

**BEFORE THE HEARINGS PANEL
FOR THE QUEENSTOWN LAKES PROPOSED DISTRICT PLAN**

IN THE MATTER of the Resource
Management Act 1991

AND

IN THE MATTER of the Rural Hearing
Stream 2

**MEMORANDUM OF COUNSEL ON BEHALF OF QUEENSTOWN LAKES DISTRICT
COUNCIL PROVIDING INFORMATION RELATING TO RURAL HEARING STREAM**

5 MAY 2016

 **Simpson Grierson**
Barristers & Solicitors
J G A Winchester / S J Scott
Telephone: +64-3-968 4018
Facsimile: +64-3-379 5023
Email: sarah.scott@simpsongrierson.com
PO Box 874
SOLICITORS
CHRISTCHURCH 8140

MAY IT PLEASE THE PANEL:

1. This memorandum is filed on behalf of the Queenstown Lakes District Council (**Council**) to provide the Panel with:
 - 1.1 electronic copies of information handed up by reporting officer, Mr Craig Barr during the presentation of the Council's opening at the Rural hearing on 3 and 4 May 2016 (attached as **Appendix A**); and
 - 1.2 the 'Calculating Wilding Spread Risk from New Planting' Wilding Pine risk assessment matrix (**Matrix**), which is referred to in paragraph 12.2 of Mr Glenn Davis' evidence dated 6 April 2016 (attached as **Appendix B**).
2. The Panel requested a copy of the Matrix during the presentation of Mr Davis' evidence on 3 May 2016.

DATED this 5th day of May 2016



J G A Winchester / S J Scott
On behalf of Queenstown Lakes District Council

Handed up by Craig Barr
03/05/16, Rural Hearing.

Lowest Clause	No.	Name	Organisation	Agent	Original Point No	Further Submission No	Submitter Position	Submission Summary	Planner Recommendation	Deferred or Rejected	Issue Reference
22.1 Zone Purpose	243	Christine Byrch			243.7		Oppose	Re-write to make it clear and concise.	Reject		No Comment
22.2.1 Objective 1	243	Christine Byrch			243.8		Oppose	This objective could be re written to be clear and concise.	Accept in part		Purpose Statement, Objectives and Policies relating to Residential Density
22.5 Rules - Standards	243	Christine Byrch			243.15		Other	No Decision specified.	Reject		Entire Report
22.2.2 Objective 2	243	Christine Byrch			243.9		Oppose	Delete and where appropriate, visitor activities' from objective 22.2.2.	Reject.		Visitor Accommodation
22.5 Rules - Standards	243	Christine Byrch			243.16		Oppose	Any non-compliance should be prohibited	Reject		Entire Report
22.2.2.4	243	Christine Byrch			243.25		Oppose	Visitor accommodation is too different from the purpose of this zone to have a visitor accommodation sub zone.	Reject		Visitor Accommodation, Community Activities and Commercial Activities
22.2.4 Objective 4	243	Christine Byrch			243.24		Oppose	Delete and where appropriate, visitor activities' from objective 22.2.2	Reject		Entire Report
22.2.5 Objective 5	243	Christine Byrch			243.10		Other	Revise, it needs to be more clearly written.	Reject		Entire Report
22.2.6 Objective 6	243	Christine Byrch			243.11		Other	Clarify the sentences within the objective and policies.	Reject		Entire Report
22.3.2.7	243	Christine Byrch			243.12		Other	Is another floor area calculation necessary.	Accept		Entire Report
22.4 Rules - Activities	243	Christine Byrch			243.13		Oppose	Revise so that all buildings are given an activity status.	Reject		Entire Report
22.4 Rules - Activities	243	Christine Byrch			243.14		Oppose	Remove the Visitor Accommodation sub-zone from the proposed plan.	Reject		Entire Report
22.4.10	243	Christine Byrch			243.26		Oppose	All visitor accommodation should be non-complying.	Reject		Visitor Accommodation
22.4.13	243	Christine Byrch			243.27		Oppose	Informal airports should be prohibited.	Reject		Informal Airports
22.4.15	243	Christine Byrch			243.28		Oppose	Any building within a building restriction area should be prohibited.	Reject		Entire Report
22.5.1	243	Christine Byrch			243.18		Oppose	Distinguish between residential buildings and all other buildings. The maximum building size should be the same for both rural lifestyle and rural residential zones.	Reject		Standards for structures and buildings Rule 22.5.1
22.5.2	243	Christine Byrch			243.30		Oppose	Delete the maximum site coverage for rural residential - this zone should also have a building platform. 22.5.2. This standard as it is written allows many buildings covering 15% of the net site area. Do you mean maximum of all buildings should be 15%? I think that is too much.	Reject		Entire Report
22.5.3	243	Christine Byrch			243.31		Oppose	Delete the matters of discretion: 'Building design and reasons for the size'.	Reject		Standards - Rule 22.5.3
22.5.6	243	Christine Byrch			243.17		Oppose	Delete the sentence 'Except this rule does not apply to the visitor accommodation sub zones' from Rule 22.5.6.	Reject		Buildings are controlled in the VA sub zone so the exemption is appropriate. It is where buildings are permitted a standard is necessary.
22.5.6	243	Christine Byrch			243.32		Oppose	Setbacks from water bodies should apply to visitor accommodation subzones.	Reject		Buildings are controlled in the VA sub zone so the exemption is appropriate. It is where buildings are permitted a standard is necessary.
22.5.13	243	Christine Byrch			243.33		Oppose	Delete this sub-zone, but if it is retained, maximum building coverage should be 2000m ² , and any more than this should be prohibited. add another point for discretion: Whether the building would be visually prominent, especially in the context of the wider landscape, rural environment and as viewed from neighbouring properties.		Deferred to the hearing on mapping	
22.5.25	243	Christine Byrch			243.23		Other	Informal Airports Located on Public Conservation and Crown Pastoral Land Helicopter landings at informal airports that do not comply with this standard should be prohibited or even non-complying.	Reject		Informal Airports Chapter 21.2.25
22.6.2.	243	Christine Byrch			243.19		Oppose	This VA sub-zone should be deleted. If not, applications for resource consent should all be notified.		Deferred to the hearing on mapping	

Handed up by Craig Barr
03/05/16, Rural Hearing.

Category	Lowest Clause	No.	Name	Organisation	Agent	Original Point No	Further Submission No	Submitter Position	Submission Summary	Planner Recommendation	Deferred or Rejected	Issue Reference
22 Rural Residential and Rural Lifestyle		811	Marc Scaife			811.1		Not Stated	The proposed Planning provisions for the Rural living zones have too many activities and rules that have discretionary activity status, and too few that are non-complying or prohibited.	Reject		The framework proposed is considered the most appropriate in terms of being efficient and effective.
22 Rural Residential and Rural Lifestyle	22.2.5 Objective 5	811	Marc Scaife			811.4		Support	With reference to the Control of buildings objective 22.2.5 refers to the bulk, scale and intensity of buildings. The latter is missing in 22.4.10. Also there is control over buildings, but questions control over numbers of people for different activities/land use types.	Reject		The matters of control for VA in the subzone are considered adequate. Intensity is addressed by site standard 22.5.13 that controls density and intensity is included.
22 Rural Residential and Rural Lifestyle	22.4.3	811	Marc Scaife			811.2		Not Stated	The change from controlled to permitted activity status for building platforms is sensible, but only if standards are introduced which define the matters previously controlled: location, appearance, earthworks, landscaping. These standards do not exist in the proposed plan as it stands.	Reject		Could not define relief sought.
22 Rural Residential and Rural Lifestyle	22.4.3	811	Marc Scaife			811.3		Support	The proposed plan is not clear as to the activity status of buildings. Not on a building platform in the RL zone. Nor does there appear to be standard governing the number of non-residential buildings, or building platforms for non-residential buildings. But these matters do need to have clear rules.	Reject		First point: Rule 22.4.1 Non-complying activity. Second matter is deferred to the hearing on mapping.
22 Rural Residential and Rural Lifestyle	22.4.10	811	Marc Scaife			811.15		Not Stated	Opposes the VA subzone over the Matakauri Lodge. The proposed sub zone for Matakauri has no planning rationale. Submits that the creation of special Rural Lifestyle visitor accommodation subzones will not solve potential conflicts between the Rural Lifestyle zone and visitor accommodation, but rather enhance them. The site has been developed to a level of intensity that is now in excess of twenty times the standard for visitor accommodation activity.		Deferred to the hearing on mapping	
22 Rural Residential and Rural Lifestyle	22.4.13	811	Marc Scaife			811.5		Support	Informal airports should have a prohibited activity status.	Reject		Informal Airports and Discretionary status is considered appropriate for proposals to be considered on their merits. Prohibited is too onerous.
22 Rural Residential and Rural Lifestyle	22.5 Rules - Standards	811	Marc Scaife			811.6		Support	Where buildings are permitted there needs to be as standard or landscaping, location, earthworks (submitters words).	Reject		Any landscaping necessary is intended to be imposed through the subdivision consent. The s32 describes the costs and benefits associated with permitted activity status vs controlled.
22 Rural Residential and Rural Lifestyle	22.5.2	811	Marc Scaife			811.7		Support	15% BC may be too much for larger Rural lifestyle lot sections. Numerous RR lots exist that are well in excess of the minimum 4000 sqm. A uniform site coverage of 15% could result in massive sprawl of buildings. * The Non compliance status (NCS) for breaches of site coverage should not be discretionary. It should be NC or PR.	Reject		15% is long established in the RR Zone. The RL zone is coverage is set by the Building Platform, usually 1000 square meters so this is up to 10% equivalent. The submitter would need to submit more information to prove 15% is not appropriate in the RR zone. It does not apply in the RL zone.
22 Rural Residential and Rural Lifestyle	22.5.3	811	Marc Scaife			811.8		Support	Questions whether max size = defined GFA or Ground floor area.	Reject		Measured from outside exterior building footprint at ground floor.
22 Rural Residential and Rural Lifestyle	22.5.4	811	Marc Scaife			811.9		Support	Setbacks: NCS should be non-complying, possibly PR. Scrap the exception for R Visitor zone in 22.5.6.	Reject		Buildings are controlled in the VA sub zone so the exemption is appropriate. It is where buildings are permitted a standard is necessary.
22 Rural Residential and Rural Lifestyle	22.5.11	811	Marc Scaife			811.10		Support	Residential density. Non complying status should be Prohibited.	Reject		This is too onerous and does not accord with section 5 RMA.
22 Rural Residential and Rural Lifestyle	22.5.12	811	Marc Scaife			811.11		Support	Residential density. Non complying status should be Prohibited.	Reject		This is too onerous and does not accord with section 5 RMA.
22 Rural Residential and Rural Lifestyle	22.5.13	811	Marc Scaife			811.12		Support	NCS should be non-complying, possibly Prohibited. Questions how can the scale and intensity of the activity be compatible with surrounding activities if the VA subzone is surrounded by Rural Lifestyle? Rural Lifestyle has 1 residential unit, max 1000 sqm site coverage whereas VA has 2.5 times that?	Reject		This is too onerous and does not accord with section 5 RMA.
22 Rural Residential and Rural Lifestyle	22.5.20	811	Marc Scaife			811.13		Support	Building restriction NCS should be Prohibited.	Reject		This is too onerous and does not accord with section 5 RMA.

Handed up by Craig Barr
03/05/16, Rural Hearing.

Craig Barr

Subject: FW: REPA FW: QAC submission on Queenstown PDP
Attachments: Figure 3.3.docx

From: Kirsty O'Sullivan [<mailto:kirsty.OSullivan@mitchellpartnerships.co.nz>]
Sent: Tuesday, 12 January 2016 4:49 PM
To: Craig Barr
Cc: Rachel Tregidga
Subject: RE: QAC submission on Queenstown PDP

Hi Craig,

The REPA is for both ends of the runway. See the image attached. We do not currently have a .dwg for this, although the dimensions are shown on the image. We can check with Airbiz to see whether they still have this on file and let you know accordingly.

Regards,
Kirsty

Kirsty O'Sullivan
Mitchell Partnerships Ltd
PO Box 489
DUNEDIN

Phone: 03 477 7884
Fax: 03 477 7691
e-mail: kirsty.osullivan@mitchellpartnerships.co.nz
Web: www.mitchellpartnerships.co.nz

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From: Craig Barr [<mailto:Craig.Barr@qldc.govt.nz>]
Sent: Friday, 8 January 2016 5:03 PM
To: Kirsty O'Sullivan <kirsty.OSullivan@mitchellpartnerships.co.nz>
Subject: QAC submission on Queenstown PDP

Hi Kirsty

Happy new year.

Can you please clarify app. C of the QAC submission and the proposed REPA for Wanaka Airport, which end of the runway, or both ends?

It would be good if you could provide a dwg file that our GIS team can utilise in its GIS system.

Regards
Craig

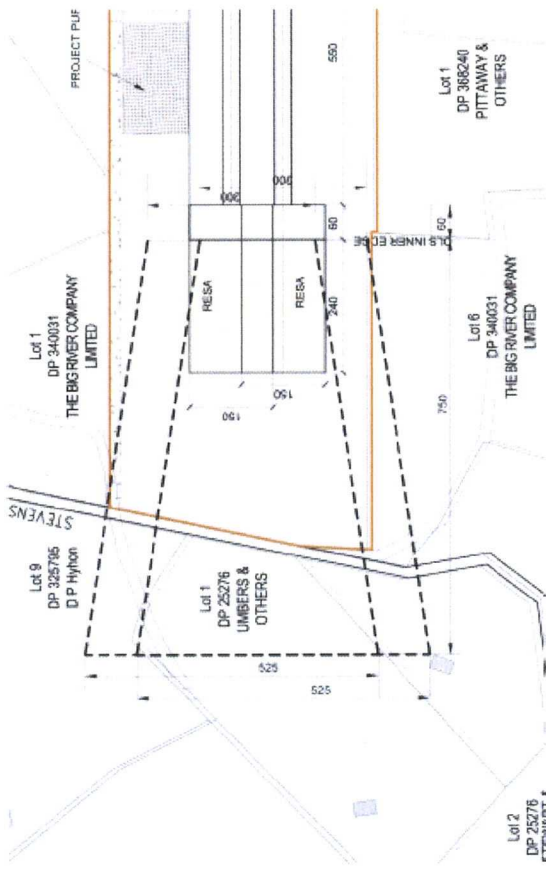


FIGURE 3-2 EXTENT OF REPA AT NORTH RUNWAY END

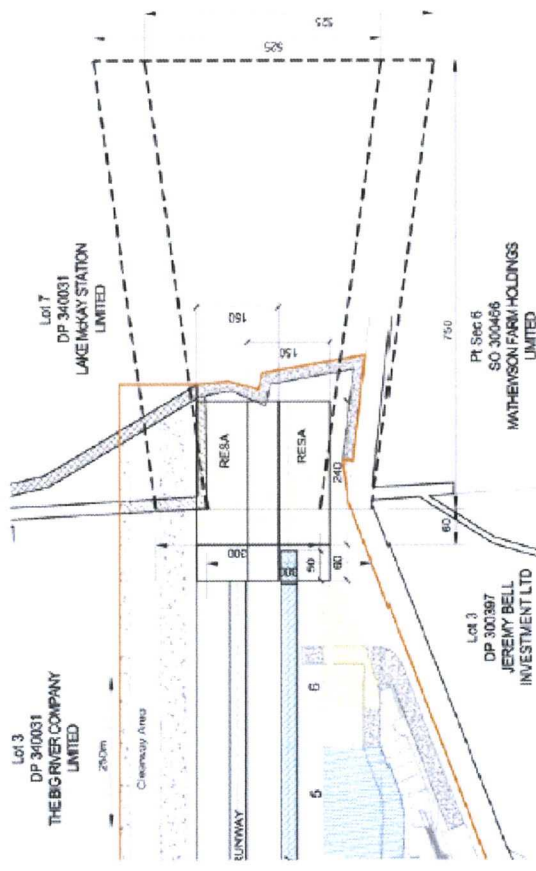


FIGURE 3-3 EXTENT OF REPA AT SOUTH RUNWAY END

Handed up by Craig Barr
04/05/16, RC 300
Rural Hearing

THIS DEED is made the 23rd day of March 1998

BETWEEN THE OTAGO REGIONAL COUNCIL ("the Region") of the one part

AND THE QUEENSTOWN-LAKES DISTRICT COUNCIL ("the District") of the other part.

both being bodies corporate constituted under S.37L of the Local Government Act 1974, the Region being a regional council and the District being a territorial authority.

WHEREAS the regional boundary of the Region includes an area that is also within the boundary of the District ("the Land")

AND WHEREAS pursuant to S.33 of the Resource Management Act 1991 ("the Act") the Region has agreed to transfer in respect of the Land certain of its functions, powers or duties as defined below to the District.

AND WHEREAS the District has agreed to assume such functions, powers or duties on the terms and conditions as are agreed herein the Region and the Council being satisfied that the transfer is desirable on all of the following grounds, namely the District to which the transfer is made represents the appropriate community of interest relating to the exercise or performance of the function, power or duty and efficiency and technical or special capability or expertise

AND WHEREAS the Region duly served notice on the Minister for the Environment

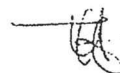
AND WHEREAS the Region has duly completed the special consultative procedure specified in S.716A of the Local Government Act 1974 and no submissions to the proposed transfer have been received

AND WHEREAS the proposed transfer is made expressly on the terms and in accordance with the said S.33 in particular subss (1), (3), (8) and (9) thereof

NOW THEREFORE THIS DEED WITNESSETH

1. THE region DOETH HEREBY TRANSFER to the District in respect of the Land the functions, powers or duties of:

- (a) determining applications for land use consent, consent for which is required to be obtained pursuant to S.13(1)(a) of the Act within the land;





- (b) administering, monitoring and supervising the implementation of consents given by the District pursuant hereto;
- (c) issuing of any consent required under bylaws promulgated under the Harbours Act 1950 in respect of any of the structures mentioned in subclause (a) hereof;
- (d) enforcement as provided in Part XII of the Act and as provided in the Harbours Act 1974 in respect of any of the above structures.

2. THE District HEREBY AGREES TO AND ACCEPTS to undertake these functions, powers and duties subject to the terms of this agreement and the said S.33.

3. ON receipt of land use consent applications in respect of structures which:

- (a) are located or proposed to be located on the bed of rivers; or
- (b) are solid or effectively solid structures (as distinct from open, piled structures); or
- (c) involve excavation of the bed, disturbance of the shoreline or significant disturbance of the lake bed; or
- (d) are owned or proposed by the District

the District will forthwith advise the Region of the receipt and nature of the application and the Region may at its discretion in any particular case resume the functions, powers and duties of processing and determining any application and of administering the consents at any time prior to the commencing of a hearing where such is held prior to determination of an application where no hearing is held.

4. THE District shall have all of the functions, powers and duties given under the Act or Local Government Act 1974 or any other power thereunto enabling to recover all costs incurred by it in the carrying out of the functions, powers and duties hereby transferred but shall have no right to call on a contribution to costs in respect thereof from the Region.

CA

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5. THE District shall report to the Region at six monthly intervals in such manner as may be agreed from time to time between the parties on the exercise of the functions, powers and duties hereby transferred.

6. THE District may relinquish the transfer of the functions, powers and duties agreed hereby following consultation with the Region and upon one month's notice following such consultation.

7. THIS agreement may be modified or varied by agreement in writing made between the parties.

8. THE Region may change or revoke the transfer of any function or power transferred hereby at any time by notice in writing to the District.

IN WITNESS WHEREOF the parties have executed this deed the day and year first before written.

THE COMMON SEAL of THE OTAGO REGIONAL COUNCIL was hereunto affixed in the presence of:



[Handwritten signature]
.....

Chairperson

[Handwritten signature]
.....

Director Corporate Services

THE COMMON SEAL of THE QUEENSTOWN-LAKES DISTRICT COUNCIL was hereunto affixed in the presence of:



[Handwritten signature]
.....
MAYOR

[Handwritten signature]
.....
lkl cs

DSS 1. CALCULATING WILDING SPREAD RISK FROM NEW PLANTINGS^{a,b}*(Select score applicable for each of the five categories)***1. SPECIES – GROWTH** *(score for one species only)***Spreading vigour varies with species**

- Redwoods, Leyland cypresses, cedars and spruces (very low risk – no need to proceed further) 0
- Radiata (*P. radiata*) and ponderosa (*P. ponderosa*) pine, Lawsons cypress (*C. lawsoniana*) 1
- Muricata (*P. muricata*) and maritime (*P. pinaster*) pine and larches (*Larix* spp) 2
- Corsican (*P. nigra*) and mountain/dwarf mountain (*P. uncinata/mugo*) pine 3
- Douglas-fir^g (*Ps. menziesii*), Scots pine (*P. sylvestris*) 4^g
- Lodgepole/contorta pine (*P. contorta*) 5

*Enter score (0, 1, 2, 3, 4 or 5) here***2. SPECIES – PALATABILITY****Palatability varies with species**

- Radiata, maritime and ponderosa pine 1
- Lodgepole and muricata pine and European larch 2
- Scots and mountain/dwarf mountain pine and Douglas-fir 3
- Corsican pine 4

*Enter score (0, 1, 2, 3 or 4) here***3. SITING OF NEW PLANTING**^{c,d}**Trees are located on**

- Sites well sheltered from prevalent and strong winds 0
- Flat sites (<10°), partially exposed to strong/prevalent winds 1
- Lea slopes where strong eddy gusts are likely 2
- Flat sites (<10°), fully exposed to strong/prevalent winds 3
- *Either* elevated 'take-off' sites, (ridge-tops, or base of exposed slopes >10°) 4
- or sloping land, fully exposed to strong/prevalent winds

*Enter score (0, 1, 2, 3 or 4) here***4. DOWNWIND LANDUSE – GRAZING****Wilding establishment influenced by grazing (particularly with sheep)**

- Intensive grazing on developed pasture 0^d
- Regular mob stocking with sheep^e 1^d
- Semi-improved grazing (sheep/cattle)/ occasional mob stocking with sheep 2^d
- Extensive grazing only^e 3^d
- No grazing 4^d

*Enter score (0, 1, 2, 3 or 4) here***5. DOWNWIND VEGETATION COVER** *(if Douglas-fir involved see^g in Notes)***Wilding establishment influenced by competition from existing vegetation**

- Plantation forest, developed pasture (intensive grazing) 0^d
- Native forest^h, shrubland/tussock/grassland with a continuous and dense vegetation cover 1^d
- Forest/shrubland/tussock/grassland with few gaps 2^d
- Open forest and/or scattered patches of dense shrubland/tussock/grassland with many gaps 3^d
- Open slips/rockland and/or light, low-stature shrubland/tussock/grassland 4^d

*Enter score (0, 1, 2, 3 or 4) here***TOTAL SCORE***(See Assessment below for interpretation)*

ASSESSMENT

- A score of **12** or more indicates a high risk of spread from the planted site.
- BUT, if a score of '0' is obtained in 1. SPECIES – GROWTH, or 4. DOWNWIND LANDUSE – GRAZING, or 5. DOWNWIND VEGETATION COVER, the total score automatically becomes '0' (ie., there is no risk of wilding spread). Although, note the need to test long distance spread risk from exposed sites (scoring 3 or 4 in 3 - Siting)

A high risk does not necessarily mean that trees should not be planted. A change of species, or siting, or downwind land management can significantly lower spread risk. Conversely, a change of species when replanting after harvesting might increase spread risk. If there is a risk of wilding spread, then a commitment to wilding removal should be made - this may not be onerous, particularly for scattered trees (often outliers from distant spread).

NOTES:

^a **Multiple calculations.** As the above score sheet indicates, there are a range of factors influencing the risk of spread. The impact of these will vary from site to site, both within a single forest and on the surrounding land. Therefore, spread risk will need to be calculated not just once, but a number of times in order to accommodate the range of sites represented within and outside the forest.

^b **Risk assessment location.** This DSS was compiled primarily for use in the drier hill and high country areas of the eastern South Island, where low-stature grasslands (and to a lesser extent, shrublands) often dominate, and where opportunities for wilding establishment are greatest. Wilding spread risk is considerably less in the warmer, wetter parts of New Zealand (mostly present in the North Island), due to higher-stature vegetation covers being more vigorous and complete, and to poorer seed production in some species (such as Douglas-fir).

^c **Altitude.** The coning ability of some species drops off quickly with increasing altitude. Contorta and mountain pine will readily establish and cone above native treeline. Scots pine and Douglas-fir will establish at tree line. Corsican pine and Douglas-fir coning drops off quickly above 800 and 1100 m respectively – the limit for Scots pine coning is unknown. Radiata pine is a reluctant spreader above 6-700 m, except on the warmer sites. The altitudinal establishment and coning limits for muricata pine and larch are unknown.

^d **Long distance spread.** This is quite possible if a score of 3 or 4 is scored in 'Siting' (in 3) especially if Douglas-fir, larch or Corsican, contorta, mountain or Scots pines are involved (all have light seed which is readily dispersed greater distances by wind). In these circumstances, the risk of spread relative to grazing (4) and vegetation cover (5) needs to be scored out to beyond the 'fringe' area, to a distance of 2 km. ('Fringe' infers a distance from seed source of 1 – 200m)

^e **Regular mob stocking.** If the pasture is only semi-improved and the seed rain is heavy, such as alongside mature conifers (particularly Corsican pine – the least palatable conifer), regular mob stocking may not prevent wilding establishment over the long term.

^f **Light grazing.** This will reduce wilding establishment, but given enough time, some wildings will eventually grow to above browse height. Palatability of introduced conifers is (in decreasing order): radiata > ponderosa > contorta > larch > Scots pine > Douglas fir > Corsican pine.

^g **Douglas-fir.** i) This species is more shade tolerant than the other common conifers. Therefore, it is more likely to invade under forest canopy gaps and within low-stature (<2m tall) shrublands.

ii) Douglas-fir requires some drought stress during bud formation in late summer to ensure cone buds are formed in the following season; otherwise they become vegetative buds. Hence, coning is significantly less in moister (and often warmer) parts of NZ (eg., much of N. Island, west coast of S. Island). *Therefore, in these areas, Douglas-fir should be given a score of '1' (not '4') in 'SPECIES – GROWTH'.*

^h **Native forests .v. plantations of introduced trees.** Man-made plantations are much more likely to have a continuous canopy cover, than are existing native forests, where disturbance and canopy gaps are a normal part of the natural succession cycle.

DSS 2. CALCULATING RISK OF WILDING TREE SPREAD INTO/WITHIN NEW SITES ^{1,7}

(Select score applicable for each of the six categories)

1). SPECIES PROVIDING SEED SOURCE (score for one species only)

Spreading vigour varies with species

- Redwoods, Leyland cypresses, cedars and spruces 0
- Radiata (*P. radiata*) and ponderosa (*P. ponderosa*) pine, Lawsons cypress (*C. lawsoniana*) 1
- Muricata (*P. muricata*) and maritime (*P. pinaster*) pine and larches (*Larix* spp) 2
- Corsican (*P. nigra*) and mountain/dwarf mountain (*P. uncinata/mugo*) pine 3
- Douglas-fir ⁶ (*Ps. menziesii*), Scots (*P. sylvestris*) pine 4 ⁶
- Lodgepole/contorta (*P. contorta*) pine 5

Enter score (0, 1, 2, 3 or 4) here

2). SITING OF SOURCE TREES ^{2,3}

Source trees are on....

- Sites well sheltered from prevalent and strong winds 0
- Flat sites (<10⁰), partially exposed to strong/prevalent winds 1
- Lea slopes where strong eddy gusts are likely 2
- Flat sites (<10⁰), fully exposed to strong/prevalent winds 3
- Either elevated 'take-off' sites, (ridge-tops, or base of exposed slopes >10⁰) or sloping land, fully exposed to strong/prevalent winds 4

Enter score (0, 1, 2, 3 or 4) here

3). SITING OF SAMPLE SITE RELATIVE TO SOURCE TREES

Location relative to seed-dispersing winds

- Up-wind relative to prevalent or strong winds (If upwind and >1km distant - score 0) 1 (0)
- Subject to cross-winds and/or wind-eddies relative to prevalent or strong winds 2
- Down-wind relative to prevalent and strong winds (often from N and W) 3

Enter score (0/1, 2 or 3) here

4). DISTANCE OF SAMPLE SITE FROM SOURCE TREES ³

Spread risk decreases with distance from seed source

- Greater than 5km 0 ³
- 1-5km 1
- 200m – 1km 3
- 0-200m 4

Enter score (0, 1, 3 or 4) here

5). GRAZING WITHIN SAMPLE AREA

Wilding establishment influenced by grazing (particularly with sheep)

- Intensive grazing on developed pasture 0
- Regular mob stocking with sheep ⁴ 1 ⁴
- Semi-improved grazing (sheep/cattle)/ occasional mob stocking with sheep 2
- Extensive grazing only ⁵ 3
- No grazing 4

Enter score (0, 1, 2, 3 or 4) here

6). VEGETATION OF SAMPLE SITE (if Douglas-fir involved see ⁶ below)

Wilding establishment influenced by competition from existing vegetation

- Developed pasture, rank grass, plantation forest (no gaps) ⁸ 0
- Native forest ⁸, shrubland/tussock/grassland with a continuous and heavy vegetation cover 1
- Forest/shrubland/tussock/grassland with few gaps 2
- Open forest and/or scattered patches of dense shrubland/tussock/grassland with many gaps 3
- Open slips/rockland and/or light, low-stature shrubland/tussock/grassland 4

Enter score (0, 1, 2, 3 or 4) here

TOTAL SCORE:

(See Assessment below for interpretation)

ASSESSMENT

- A score of **14** or more indicates a high risk of invasion by the assessed species onto the sample area.
- BUT, if a score of '0' is obtained in any one category, the total score automatically becomes '0' (ie., there is no risk of wilding spread). Although, note the need to test long distance spread risk from exposed sites (scoring 2 or 3 in 3 - Siting)

A high risk does not necessarily mean that the area will inevitably succumb to wilding trees. A commitment to wilding removal can be made, possibly involving the owner of the source trees. Providing it is timely (before wildings cone and produce seed), this commitment need not necessarily be onerous, particularly for scattered trees (often outliers from distant spread).

NOTES:

¹ **Multiple calculations.** As the above score sheet indicates, there are a range of factors influencing the risk of spread. The impact of these will vary from site to site, both relative to the seed source and to the land being sampled. Therefore, spread risk will need to be calculated not just once, but a number of times in order to accommodate the range of sites represented at the seed source and at the site being sampled.

² **Altitude.** The coning ability of some species drops off quickly with increasing altitude. Contorta and mountain pine will readily establish and cone above native treeline. Scots pine and Douglas-fir will establish at tree line. Corsican pine and Douglas-fir coning drops off quickly above 800 and 1100 m respectively – the limit for Scots pine coning is unknown. Radiata pine is a reluctant spreader above 6-700 m, except on the warmer sites. The altitudinal establishment and coning limits for muricata pine and larch are unknown.

³ **Long distance spread.** This is likely if a score of 3 or 4 in 'Siting' (in 3) is followed by a 2 or greater in 'Vegetation' and 'Grazing' (in 5 & 6), especially if Douglas-fir, larch or Corsican, contorta, mountain or Scots pines are involved (all have light seed which is readily dispersed greater distances by wind). In these circumstances, the risk of spread may need to be considered out beyond 5 km.

⁴ **Regular mob stocking.** If the pasture is only semi-improved and the seed rain is heavy, such as alongside mature conifers (particularly Corsican pine – the least palatable conifer), regular mob stocking may not prevent wilding establishment over the long term.

⁵ **Light grazing.** This will reduce wilding establishment, but given enough time, some wildings will eventually grow to above browse height. Palatability of introduced conifers is (in decreasing order): radiata > ponderosa > contorta > larch > Scots pine > Douglas fir > Corsican pine.

⁶ **Douglas-fir.** i) This species is more shade tolerant than the other common conifers. Therefore, it is more likely to invade under forest canopy gaps and within low-stature (<2m tall) shrublands.

ii) Douglas-fir requires some drought stress during bud formation in late summer to ensure cone buds are formed in the following season; otherwise they become vegetative buds. Hence, coning is significantly less in moister (and often warmer) parts of NZ (eg., much of N. Island, west coast of S. Island). *Therefore, in these areas, Douglas-fir should be given a score of '1' (not '4') in 'SPECIES – GROWTH'.*

⁷ **Risk assessment location.** This DSS was compiled primarily for use in the drier hill and high country areas of the eastern South Island, where low-stature grasslands (and to a lesser extent, shrublands) often dominate, and where opportunities for wilding establishment are greatest. Wilding spread risk is considerably less in the warmer, wetter parts of New Zealand (mostly present in the North Island), due to higher-stature vegetation covers being more vigorous and complete, and to poorer seed production in some species (such as Douglas-fir).

⁸ **Native forests .v. plantations of introduced trees.** Man-made plantations are much more likely to have a continuous canopy cover, than are existing native forests, where disturbance and canopy gaps are a normal part of the natural succession cycle.