BEFORE THE ENVIRONMENT COURT
I MUA I TE KOOTI TAIAO O AOTEAROA

IN THE MATTER	of the Resource Management Act 1991
AND	of appeals under clause 14 of the First Schedule of the Act
BETWEEN	**SOUTHWOOD EXPORT LIMITED, KODANSHA TREE FARM NEW ZEALAND LIMITED AND SOUTHLAND PLANTATION FOREST COMPANY OF NEW ZEALAND LIMITED** (ENV-2018-CHC-046)
	Appellants
AND	**SOUTHLAND REGIONAL COUNCIL**
	Respondent
AND	**CAMPBELL'S BLOCK S 274 PARTIES** (as continued on next page)

STATEMENT OF EVIDENCE OF GRAEME MANLEY

Dated: 4 February 2022

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AND	PETER CHARTRES
AND	DIRECTOR-GENERAL OF CONSERVATION
AND	FEDERATED FARMS OF NEW ZEALAND
AND	ROBERT GRANT
AND	RAYONIER NEW ZEALAND LIMITED
AND	ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND INCORPORATED
AND	STONEY CREEK STATION
AND	THE TERRACES LIMITED

Introduction

1 My name is Graeme Manley.

2 I am the general manager of Southwood Export Limited (SWEL). SWEL owns and manages its own plantation forest in the Southland region. It also manages plantation forest on behalf of several other entities including the other appellants Kodansha Tree Farm New Zealand Limited and Southland Plantation Forests Company of New Zealand Limited.

3 I am based in the head office of Southwood Export Limited at Invercargill.

Qualifications

4 I hold a New Zealand forest service certificate in forestry which was awarded to me in 1967 following the completion of a four year Ranger training program. I have been continuously involved in New Zealand's forestry sector since obtaining that qualification.

5 My evidence is based on my experience in plantation forestry operations in Marlborough, Northland, Southland and South Otago. I have extensive experience of managing both new forest development, re-establishment, forest growth and harvesting.

6 My qualifications as an expert are set out above. I confirm that the issues addressed in this statement are within my area of expertise.

7 I have read the Environment Court's code of conduct and agree to comply with it, but note that as an employee of the Appellant, I am not an independent expert. However, I confirm that I believe I can maintain impartiality and that my expertise may assist the Court to resolve the issues on appeal.

Background

8 Southwood Export Ltd, Kodansha Treefarm New Zealand Limited and Southland Plantation Forest Company of New Zealand Limited jointly made a submission on the proposed Southland Water and Land Plan (pSWLP) as notified on 3 June 2016.

9 The National Environmental Standard Plantation Forestry was gazetted on 1 May 2018.

10 Southwood Export Ltd, Kodansha Treefarm New Zealand Limited and Southland Plantation Forest Company of New Zealand Limited lodged an

appeal of the decisions version of the pSWLP, and also filed a section 274 notice on an appeal lodged by Rayonier New Zealand Limited.

Scope of statement of evidence

11 I consider in light of the outcomes of the Joint Witness Conference, the most efficient means of addressing SWEL's interests in appeals and as a section 274 party is to set out its position on both proceedings in this statement of evidence.

12 My evidence therefore traverses the full scope of the appeal and the issues specified in the section 274 notices filed by SWEL in respect of the appeal lodged by Rayonier New Zealand Limited.

13 I attended the joint witness conference and while the outcome of that conference is different to the specific relief sought in the notice of appeal and section 274 notices, I consider that the outcome achieves the intent and purpose of the relief sought by SWEL.

14 My evidence therefore addresses the form of relief described in the Joint Witness Statements, rather than the relief sought as set out in the notice of appeal and the section 274 party to the Rayonier appeal.

Joint witness conference

15 In preparing my statement of evidence I have reviewed the following:

16 The pSWLP as confirmed by decisions of the Regional Council and dated 4 April 2018;

17 The NES Plantation Forestry dated 1 May 2018

18 The Appeal by Rayonier, being proceeding ENV-2018-CHC-49;

19 The overview evidence of the Regional Council dated 22 October 2021 (noting that it makes no express reference to the NES Plantation Forestry);

20 Statements of Evidence for Rayonier dated 20 December (including the Will Say Statements annexed to same);

21 The Will Say Statement of Sally Strang and the Will Say Statements for Rayonier prepared for the Forestry Experts Joint Witness Conferences dated 29 November 2021 and the Planning Experts dated 9 and 10 December 2021.

22 The Joint Witness Statements developed from the Forestry Experts Joint Witness Conferences dated 29 November 2021 and the Planning Experts dated 9 and 10 December 2021.

23 I prepared a Will Say Statement dated 25 November 2021 regarding this matter which I attach as appendix A.

24 I participated (together with Sally Strang) in the Joint Witness Conference for Forestry Experts held on 29 November 2021.

25 I am a signatory to the Joint Witness Statement - Forestry, and I attach this as appendix B.

26 SWEL did not engage a planner to attend the Joint Witness Conference - Planning held on 9 and 10 December 2021. In my evidence I refer to the amended provisions developed at this conference and I include that particular provision as appendix C.

27 I do not intend to repeat the statements that I have made in my prior Will Say Statement. However, I can confirm that I agree with the statements of evidence provided by the experts in the related Rayonier appeal and I do not wish to re-state the information that has been presented by them.

Section 32AA analysis of proposed resolution of appeal and section 274 interests

28 The scope of changes proposed to the pSWLP are narrow because the National Environmental Standard provides for appropriate regulation of forestry activity.

29 I reconfirm my view that excluding the activities of stick raking and herbicide spraying from the definition of cultivation are the most effective and efficient means of achieving the objectives and policies of the pSWLP. I also consider that adjusting the definitions to describe stick raking and slash raking achieves the broad intent of the relief sought in the SWEL notice of appeal and I have no objection to its inclusion.

30 I set out my reasons for these opinions in my Will Say statement, and additional reasons for my view are also recorded in the Joint Witness Statement. I consider that the provisions developed in the JWC will give effect to the purpose of the relief sought in the SWEL appeal, and the outcome are also desirable and do not conflict with SWEL's interests as a section 274 party on the related Rayonier appeal.

31 I don't wish to repeat the evidence of Sally Strang, but confirm that I agree with her statement of evidence in regard to the section 32AA analysis she has provided and I have nothing further to add to the assessment she has undertaken.

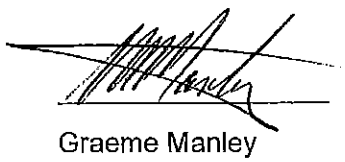
32 I have also reviewed the evidence of Jerome Geoffrey Wyeth for Rayonier New Zealand Limited and I agree with the conclusions reached at paragraphs 17 through to 19. I have no additional comments to make in respect of that evidence.

33 Therefore, I confirm that in respect of the proposed provisions agreed at the Joint Witness Conference, I support the provision that was developed as it broadly achieves the outcome and purpose of the relief sought in the SWEL appeal and in terms of the section 274 notice that was filed by SWEL.

Conclusion

34 I note that the provisions which have been developed in the course of the Joint Witness Conferences are different in character to the relief sought by SWEL as set out in its appeal and section 274 notices. However, I confirm my opinion that overall the provisions proposed will resolve the issues raised on appeal and also in respect of the section 274 notices filed by SWEL.

DATED 4 February 2022



Graeme Manley

Appendix A

BEFORE THE ENVIRONMENT COURT
I MUA I TE KOOTI TAIAO O AOTEAROA

IN THE MATTER	of the Resource Management Act 1991
AND	of appeals under clause 14 of the First Schedule of the Act
BETWEEN	SOUTHWOOD EXPORT LIMITED, KODANSHA TREE FARM NEW ZEALAND LIMITED AND SOUTHLAND PLANTATION FOREST COMPANY OF NEW ZEALAND LIMITED (ENV-2018-CHC-046)
	Appellants
AND	SOUTHLAND REGIONAL COUNCIL
	Respondent
AND	CAMPBELL'S BLOCK S 274 PARTIES (as continued on next page)

WILL SAY OF GRAEME MANLEY

Dated: 25 November 2021

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AND	RAYONIER NEW ZEALAND LIMITED
AND	ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND INCORPORATED
AND	STONEY CREEK STATION
AND	THE TERRACES LIMITED

1. My name is Graeme Manley.

2. I am the general manager of Southwood Export Limited (SWEL). SWEL owns and manages its own plantation forest in the Southland region. It also manages plantation forest on behalf of several other entities including the other appellants Kodansha Tree Farm New Zealand Limited and Southland Plantation Forests Company of New Zealand Limited.

3. I am based in the head office of Southwood export Ltd at Invercargill.

4. I hold a New Zealand forest service certificate in forestry which was awarded to me in 1967 following the completion of a four year Ranger training program. I have been continuously involved in New Zealand's forestry sector since obtaining that qualification.

5. My evidence is based on my experience in plantation forestry operations in Marlborough, Northland, Southland & South Otago. I have extensive experience of managing both new forest development, re-establishment, forest growth and harvesting.

6. My qualifications as an expert are set out above. I confirm that the issues addressed in this statement are within my area of expertise.

7. I have read the Environment Court's code of conduct and agree to comply with it, but note that although I am an employee of the Appellant, I believe my expertise may assist the parties to resolve this dispute and I can maintain impartiality.

Scope of statement

8. I have reviewed the will say statements for Rayonier New Zealand.

9. SWEL owns and operates a different plantation forest management program as the predominant species planted is Eucalyptus.

10. I consider that much of the information provided by Rayonier New Zealand is generally relevant to the management of plantation forestry and I broadly agree with the statements made. Therefore, I do not repeat the points made by those experts but instead where my opinion differs, I set out the reasons for holding a different opinion below and make additional comments where it is relevant to explain the differences between the management of plantation eucalyptus forest and plantation pine forest.

11. I have also reviewed the Regional Council's proposed wording for the Regional Plan Rule 25 and definition of "cultivation".

12. I consider that the issues in our Appeal as it relates to aerial spraying are resolved by this revised wording. However, issues in respect of soil erosion are still unresolved. Therefore, my statement addresses the topic of changes to the definition of "cultivation" and rule 25 as it concerns the issue of soil erosion only.

Background

13. SWEL was established in 1981 to process indigenous logs into chip for export to pulp and paper mills in Japan.

14. SWEL has been managing plantation forests in Southland since 1985, when it began establishing eucalyptus plantations to provide an alternative hardwood fibre resource to the indigenous resource it was processing at that time. In addition to its own estate, SWEL manages the plantation forest estates of Southland Plantation Forest Company of New Zealand Limited (SPFL) and Kodansha Tree Farm New Zealand Limited (KTNZ).

15. The mill was updated in 2010 and currently processes on a single shift 350,000 GMT of logs annually. All wood chip is stockpiled and exported through the port of Bluff.

16. All forest estates managed by SWEL are located in Southland or South Otago and have a total current net stocked area of approximately 11,900 ha.

17. Approximately 80% of the land planted is on land with a slope of 10° or greater. A small proportion of plantation forest occurs on land with a slope of 25° or more.

18. The Company's forest management plan is to provide for high yielding crops on the most economic basis, whilst ensuring that in doing so there are no serious adverse effects on the environment.

19. In July 2004, SWEL attained FSC® Chain of Custody certification for its mill and port operations (NC-COC-001257). SWEL also has attained FSC® Chain of Custody certification in association with its forest certification.

20. In 2017 SWEL also attained Forest Management Certification from PEFC (Program for the Endorsement of Forest Certification) for its forest management practices. Annual PEFC and FSC audits provide an

intensive assessment of SWEL's forest management performance to measure compliance with the global certification programmes.

21. SWEL is required to develop and adhere strictly to plantation forestry management plans. A key objective of the ISO audit framework and the plantation management plans is to ensure the health and wellbeing of the ecosystem, and this includes waterways and aquatic life forms.

Context of Southland Forestry

22. Typical forestry terrain in Southland comprises flat plains – rolling topography and hillsides with steep slopes (>20° gradient).

23. The plains and hillsides in Southland have been classified as low-risk of soil erosion under the National Environmental Statement - PF[1]. Therefore, the majority of the areas under forestry management by SWEL are low-risk.

Overview of eucalyptus plantation forestry life-cycle

24. The management of SWEL's eucalyptus forest is different to a typical pine forest. Although SWEL grows both species, eucalyptus is the predominant species grown.

25. The Eucalypt forests managed SWEL by are established to provide a supply of export hardwood fibre on a 15-20 year growth cycle which is shorter than typical 26-30 year regime for Pines.

26. Soil structure remains intact for the majority of the forest lifecycle, and the forest contributes positively to the environment in terms of eco system health and well-being, particularly as hillsides are protected from erosion during the planting and growth phases.

27. Site preparation and harvest activities do not mean that the entirety of hillside soils are laid bare to the elements for long periods. The vegetative matter remains as a litter layer and the litter layer is laid out by stick raking (wind rowing). This is then followed by re-planting.

Avoiding Soil Erosion in Southland

28. It is my opinion that the impact of plantation forestry has positive benefits for avoiding soil loss within the Southland region particularly in relation to

[1] https://mpi_nes.cloud.eaglegis.co.nz/NESPF/

significant weather events as the forest root system is binding the soils preventing soil loss, particularly on steep slopes. Following harvest the impact of those positive benefits reduce for a period and then return as the new growing forest becomes established.

29. It should not be assumed that erosion is inevitable post-harvest. The goal is to ensure an appropriate and practical land preparation technique is applied to avoid soil loss.

The learning from the 'Far North' of Northland

30. Soils in the far North are varied in type and quality. Some of the poorest heavy clays require deep ripping (to give drainage & aerate / breakup the soils) and have fertiliser applied to grow Pines.

31. Typically large dozers fitted with 1 or 2 rippers would rip to 60 cm in depth. Some tunnel erosion occurred and a survey I did over an area of moderate to steep rolling country indicated 19 degrees seemed to be the critical slope angle, beyond which scouring occurred.

32. To prevent both the tunnelling and achieve break-out of the soils in the ripped line the rippers were fitted with a large plate to provide sufficient upward force to achieve break-out of soil and discs were fitted following the ripper to pull the broken out soil back into the ripped line and leave a crowned surface that kept water from forming a drain along the rip line. To prevent scouring tractors were fitted with a simple angle indicator so drivers could keep the rip angle below 19 degrees.

33. That eliminated the potential for scouring of ripped & cultivated planting lines and became the standard ripping/cultivation technique over more than 5000 ha of forest establishment on clay soils.

34. On steeper slopes where ripping was required – for safety reasons the tractors ripped steeper than 19 degrees but the ripper was completely withdrawn after about 25 metres to leave a short uncultivated gap of a few metres before repeating the process as it travelled down the slope.

35. Again this procedure caused no issues of scouring although such slopes were of lesser frequency and size.

The Southland Experience

36. Eucalypts respond to good soils and site preparation and don't like wet feet.

37. For SWEL's forest establishment the Far North technique was brought to Southland to give adequate cultivation & drainage and provide a 'sure start' for what was a new forestry venture based on a short rotation fibre Eucalypt crop.

38. It has been my experience that using this technique has prevented any significant erosion from deep cultivation of planting lines over a wide range of topography across most properties SWEL has established in Southland / South Otago. Certainly, it is my experience that significant erosion from such cultivation has not occurred on forestry land managed by SWEL. That is primarily because we ensure that the use of mechanical tools is appropriate for the task and carefully managed to avoid or minimise any incidence of erosion. This outcome is assisted by the fact that soils present in Southland hills & plains where the plantation forestry is occurring are not prone to erosion.

39. SWEL has applied this cultivation over approximately 85% of its Eucalypt areas. It follows that its stump lines are not contoured parallel to the slope for reasons mentioned prior.

40. The purpose of this commentary about cultivation (i.e. ripping/discing) is that experience has shown that sediment movement can be controlled in forest cultivation above 20 degrees, and where ripping/discing lines are angled down across the slope (i.e. not contoured)

41. I consider that stick raking which is an above ground operation, is not considered to be cultivation (see cultivation definition) and is the main land preparation tool to clear land for replanting poses no reason to be restricted by slope limits. Further, it is essential to stick rake windrows in accordance with the direction of planted lines as illustrated in 34. above and not be restricted to contour.

Issues regarding proposed definition of cultivation

42. I am concerned that plantation forestry in Southland which is a land use with low impact and low frequency of soil disturbance is being held to a higher standard than is reasonably justified.

43. Southland is low risk (green/yellow zone) environment as defined by the NES-PF. The region is not prone to the effects of soil erosion, and therefore the impact of mechanical land preparation in the Southland region is significantly less than other parts of New Zealand.

44. I consider that a more appropriate option to achieve the objectives and policies of the SWLP is to better accept the good practice plantation forestry activities and exclude those good practice activities from the requirement for resource consents.

45. In this regard the NES-PF has undergone national debate and consideration by a wide audience including as I understand from councils.

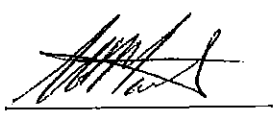
46. Above I set out my opinion as to why the stick raking for plantation forest is a low impact and low frequency activity. It is my view that stick raking and forming windrows running other than contour to the slope should not require a resource consent but would best be controlled by provisions of the NES – PF.

47. As I understand the currently proposed SWLP rule on cultivation would permit stick-raking but require contour windrows for slopes over 10 degrees.

48. In contrast, agriculture can proceed as permitted activity up to a 20 degree slope, and perpendicular to the contour without any express requirement for mitigation other than a setback distance from waterways.

49. SWEL is therefore seeking as its relief that mechanical land preparation for plantation forestry is governed exclusively through the NES-PF due to the low impact, low frequency and low risk characteristics of this activity in Southland. SWEL is proposing that stick raking is a permitted activity when it is undertaken in compliance with the NES rules and regulations.

DATED 25 November 2021



Graeme Manley

Appendix 5

Expert Conference – Forestry

Topic: Proposed Southland Water and Land Plan – Southland Regional Council

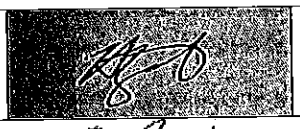
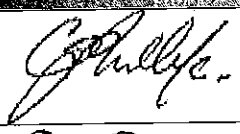
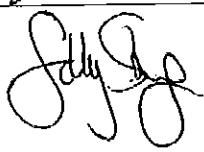
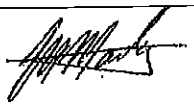
Date of conference: 29 November 2021

Venue: Remote AVL

Facilitator: Anne Leijnen

Recorder: Isabelle Harding

Attendees

Name	Employed or engaged by	Signature
Dr Greg Burrell	Southland Regional Council	
Hamish Fitzgerald	Rayonier NZ	
Dr Chris Phillips	Rayonier NZ	
Sally Strang	SWEL	
Graeme Manley	SWEL	

For ease of reference throughout this JWS, all experts had some relevant expertise in Forestry except the following:

1 Dr Burrell is an expert in freshwater ecology and water quality, including landuse impacts on freshwater ecosystems. He is not an expert in forest management or practice.

Environment Court Practice Note

2 All participants confirm that they have read the Environment Court Consolidated Practice Note 2014 and in particular Section 7 (Code of Conduct, Duty to the Court and Evidence of an expert witness) and Appendix 3 – Protocol for Expert Witness Conferences and agree to abide by it.

Experts' qualifications and experience

3 These are set out in each experts' statement of evidence.

Purpose of expert conference

4 The purpose of the conference is to assist the Court by responding to a series of questions, agreed by the experts as the conference progressed, relating to Forestry, and associated issues that the court may wish to consider when determining the appeals. For each question, the experts state matters on which they agree and on which they do not agree, with reasons.

Participants

5 This JWS is limited to those Forestry experts that have an interest and took part in the discussion.

Attachments to this JWS

6 List of questions for the Forestry experts

Conference outcomes

7 The Planning conference identified a number of technical questions to for the basis of the agenda for the Forestry experts. An outcome of this Forestry conference is the answering of these questions. These are attached.

Attachment: Questions to Forestry Experts:

Cultivation definition

1. ***What are the practical and operational implications associated with having to undertake windrowing parallel to contour when the slope is greater than 10 degrees[1]? In what situations may this be unsafe?***

   The key limitation is safety. To windrow across the slope requires a machine to drive across the slope which is more hazardous and unstable on steeper slopes.

   The slope, ground conditions, soil makeup and weather conditions all influence the maximum slope that a machine can operate on. Depending on variables, the slope a machine can operate on is generally between 10 and 15 degrees. On steeper slopes, the safe operating practice is to drive up and down the slope, which means the windrows form in that direction. In addition for some crops, the windrows must follow the direction of the stumps of the previous crop to allow planting to take place in the old crop lines.

Stick raking/windrowing

2. ***Is stick raking/windrowing any different in terms of risk of sediment loss to other cultivation or slopes above 20 degrees?***

   As a general principle, as slope increases, the potential for erosion increases. However, there are many factors that will contribute to how much erosion occurs and whether the eroded sediment reaches waterways. The risk of sediment run-off from stick racking is at the lower end of land preparation techniques. In comparison to agricultural cultivation and other forestry land management activities, stick raking is very low with regards to erosion risk. This reflects the low level of soil disturbance. In addition, stick raking occurs in a forestry cutover and the stabilising effects of the old stumps, roots and slash further reduce the potential for erosion and sediment loss.

   Cultivation is essentially disturbing and breaking up the soil profile, stick racking does not do this. Stick racking is not cultivation.

3. ***What are the risks from sediment runoff from stick raking? How significant are these risks compared to other forestry and cultivation activities?***
   Stick raking is a low-risk activity in terms of sediment run-off. In comparison to other plantation forestry activities (i.e earthworks, road construction, landing construction) it is low risk (See Question 8 below). In comparison to agricultural cultivation, stick raking is significantly lower risk.

4. ***What are the most effective measures to mitigate the risk of sediment runoff from stick raking?***

   The most effective mitigation measure is to not disturb the soil. Good practice ensures that not not all the branches are moved leaving a layer of fine material on the surface that helps to protect the soil from rain. This also acts as surface roughness elements to capture soil and material that may be moved by rain which forms barriers at the micro level. The preference where the slope permits is to put a windrow across the slope. If the slope is too steep to place windrows across the slope, you need to have a sediment barrier at the base of the slope, usually a windrow.

   Reference for compliance with NES-PF, subpart 7, mechanical land preparation, Regulation 74, subclause 2.

[1] As per paragraph c. in the definition of cultivation in Enviroment Southland's tracked change relief.

5. ***Are the NES-PF controls for mechanical land preparation (including stick raking) considered to be effective in reducing the risks from sediment runoff?***

Yes.

6. ***Are there circumstances in the Southland region that justify a more stringent approach than the NES-PF in relation to stick raking?***

No. Southland has some of the lowest risk geology in NZ. Based on MPI's analysis of the landcover database, 96% of Southland's forests are on land with an erosion susceptibility classification under the NES-PF of low or moderate erosion risk.

7. ***Will application of the control in the NES-PF result in a reduction in sediment loss during stick raking/windrowing relative to what would occur under controls in Rule 25?***

Expected to get the same result. The only difference would be the need to get a resource consent and the time and money involved in obtaining this. Following the NES-PF will produce the same result more efficiently.

Reference for compliance with NES-PF, subpart 7, mechanical land preparation, Regulation 74.

As a general comment it is desirable for the industry to maintain a consistent set of regulations via the NES-PF.

Critical source areas and setbacks[2]

8. ***What are the likely practical implications and costs associated with identifying 'critical source areas'***[3] ***within a plantation forest ()?***

The concept of critical source areas is associated with farming activities. It is not to date a concept that has been used in forestry.

In forestry we can define where the most important areas for sediment generation are, which are not landscape features, as indicated by the Southland Plan definition of critical source areas.

In plantation forestry, potential sediment generating areas are often unrelated to landscape features and are generally in the following order of risk:

- Construction of earthworks,
- Roads and landings,
- harvest tracks,
- haul paths,
- other areas of bare exposed soil,
- covered material/stick raked areas
- sprayed areas

These risks in plantation forestry are managed through the harvest and earthworks plan and the erosion and sediment control plan. Stick raking is managed through a work prescription which falls outside the NES.

9. ***How effective are the following measures likely to be in terms of mitigating the risks from erosion and sediment runoff:***

---

[2] Questions 6 to 8 relevant if Rule 25 applies to stick raking.

[3] As per definition of critical source areas in Environmental Southland's tracked change relief.

a. ***Establishing sediment detention when stick raking is undertaken in identified critical source areas[4]?***

The definition of critical source areas from the Plan appears to have been developed for farming. Stick raking will not be undertaken in the most significant sediment generating areas for forestry, as these are defined above (earthworks). Undertaking sediment controls in critical source areas as defined in the definition in the Plan will be ineffective because the most important areas to control in a plantation forestry setting are the roads, landings and earthworks.

b. ***Graduated setbacks for all water bodies based on slope[5]?***

The NES-PF has graduated setbacks based on the type and size of the waterway (Regulation 74 (8)). The distances are the same in the NES and the Plan but the Southland Plan setbacks are based on slope. With sediment capture by a buffer it is the outer part of the buffer that is the most crucial because that is where most of the trapping happens. There is little need for a graduated buffer in terms of slope for stick raking due to the low risk it poses with respect to sediment generation.

10. ***What are the likely practical and operational implications associated with:***

a. ***Establishing sediment detention when stick raking is undertaken in identified critical source areas?***

Refer above.

b. ***Graduated setbacks for all water bodies based on slope?***

Refer above.

<u>Herbicide spraying</u>

11. ***What are the risks from sediment runoff associated with herbicide spraying within a plantation forest? How significant are these risks compared to other cultivation activities that physically disturb the soil?***

Very low. The activity of herbicide spraying is physically not disturbing the soil at all, hence has a low risk of generating sediment. Following spraying, plant material remains intact and forms a mulch and continues to capture sediment alongside the remaining debris on the cutover.

12. ***What, if any, mitigation measures can be used to manage the risks of sediment runoff from herbicide spraying within a plantation forest?***

None.

<u>Critical source areas and setbacks[6]</u>

13. ***How effective are the following measures likely to be in terms of reducing the risks from erosion and sediment runoff:***

[4] As per Environmental Southland's tracked change relief for Rule 25.
[5] As per Environmental Southland's tracked change relief for Rule 25.
[6] Questions 11 and 12 relevant if amendments to the definition of cultivation not accepted.

a. ***Establishing sediment detention when herbicide spraying is undertaken in identified critical source areas within a plantation forest[7]?***

As noted in the answers to question 11 above, herbicide spraying presents a very low risk in terms of erosion, less so than stick raking. Therefore, the same answers as those given in response to question 9 and 10 apply.

b. ***Graduated setbacks for herbicide spraying within a plantation forest to all water bodies based on slope[8]?***

From a sediment discharge point of view, the level of risk from sediment discharge does not warrant additional setbacks based on slope. We understand there are rules in the Regional Plan governing aerial chemical application from point of view of protecting waterbodies.

14. What are the practical and operational implications associated with:

a. ***Establishing sediment detention when herbicide spraying is undertaken in critical source areas (as per Environmental Southland's tracked change relief for Rule 25)?***

As per question 8, the most significant source areas for sediment generation in forestry are earthworks, forestry roads and landings which is managed through erosion and sediment control plans (as required by the NES-PF).
By its nature, herbicide application makes no difference to the potential sediment delivery from earthworks. A requirement to establish sediment detention in critical source areas for herbicide spraying is unnecessary.

b. ***Graduated setbacks for herbicide spraying all water bodies based on slope (as per Environmental Southland's tracked change relief for Rule 25)?***

Answered in question 13 (b) above.

Supplementary question:

The question was raised, "what are the processes for documenting and checking compliance with the NES-PF rules for land prep?" It was confirmed that harvesting and earthwork plans, and associated erosion and sediment control plans are required under the NES-PF, must be available to the Council and can be monitored for compliance. These requirements do not apply to mechanical land prep due to the low-risk nature of that activity however there are regulations (Regulation 74) that cover these activities and the Council can monitor compliance.

[7] As per Environmental Southland's tracked change relief for Rule 25.
[8] As per Environmental Southland's tracked change relief for Rule 25.

Appendix C

Proposed Amendments to the Definition of Cultivation

Definition - Cultivation
Preparing land for growing pasture or a crop by mechanical tillage, direct drilling, herbicide spraying, or herbicide spraying followed by over-sowing for pasture or forage crops (colloquially referred to as 'spray and pray'), but excludes: excluding any
a. herbicide spraying undertaken solely for the control of pest plant species;
b. herbicide spraying for the establishment or maintenance of plantation forestry; and
c. stick raking or slash raking associated with a plantation forest.

Definition (new) – Stick raking
Stick raking or slash raking means the use of machinery to clear slash from harvested plantation forest to enable the replanting of trees. It does not include breaking up of the soil profile or the disturbance of the stumps of the harvested plantation forest trees.