasture, or maintain a closed canopy in shrublands/forest, to prevent wilding establishment
  - improve pasture, or mob stock annually
  - commitment to wilding removal before coning age (agreement with neighbours may be necessary)