7 October 2021

Joint submission on proposed changes to the intensive winter grazing regulations

This written submission is provided to Ministry for the Environment by Fish & Game New Zealand (referred to subsequently as **Fish and Game**), which is comprised of the 13 Fish and Game Councils, **Forest and Bird**, and the **Environmental Defence Society**.

Submitter Details

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Preliminary

1. This submission is structured in the following manner:

   a. A summary of the submission on intensive winter grazing and '*Managing intensive winter grazing: A discussion document on proposed changes to intensive winter grazing regulations'* (the discussion document);

   b. General submissions on intensive winter grazing,

   c. Specific responses to the seven consultation questions set out in the discussion document; and

   d. Two appendices, including suggested amendments to intensive winter grazing regulations in the Resource Management (National Environmental

Standards for Freshwater Regulations 2020 (NES-FW) and proposed amendments in the discussion document.

Summary

2. Intensive winter grazing poses high environmental risks to both water quality and soil health as well as risks to animal welfare. We continue to support the intent of the NES-FW to regulate poor practice intensive winter grazing. In the process, national environmental standards cannot permit an activity that has significant adverse effects on the environment.[1]

3. We support aspects of current default conditions for intensive winter grazing in the NES-FW and proposed amendments, including:

    a. Reg 26(4)(b): Slope – Amendment to measure the slope threshold as a *maximum allowable slope* instead of *mean slope across a paddock* (while keeping the existing threshold of 10 degrees slope); and

    b. New condition: Critical source areas – Inclusion of a new condition requiring that critical source areas must be protected from activities, including cultivation and grazing, that result in the exposure of bare soil and / or pugging of the soil at any time of the year.

4. We oppose aspects of current default conditions for intensive winter grazing in the NES-FW and proposed amendments, including:

    a. Reg 26(4): Pathway 1 – Suggested phasing out of the permitted activity pathway for intensive winter grazing based on default conditions (pathway 1) after certified freshwater plans are implemented; and

    b. Reg 26(4)(d): Setback – Amendment of the definition of 'drains' to exclude *sub-surface* drains but require management of sub-surface drains 'where known to exist' through critical source areas.

5. We submit that the NES-FW requires additional amendment, including:

    a. Reg 26(3): Pathway 2 – Permitted activity pathway based on a certified freshwater farm plan to avoid compliance with default conditions in Reg 26(4) should be struck out in its entirety; and

    b. Reg 27: Pathway 3 – Restricted discretionary activity status for the resource consent applications for intensive winter grazing should be amended to a non-complying activity; and

    c. Reg 26(4)(d): Setback – Minimum riparian buffer zones from waterbodies should be increased from 5m to 10m;

    d. Sub-surface drains – Discharges from sub-surface drains to surface water should be managed as point source discharges and meet receiving water quality standards; and

    e. Critical source areas:

[1] Resource Management Act 1991 – s 43A.

i. Critical source areas must be objectively determined by a digital elevation model and mapped, including buffer zones; and

ii. Activities in critical source areas, including cultivation and grazing, that result in the exposure of bare soil and / or pugging of the soil at any time of the year must be prohibited.

6. Some measure of accountability and sanction for poor regional council performance in monitoring and enforcing the NES-FW, including the intensive winter grazing regulations, is required.

7. Our proposed amendments to the NES-FW are shown as track changes in **Appendix 1**.

Support for increased regulation of intensive winter grazing

8. Research highlights that on-paddock grazing of livestock on forage crops over the autumn-winter-spring months is a high loss activity, which contributes a disproportionately large proportion of nutrient (nitrogen and phosphorus), faecal bacteria and sediment loss from the total farm system.[2] In addition to nutrient, faecal bacteria and sediment losses, significant structural damage to the soil can occur through pugging and structural compaction. The issue is significant because of the prevalence of the activity. For example, Environment Southland mapping conservatively identified 68,155ha of winter forage crop (excluding cereal crops) in Southland in 2014.[3]

9. Environmental risks are compounded by the fact that there is no 'ideal' soil type, physiographic zone and / or topography to intensively winter graze livestock on.

10. Nearly 30 years after the RMA was enacted, Governments of varying persuasions have not addressed the adverse effects of intensive winter grazing, notwithstanding deterioration and degradation of freshwater in catchments dominated by farming. Our experience is that the largely non-regulatory and educative approach taken by regional councils to intensive winter grazing has been unsuccessful and caused adverse effects on soils, landscapes, biodiversity, habitat, and water quality.

11. Resultantly, we see it as critical that there are consistent national level regulations that require regional councils to address the effects of intensive winter grazing.

Consultation questions – Section 5

Context for the proposed changes to the intensive winter grazing regulations

Question 1 - Do you agree with our framing of the issue? If not, why not?

12. We generally support the requirement for all farmers to hold a certified freshwater farm plan regardless of intensive winter grazing regulations, but it does not support:

[2] Monagahn, R. M. (October 2012). *The impacts of animal wintering on water and soil quality*, Ag Research – Client report number RE500/2012/029, Report prepared for Environment Southland.
[3] Pearson, L., Couldrey, M., and Rodway, W. (November 2016). *Spatial analysis of winter forage cropping in Southland and the implications for water quality management – Technical report*. SRC Publication No 2016-13.

a. The proposed phasing out of the permitted activity pathway based on default conditions (Pathway 1); or

b. The inclusion of a permitted activity pathway based on certified freshwater farm plans (Pathway 2); or

c. A restricted discretionary activity status for the resource consent pathway (Pathway 3).

These matters are discussed individually below.

Pathway 1 – Permitted activity with default conditions

13. We do not agree with MfE and MPI that freshwater farm plans are ultimately the best way to manage intensive winter grazing[4] nor does it support the associated proposal to phase out the permitted activity based on default conditions (Pathway 1) once certified freshwater farm plans are fully implemented. In response, we submit that:

a. It is unclear what, if any, evidence is relied upon by MfE and MPI to support the above statement, which appears to be untested assumption / conjecture.

b. Research looking at critical source area management during intensive winter grazing of dairy cows on forage crop in South Otago found that contaminant loss by overland flow and subsurface drainage could be reduced by approximately 80% for sediment and 60 – 70% for nutrients (N and P) by protecting critical source areas.[5]

c. However, there is no research that identifies alternate methods that would remediate contaminant losses once they become mobilised in a critical source area. Therefore, to imply there are other such pathways that will be identified through a farm plan is unrealistic at best.

d. A permitted activity pathway based on default conditions provides consistency in the approach to mitigating the adverse environmental effects of intensive winter grazing across the country. These nationally consistent requirements are long overdue and should not be phased out.

e. It is unclear what will be the environmental measure of 'successes' associated with implementation of freshwater farm plans to trigger phasing out of Pathway 1. The previous largely non-regulatory / educational approach to managing the adverse effects of winter grazing has been unsuccessful.

14. Our opposition to the phasing out of Pathway 1 is coloured by the reluctance of regional councils, particularly in the Otago and Southland regions, to regulate intensive winter grazing and monitor / enforce rules for the activity in their regional plans. Indeed, if regional councils were adequately managing intensive winter

[4] Ministry for the Environment and Ministry for Primary Industries. 2021. *Managing intensive winter grazing: A discussion document on proposed changes to intensive winter grazing regulations*. Wellington: Ministry for the Environment. P. 10.
[5] Monaghan, R., Laurenson, R., Dalley, D., and Orchiston, T. (2017). *Grazing strategies for reducing contaminant losses to water from forage crop fields grazed by cattle during winter*. New Zealand Journal of Agricultural Research, 60:3, 333-348.

grazing promulgation of an NES would not be necessary. Therefore, to subsequently rely on regional councils to monitor intensive winter grazing activities against thousands of 'bespoke' freshwater farm plans without clear and objective minimum standards is simply not realistic.

15. The proposal to phase out Pathway 1 also conflicts with the proposal to maintain Pathway 2. Under Pathway 2 the certified freshwater plan must demonstrate that any adverse effects of 'non-compliant' intensive winter grazing are no greater than those allowed for by the default conditions (Pathway 1). It is unclear how this process, including re-certification, would operate without reference to the default conditions.

Pathway 2 – Permitted activity based on certified freshwater farm plan

16. We submit that intensive winter grazing activities should not be permitted if a farmer obtains a certified freshwater farm plan providing that the adverse effects in relation to the activity are no greater than would be allowed for by the default conditions set out in the NES-FW (pathway 1) because:

    a. It is unclear how a certifier could demonstrate in a robust and transparent manner that this was the case in circumstances where:

        i. there is no model currently available that can estimate the magnitude of diffuse contaminant loss associated with intensive winter grazing (sediment, nutrients, and microbial); and

        ii. the Overseer model, which aims to estimate farm-scale nutrient flows (N and P), has well recognized limitations.[6] For example, Overseer cannot (and was never intended to) model losses of sediment and microbial contaminants or episodic events such as intermittent heavy rain nor can it estimate adverse effects on ecosystems, freshwater, and waterbodies. Episodic events are, however, critical drivers of nutrient, microbial and sediment losses from intensive winter grazing activities.

    b. Pathway 2 is dependent on a yet to be implemented and tested regulatory regime; and appears to be designed to avoid large numbers of resource consents for intensive winter grazing. This directly conflicts with MfE advice[7] that:

        i. the NES-FW establishes requirements for carrying out certain activities that pose risks to freshwater and freshwater ecosystems and anyone carrying out these activities will need to comply with the standards;

        ii. the standards are designed (amongst other things) to improve poor practice intensive winter grazing of forage crops; and

[6] Ministry for the Environment and Ministry for Primary Industries. July 2021. *Overseer whole model review – Assessment of the model approach*. Wellington: MPI Technical Paper no: 2021/12; and Parliamentary Commissioner for the Environment. 2018. *Overseer and regulatory oversight: Models, uncertainty and cleaning up our waterways*.

[7] MfE advice titled "What the Freshwater NES does" at https://environment.govt.nz/acts-and-regulations/regulations/national-environmental-standards-for-freshwater/ - accessed 2 October 2021.

iii. in many cases, people will need to apply for a resource consent from their regional council to continue carrying out regulated activities.

17. Pathway 2 carries significant risk, including:

a. Allowing poor intensive winter grazing practice, such as not excluding critical source areas from cultivation and grazing, to continue for longer than necessary with associated adverse effects on receiving environments;

b. Potential manipulation of the certification process, which is subjective, to avoid compliance with permitted activity default conditions (pathway 1) or the need to apply for a resource consent (pathway 3); and

c. No requirement to consider cumulative effects on the receiving environment, including those that are sensitive, vulnerable to degradation, or degraded from diffuse contaminant loss.

18. Pathway 2 is fundamentally flawed and should be struck out in its entirety.

Pathway 3 – Resource consent

19. We submit that where intensive winter grazing cannot meet permitted activity default conditions (Pathway 1) consent should be required by way of a non-complying activity.

A non-complying activity status is appropriate considering the potential risk and well documented environmental adverse effects of intensive winter grazing. Applicants for intensive winter grazing consents should be required to demonstrate under s 104D of the RMA that the adverse effects of the proposed activity on the environment are minor or that the activity is not contrary to the relevant plan objectives and policies.

Cultivation and grazing of critical source areas should, however, be a prohibited activity. The environmental rationale for this view is discussed in detail in this submission – see paragraphs 28(d) and 36-37.

Question 2 - What other information should we consider?

20. We submit that MfE and MPI should consider the legal and practical challenges of successfully implementing Pathway 2, which are untested.

21. There is no objective methodology or model available to estimate the loss of diffuse contaminant loss associated with intensive winter grazing. In addition, Pathway 2 fails key legal tests for a permitted activity because:

a. It does not include any clear and measurable standards, terms, or conditions to ensure any diffuse discharge from intensive winter grazing under a certified freshwater farm plan does not have a significant adverse environmental effect.

b. It is not readily comprehensible to a reasonably informed, but not expert, person.

c. It allows a certifier to decide by discretionary assessment whether intensive winter grazing in breach of default conditions is compliant or not.

Question 3 - Are there any other implementation issues with the current default conditions that have not been discussed above?

22. Yes. We are concerned that the current NES-FW contains a 'loophole' that is vulnerable to exploitation and is not addressed by the proposed amendments.

'Alternate' intensive winter grazing loophole

23. 'Alternate' intensive winter grazing activities, where livestock are grazed at a density that means pasture or other vegetative ground cover cannot be maintained, are not captured by the NES-FW. This is because the NES-FW defines intensive winter grazing in the following constrained way:

> *"**intensive winter grazing** means grazing livestock on an annual forage crop at any time in the period that begins on 1 May and ends with the close of 30 September of the same year."*

In turn, annual forage crop is defined as:

> *"**annual forage crop** means a crop, other than pasture, that is grazed in the place where it is grown."*

This means that the intensive winter grazing regulations in the NES-FW do not capture (regulate) wintering activities where livestock are grazed on pasture at a density that means pastoral cover cannot be maintained.

24. Further, there are no alternative rules in the NES-FW that address this 'alternate' intensive winter grazing. The 'feedlot' and 'stock holding areas other than feedlots' regulations in the NES-FW do not capture the activity because the applicable definitions of 'feedlot', 'stock holding area' and 'sacrifice paddock' mean they do not apply to the above scenario. Specifically:

a. The definition of a feedlot, which is restricted to cattle, is not applicable to intensive wintering grazing of livestock that involve in-situ pasture or an element of it.

b. The definition of stock holding area (including the examples set out) appears focused on enclosed areas with some form of base (either permeable or impermeable) that are used for feeding and / or loafing of cattle to avoid damage to pasture and soil structure when soils are saturated. 'Sacrifice paddock(s)', which would otherwise be captured are expressly excluded from the definition.

25. The following images graphically illustrate 'alternate' intensive winter grazing of dairy cows on pasture and supplementary feed (baleage) at a stocking density meaning pastoral cover could not be maintained. The diffuse contaminant loss (fine sediment, nutrients, and microbial contaminants) associated with this activity, particularly following episodic rainfall events, are likely to be very similar in nature to intensive winter grazing of an annual fodder crop, however, the activity is not regulated by the NES-FW. It is unclear whether this lack of regulatory control is an oversight or deliberate omission.

Figure 1 – Intensive winter grazing of dairy cows on pasture and baleage – Southland Region – June 2019.

Figure 2 – Intensive winter grazing of dairy cows on pasture and baleage – Southland Region – June 2019.

26. We submit that 'alternate' intensive winter grazing activities that involve feeding livestock pasture and / or supplementary feed (typically hay, straw, silage and baleage) at a stocking density that means pasture or other vegetative ground cover cannot be maintained should fall within the definition of intensive winter grazing and be regulated by the NES-FW. Failure to do so creates a loophole that is vulnerable to exploitation, promotion of poor practice, and adverse environmental effects.

Amendments to the default conditions

Question 4 - Do you think these proposed changes are the right way to manage intensive winter grazing? If not, why not?

27. We consider that nationally consistent regulation is the first step in managing intensive winter grazing of livestock. Proposed changes that are consistent with improving poor practice are supported. We do, however, remain concerned that the NES-FW contains provisions that are inconsistent with good practice and omissions that are vulnerable to exploitation. Matters that are supported and opposed by us are discussed separately below.

Proposed changes supported

28. We support in full or part the following proposed changes to the default conditions in Reg 26(4) of the NES-FW:

a. Slope – Support in full proposed amendment of Reg 26(4)(b) to measure the slope threshold as *maximum allowable slope* instead of *mean slope across a paddock,* whilst keeping the existing threshold of 10 degrees.

There is very little, if any, research demonstrating the efficacy of mitigations to reduce diffuse contaminant loss on sloping land beyond a maximum threshold of 10 degrees.[8] Further, MfE modelling demonstrates that sediment loss increases significantly when intensive winter grazing is undertaken on slopes higher than 10 degrees.

We submit that:

i. It should be made explicit to farmers that any part(s) of a paddock used for intensive winter grazing that exceeds the maximum threshold of 10 degrees slope must be protected (left uncultivated and ungrazed) to avoid de-vegetation and exposure of bare soil; and

ii. Application of a digital elevation model[9] to LiDAR (light detection and ranging) survey data should be required to objectively identify and map paddock slope for the purposes of Reg 26(4)(b) at fine scale resolution, including areas exceeding the maximum threshold of 10 degrees.

b. Pugging – Support in part proposed amendment of Reg 26(4)(c) so that farmers have to take all practicable steps to manage the effects of pugging associated with intensive winter grazing on freshwater.

We acknowledge that officials will develop advice on the management of pugging on freshwater. This is useful but does leave potential animal welfare issues associated with the spatial extent and depth of pugging unresolved.

Pugging and heavy treading damage reduces soil infiltration rates, resulting in more water moving across the soil via overland flow, which increases the loss

[8] See for example: Zhang, X., Liu, X., Zhang, M., Dahlgren, R., A. (2010). *A Review of Vegetated Buffers and a Meta-analysis of Their Mitigation Efficacy in reducing Nonpoint Source Pollution*. Journal of Environmental Quality.

[9] A Digital Elevation Model (DEM) is a representation of the bare topographic surface of the earth, excluding trees, buildings, and any other surface objects.

of sediment and nutrients. Accordingly, wesubmit that that the drafting of Reg 26(4)(c) should be clear and directive in intent and application, i.e., farmers must take all practicable steps to manage the effects of pugging associated with intensive winter grazing. The insertion of 'reasonably' as a precursor to 'practicable steps'' is unnecessary and Usage of the words 'reasonably practicable' as opposed to the use of the word 'practicable' does not compliment or add to the drafting of Reg 26(4)(c) and is inconsistent with the proposed drafting of Reg 26(4)(e), which requires farmers to resow 'as soon as practicable'.

The above support in part is conditional upon implementation of the proposed new critical source area condition.

c. Resow – Support in part proposed amendment of Reg 26(4)(e) to require farms to resow 'as soon as practicable' to minimise the amount of time that bare ground is exposed to the weather.

We submit that that the drafting of Reg 26(4)(e) should be directive in nature to minimise the amount of time that bare ground is exposed to the weather, i.e., farmers must take proactive steps to resow as soon as practicable.

The key point is that the adverse environmental effects of intensive winter grazing, particularly overland flow of contaminants (such as fine sediment), extends well beyond the period of grazing by stock and includes the period between cessation of grazing by stock and subsequent re-establishment of vegetation, which in some years can extend to late November / early December due to wet and saturated soil conditions. Re-sowing as soon as practicable must occur in combination with a suite of preceding mitigation options, including nil cultivation and grazing of critical source areas and riparian buffers to minimise run off from grazed paddocks. For this reason, the above support in part is conditional upon implementation of the proposed new critical source area condition.

d. New condition – Support in full proposed amendment of Reg 26(4) to require that critical source areas must be protected (uncultivated and ungrazed). Officials will develop guidance on how critical source areas will be identified and protected.

We submit:

i. Research looking at critical source area management during intensive winter grazing of dairy cows on forage crop in South Otago found that contaminant loss by overland flow and subsurface drainage could be reduced by approximately 80% for sediment and 60 – 70% for nutrients (N and P) by protecting critical source areas.[10]

ii. Defining areas that represent enriched sources of contaminants is central to isolating and then managing contaminant losses from a critical source area.

iii. Objective identification of critical source areas is key to the integrity of the proposed new condition that seeks to protect them from intensive

[10] Monaghan et al (2017)..

winter grazing activities. As such, it must require the use of topographic methods to objectively identify areas that represent a high risk to water quality from intensive winter grazing. LiDAR survey data enables fine-scale topographical information to identify objectively and robustly what constitutes a critical source area at a paddock scale. This information can then be mapped and overlaid on aerial photography / maps, identifying locations where cultivation and intensive winter grazing is prohibited, as well as the locations of appropriate vegetated buffers. The same system can also be used to identify gradient of paddock too. Once mapped, the information can be made available for farmers at a paddock scale, to inform their management.

Where Li-DAR is lacking a similar, albeit slightly less resolved, assessment can be undertaken utilising NASA's Shuttle Radar Topography which has national scale coverage. Significantly, the widely used River Environment Classification (REC), a landscape-based classification of surface waterways, does not identify ephemeral waterways nor associated drainage areas.

An example of how Li-DAR can be used to identify critical source areas to exclude these areas from intensive winter grazing has been provided to MfE on several occasions over the past two years, including by the Southland Advisory Group and Fish and Game. Attached as **Appendix 2** is a further copy of this example.

Proposed changes opposed

29. Setback - We oppose in part the proposed amendment of Reg 26(4)(d) so the definition of 'drains' excludes *sub-surface* drains and requires that subsurface drains (where known to exist) must be managed as critical source areas.

    a. We submit that the management of sub-surface drains underlying intensive winter grazing areas is fundamental to the integrity of the NES-FW for the following reasons:

        i. Artificial subsurface drainage, along with overland flow (surface runoff) and deep drainage (leaching) are the three main pathways for the transport of contaminants from land to water. Where artificial subsurface drainage systems exist, there is potential for contaminants to bypass the soil matrix allowing less time for absorption and retention of contaminants in the soil, especially nitrogen and phosphorus, sediment, and faecal organisms.[11]

        ii. Research shows that contaminant loss from agricultural systems increase when artificial subsurface drains are active, most significantly over the wetter months of autumn, winter, and early spring[12], which

[11] Houlbrooke, D. J., & Monaghan, R. M. (2009). *The influence of soil drainage characteristics on contaminant leakage risk associated with the land application of farm dairy effluent*. AgReserach report prepared for Environment Southland.
[12] Monaghan, R. (2014). *The influence of land use, soil properties and seasonal factors on contaminant accumulation and loss from farming systems to water*. AgReserach report No. RE500/2014/106, prepared for Environment Southland.

coincides with the seasonality of intensive winter grazing (May – September inclusive).

iii. A vast network of artificial subsurface drainage, typically tile drain, is found throughout the Otago and Southland Regions where intensive winter grazing is a prevalent activity. To provide context, research undertaken by Environment Southland provides that artificial subsurface drainage systems cover approximately three quarters of agricultural land in Southland, which overlaps reasonably well with historical mapping of wetland areas in Southland.[13]

30. We are concerned that the requirement to manage subsurface drains as critical source areas is limited to locations where they are 'known to exist'. If the intent of the NES-FW is to not allow any significant adverse effects on the environment, it must require farmers to take practicable steps to identify, locate and map subsurface drainage networks, including outfalls, before undertaking intensive winter grazing. Failure to do so risks rendering redundant the intent and application of the proposed amendment to Reg 26(4)(d).

31. It is unclear what evidence is relied upon to substantiate feedback reported in the discussion document that ". . . it is impractical to implement, monitor and enforce, because extensive networks exist of *sub-surface* drains that have not been mapped or cannot be practically mapped." The reality is that:

a. In most cases, sub-surface drainage outfalls to 'open' drainage channels and surface waterways, which require periodic maintenance, can be identified by visual inspection; and

b. Several GIS layers already exist that can be used to identify surface and subsurface drainage networks. For example:

i. Environment Southland has developed a surface and subsurface drainage GIS layer[14] - see pictorial example below; and

ii. Manaaki Whenua Landcare Research has developed a national GIS layer and map that predicts the current extent of artificially drained land (surface and sub-surface drainage) throughout New Zealand and recommended its use in national and regional modelling applications.[15]

We submit that guidance on the identification and mapping of subsurface drains must be developed if integrity is to be brought to the identification and management of sub-surface drains.

[13] Pearson, L. (September 2015). *Artificial subsurface drainage in Southland – Technical Report*. Environment Southland publication no 2015-xx.
[14] Pearson, L. (September 2015).
[15] Manderson, A., (September 2018). *Mapping the extent of artificial drainage in New Zealand*. Manaaki Whenua Landcare Research contract report (LC3223) for Lincoln Agritech.

Figure 3 – Lower Mataura River - Open ditch drainage network (yellow lines) with known tile (sub-surface) locations (red lines).[16]

32. Management of sub-surface drains as critical source areas (as proposed) is not the end of the matter. Most outfalls of sub-surface drains discharge either directly to surface water bodies or open drainage channels flowing into surface water bodies. Sub-surface drainage discharges to open drainage channels and surface water bodies should be treated as point source discharges and required to comply with measurable output-based or receiving environment standards.

Question 5 - Do you think these proposed changes would improve the workability of the permitted activity standards? If not, why not? (Please be specific about which provisions you are commenting on when you are responding.)

33. We acknowledge that the proposed changes have the potential to improve the 'workability' of the permitted activity standards. Changes to Reg 26(4)(c) - pugging, (d) – setback, (e) – resow and the new condition – critical source areas do, however, remain subject to officials developing guidance on interpretation, objective identification, and subsequent application of the proposed amendments. Simply put, the devil will be in the detail.

34. As discussed, the use of robust topographic and hydrological methods to objectively identify areas, including critical source areas, that represent a high risk to water quality from intensive winter grazing is essential. Narrative and / or discretionary assessments, including visual assessments of the landscape, are inherently problematic.

[16] Pearson, L. (September 2015).

Question 6 - Do you think these proposed changes would manage adverse environmental effects of intensive winter grazing effectively? If not, why not?

35. The proposed changes represent an improvement in managing the adverse environmental effects of intensive winter grazing. There are, however, additional matters requiring consideration if the NES-FW is to prevent significant adverse effects. These matters are discussed individually below.

Prohibited activity status for cultivation and grazing of critical source areas

36. Managing the loss of contaminants, including sediment, is most effective at the source, i.e., reduce loss from the landscape through good land surface protection. It is widely accepted that actions to avoid the entrainment of sediment and other contaminants in overland flow are likely to be more effective than efforts to remove contaminants once they are being transported in suspension or solution.

37. For this reason, the NES-FW should seek to expressly prohibit intensive winter grazing activities within critical source areas. Any loss of productivity associated with exclusion of critical source areas (typically a small part of the paddock) from cultivation and grazing is associated with significant reductions in fine sediment and nutrient loss associated with overland flow.[17] As identified earlier, there is no research that identifies alternate management approaches that remediate losses of contaminants from critical source areas, other than stock exclusion. For this reason, cultivation and grazing of critical source areas associated with intensive winter grazing should be a prohibited activity.

Width of riparian buffers

38. Reg 26(4)(d) requires that livestock must be kept at least 5m away from the bed of any river, lake, wetland or drain (regardless of whether there is any water in it at the time).

39. We are concerned that the drafting of Reg 26(4)(d) is inadequate for the following reasons:

a. It does not expressly provide that vegetated buffer adjoining any river, lake, wetland, or drain must be left uncultivated and ungrazed prior to stock exclusion; and

b. The 5m buffer appears to be justified by reference to sediment research without consideration of other contaminants (nutrients and microbial).

40. The effectiveness of vegetated buffers, including grass filter strips, to reduce contaminants has been widely studied. In this regard, we submit that an increase in the minimum required riparian buffers from 5m to 10m is justified by reference to the following:

[17] Monaghan et al (2017).

a. Research applying previous meta-analysis of contaminant removal efficiency[18] to assess the cost benefit of a national riparian restoration program in New Zealand found net positive benefits associated with buffer widths ranging from 5 – 50m.[19] It is clear from this research that a 10m riparian buffer increases mitigation effectiveness for nitrogen leaching, phosphorus loss and sediment, which are key diffuse contaminants associated with intensive winter grazing, compared to a 5m buffer.

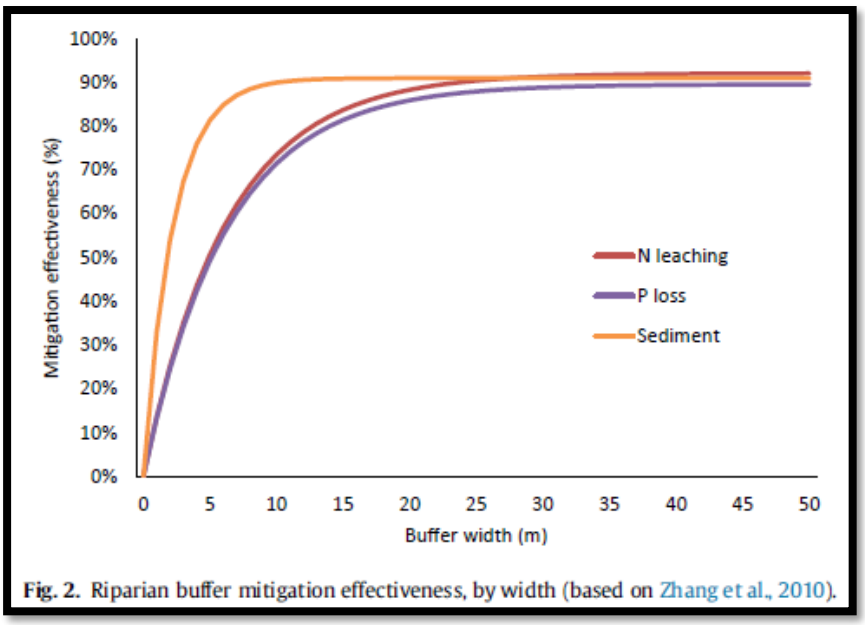

Figure 4 – Riparian buffer mitigation effectiveness by width for nitrogen leaching, phosphorus loss and sediment.[20]

b. Recent Manaaki Whenua Landcare Research provides a New Zealand centric review of relevant literature, including international perspectives.[21] In doing so, the authors identify a range of factors that influence the effectiveness of vegetated strips to reduce contaminant loss and go on to recommend <u>minimum</u> riparian set back of:

i. 10m for land with a slope less than 10 degrees to filter out more than 80% sediment and 70% of nutrients (N and P) in overland flow; and

ii. 20m for land steeper than 10 degrees slope.

The above 10m recommendation for land with a slope less than 10 degrees dovetails with the proposal to limit intensive winter grazing under Reg 26(4) to a maximum allowable slope of 10 degrees.

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[18] Zhang, X., Liu, X., Zhang, M., Dahlgren, R., A. (2010). *A Review of Vegetated Buffers and a Meta-analysis of Their Mitigation Efficacy in reducing Nonpoint Source Pollution*. Journal of Environmental Quality.

[19] Daigneault, A., Eppink, F., and Lee, W. *A national riparian restoration programme in New Zealand: Is it value for money?* Journal of Environmental Management 187 (2017) 166-177.

[20] Ibid.

[21] Fenemor, A., and Samarasinghe, O. (September 2020). *Riparian setback distances from waterbodies for high-risk land uses and activities*. Manaaki Whenua Landcare Research contract report (LC3832) for Tasman District Council.

Table 12. Riparian setback recommendations for six functional objectives

Riparian functional objective	Minimum setback recommendations	Applicability
Reduce nutrient and other contaminant inputs	10 m	For land with slope <10°. Aim is to filter out >80% sediment and pesticide, >70% nitrogen and phosphorus in overland flow, and remove c90% groundwater nitrate in fine shallow riparian sediments
	20 m	For steeper land than 10°

Table 1 – Riparian setback recommendations, including for reduction in nutrients, sediment, and pesticide.[22]

Additional intensive winter grazing mitigations

41. Without exception intensive winter grazing needs careful management to minimise risks to both water quality and soil health, as well as risks to animal welfare. There are a range of 'additional' intensive winter grazing mitigations that could and should be used by farmers. The majority of these could be uniformly applied. For example:

    a. Minimum or no tillage cultivation;

    b. Contour cultivation techniques;

    c. Strategic grazing practices, such as:

        i. progressively grazing downhill from the top of any slope to the bottom; and

        ii. progressively grazing toward any waterbody(ies) and / or critical source area(s) and adjacent vegetated buffers;

    d. Back-fencing of livestock to prevent them entering previously grazed areas;

    e. Usage of portable troughs to provide stock drinking water and avoid repetitive movement across grazed areas to access water;

    f. Providing loafing or run-off areas for livestock; and

    g. Constructed sediment capture structures, such as silt fences and bunds.

42. Comprehensive 'complimentary' guidance should be developed by officials to ensure that farmers are aware that the permitted activity default conditions are seen as the absolute 'minimum' required, rather than the standard to aim for. Simply put, more can be done and farmers undertaking intensive winter grazing should be actively encouraged to implement 'additional' mitigations.

43. Extreme weather events when undertaking intensive winter grazing should be expected and planned for. They should not provide an excuse for failure to comply with environmental standards. Climate change predictions indicate that there is likely to be an increased propensity in New Zealand for high intensity rainfall events,

[22] Ibid, p. 38.

particularly during the winter period, with potential for greater erosion and sediment loss. This means that intensive winter grazing management needs to be proactive, not reactive, in planning and implementation.

Erosion prone land

44. A major omission of the NES-FW is that it does not seek to restrict intensive winter grazing activities on friable / erosion prone land or require additional sediment mitigation (sediment traps, detention, and decanting bunds) on erosion prone land. Horticulture New Zealand guidance provides a starting point for consideration of good management practices to address erosion and sediment control for vegetable production with rainfall intensity and desired treatment efficiency to define the nature, size, and location of additional sediment mitigation.[23] Consideration needs to be given to developing a NES for soil, including its preservation and conservation.

Compliance monitoring and enforcement

45. Monitoring of compliance with intensive winter grazing requirements in the NES-FW, including randomised aerial surveys, and enforcement are critical if the benefits of regulating the activity are to be realised. This means regional councils throughout the country must have good insight into the prevalence and locations of intensive winter grazing in their region.

46. Regrettably, some regional councils where intensive winter grazing is prevalent have a 'mixed' track record of enforcing intensive winter grazing rules in their regional plans. For example, Environment Southland has in the past not undertaken any randomised aerial surveys and only responded to 'complaints' about intensive winter grazing breaches.

47. We continue to have concerns about the current divergence in approach taken by regional councils charged with monitoring and enforcing the NES-FW regarding intensive winter grazing. Some measure of accountability and sanction for poor regional council performance in monitoring and enforcing the NES-FW, including the intensive winter grazing regulations, is required. For example, the 'IWG follow up decision making tool' set out below, which is currently utilised by Environment Southland, shows that:

    a. The current focus is still very much on education and 'soft compliance'; and

    b. An infringement or prosecution response is contingent upon *"an active discharge at the time of inspection"*. This permissive approach is questionable given the nature of intensive winter grazing and the episodic diffuse contaminant loss associated with it.

[23] Horticulture New Zealand publication (June 2014) '*Erosion & Sediment Control Guidelines for Vegetable Production – Good Management Practices*', Version 1.1.

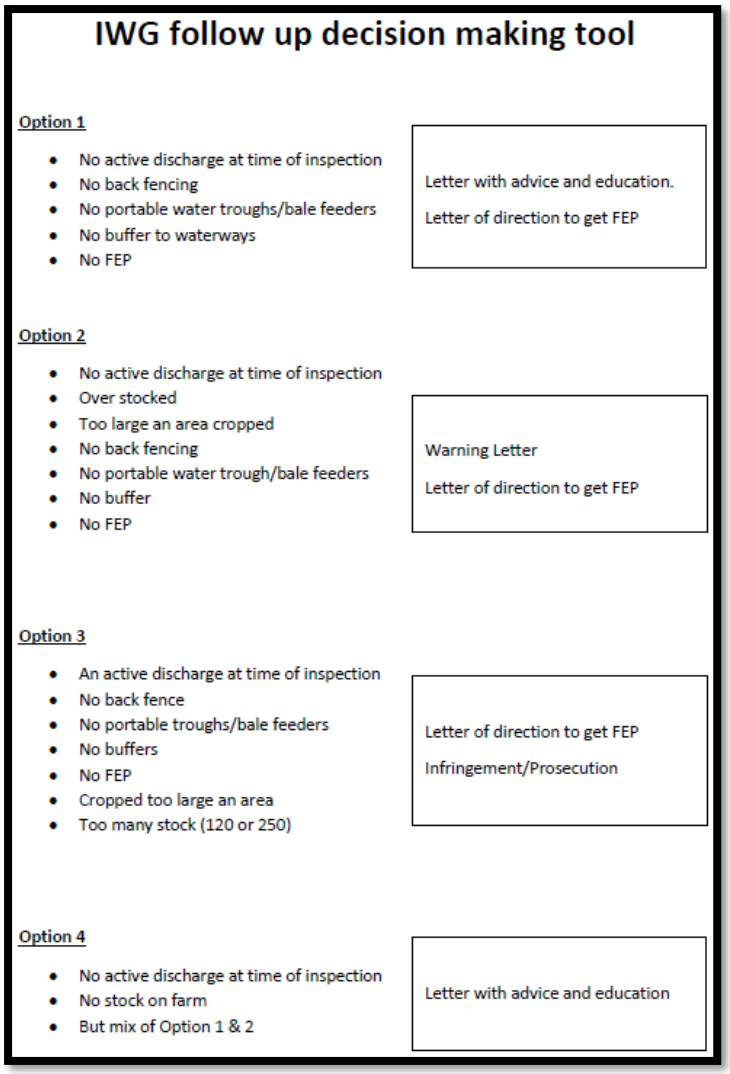

Figure 5 – Environment Southland 'IWG follow up decision making tool'.[24]

48. The development and implementation of an infringement system is required to give effect to the NES-FW.

Implementation timeframes

Question 7 - Do you have any comments on implementation timeframes and whether a further deferral would be necessary?

49. We do not support further deferral of the proposed implementation timeframes for intensive winter grazing in the NES-FW for the following reasons:

    a. The adverse effects of poor practice intensive winter grazing are well understood and have been much discussed. Many of the actions to mitigate the adverse environmental effects of intensive winter grazing are already known;

[24] Source: Environment Southland – Released under the Local Government Official Information and Meetings Act 1987.

b. There has been ample opportunity for the primary sector to improve intensive winter grazing practices, self-management has not worked; and

c. Previous deferral has already drawn out implementation of the intensive winter grazing provisions in the NES-FW by almost two years. Further delay will impede delivery of water quality improvements earlier, despite the ability to do so.

50. Non-regulatory measures, such as the use of the intensive winter grazing module and increased regional council monitoring of the activity, are complimentary measures, but are not substitutes for implementation and enforcement of the regulations.

About the submitters

Fish and Game

51. Fish and Game is the statutory manager for sports fish and game, with functions conveyed under the Conservation Act 1987. The organisation is an affiliation of 13 separate Fish and Game Councils – 12 regional Councils and one national Council. Together, these organisations represent roughly 140,000 anglers and hunters.

52. The sports fish and game resource managed by Fish and Game is defined and protected under the Conservation Act and the Wildlife Act 1953. The species within include introduced sports fish and a mix of native and introduced waterfowl and upland game.[25]

53. Fish and Game is entirely funded by licence holder fees and private contributions, meaning the delegated function of managing the species for the public good is funded entirely by the users. It is a democratic 'user pays, user says' organisation. Using this system, the organisation funds public good research to ensure fisheries and game populations are managed sustainably; undertakes compliance with the licencing system; and contributes to public planning processes.

54. In relation to planning, the Councils share a similar function to advocate on behalf of anglers and hunters and to advocate in the Councils' interest, including their interest in habitat. Overwhelmingly, the advocacy sought by anglers, hunters and their elected Council representatives has been to seek environmental protection and restoration of degraded ecosystems. This makes sense as anglers typically have a great deal of lived experience on water bodies and therefore are highly attuned to changes, which to date have overall been for the worse.

55. At the direction of its licence holders, Fish and Game has become one of the nation's best-known advocates for freshwater ecosystems.

56. To achieve this, Fish and Game staff includes planning and policy specialists. The local-facing structure of the organisation, combined with generally low turn-over rates and a focus on freshwater means that these staff are experts in freshwater policy and its implementation.

[25] Most New Zealanders refer to these species as 'game birds', distinguishing them from other types of game, such as pigs and deer. The Wildlife Act 1953 defines these birds simply as 'game' and this phrase is used in the context of this submission.

57. This submission has been developed using the combined expertise and experience of Fish and Game's planning and policy staff.

Forest and Bird

58. Forest & Bird is New Zealand's leading independent conservation organisation, which has played an important role in preserving New Zealand's environment and native species since 1923. The society is independently funded by private subscription, donations, and bequests with a mission to protect New Zealand's unique ecological values, flora and fauna, and natural habitat through the sustainable management of indigenous biodiversity, natural landscapes, rivers, lakes, and coastal environments. With branches throughout the country and a strong regional presence Forest & Bird is actively engaged in RMA planning processes at a local and national level with a key focus on improving freshwater habitats for indigenous species.

Environmental Defence Society

59. Environmental Defence Society is a not-for-profit, non-government national environmental organisation. It was established in 1971 with the objective of bringing together the disciplines of law, science, and planning in order to promote better environmental outcomes in resource management. EDS has had an extensive involvement in freshwater matters, having litigated since the early 1970s to both protect freshwater quality and support the promulgation of water conservation orders. EDS has also been a key player in policy reform relating to freshwater, initiating the Land and Water Forum and holding placements on subsequent groups.

Appendix 1 – Amendments to proposed nationally set standards for intensive winter grazing

Fish & Game submits that the nationally set standards for intensive winter grazing in the NES-FW should be re-drafted to provide as follows – amendments are set out in *underlined italic* font and deletions are set out in ~~strike through~~ font:

"**Part 1**

Preliminary provisions

3 Interpretation

In these regulations, unless the context otherwise requires,—

. . .

annual forage crop means a crop, other than pasture, that is grazed in the place where it is grown

. . .

critical source area[26] *means an area of land:*

a. where topography causes overland flow of water following rainfall events, particularly when soils are saturated, that are identified by applying a digital elevation model to regional LiDAR mapping and / or NASA Radar Topography; or

b. that is artificially drained by a subsurface drain.

. . .

[26] Until regional LiDAR mapping and / or NASA Radar Topography is available, i.e., in the short term, the definition of critical source areas could be based on the definition from the proposed Southland Water and Land Plan:

*"**Critical source area***

(a) a landscape feature like a gully, swale or a depression that accumulates runoff (sediment and nutrients) from adjacent flats and slopes, and delivers it to surface water bodies (including lakes, rivers, artificial watercourses and modified watercourses) or subsurface drainage systems; and

(b) areas which arise through land use activities and management approaches (including cultivation and winter grazing) which result in contaminants being discharged from the activity and being delivered to surface water bodies."

The above definition is not subject of appeals to the Environment Court.

In the medium – long term identification of critical source areas should be based on application of a digital elevation model as proposed above.

drain ~~has the meaning given by the National Planning Standards 2019~~ *means any artificial watercourse designed, constructed, or used for the drainage of surface water, but excludes subsurface drains and artificial watercourses used for the conveyance of water for electricity generation, irrigation, or water supply purposes*

. . .

intensive winter grazing means grazing livestock, typically on an annual forage crop, at any time between 1 May and 30 September inclusive of the same year *in a manner that results in the exposure of soil and / or pugging of the soil.*

. . .

pastoral land use has the meaning ~~given by~~ *as in* section 217B of the Act *(as set out in the box below)*

means the use of land for the grazing of livestock

. . .

subsurface drain *means a permeable subsurface conduit constructed for draining soil water moisture (for example, tile, mole, concrete and clay drains, wooden box drains and perforated and non-perforated drainage pipes), but excludes any on-site wastewater system*

supplements *mean any feed type provided to livestock in addition to pastoral land use (for example, grain, cereals, nuts, hay, straw, silage and baleage)*

. . .

Subpart 3 — Intensive winter grazing

26 Permitted activities

(1) The use of land on a farm for intensive winter grazing is a permitted activity if it complies with the applicable condition or conditions.

(2) The following discharge of a contaminant is a permitted activity if it complies with the applicable condition or conditions:

(a) the discharge is associated with the use of land on a farm for intensive winter grazing; and

(b) the discharge is into or onto land, including in circumstances that may result in the contaminant (or any other contaminant emanating as a result of natural processes from the contaminant) entering water.

Conditions

~~(3) The condition is that the intensive winter grazing must be undertaken in accordance with the farm's certified freshwater farm plan if—~~

~~(a) the farm has a certified freshwater farm plan that applies to the intensive~~

~~winter grazing; and~~

~~(b) a certifier has certified that the adverse effects (if any) allowed for by the plan in relation to the intensive winter grazing are no greater than those allowed for by the conditions in subclause (4).~~

(4) ~~In any other case,~~ the conditions are that,—

(a) at all times, the area of the farm that is used for intensive winter grazing must be no greater than 50 ha or 10% of the area of the farm, whichever is greater; and

(b) the ~~mean~~ *maximum allowable* slope of a paddock that is used for intensive winter grazing must be 10 degrees or less; and

(c) ~~on a paddock that is used for intensive winter grazing,—~~

~~(i) pugging at any one point must not be deeper than 20 cm, other than in an area that is within 10 m of an entrance gate or a fixed water trough; and~~

~~(ii) pugging of any depth must not cover more than 50% of the paddock; and~~

on a paddock that is used for intensive winter grazing all practicable steps must be taken to limit:

i. the depth of pugging; and

ii. the area of pugging.

(d) livestock must be kept at least ~~5~~ *10* m away from the bed of any river, lake, wetland, drain (regardless of whether there is any water in it at the time); and

(e) the land that is used for intensive winter grazing must be replanted as soon as practicable after livestock have grazed the land~~'s annual forage crop (but no later than 1 October of the same year)~~.

[New conditions for critical source areas and subsurface drains]

(f) on a paddock that is used for intensive winter grazing all the following must be identified and mapped:

i. Critical source areas; and

ii. Subsurface drains, including the location of outlets to any river, lake, wetland or drain (regardless of whether there is any water in it at the time); and

(g) on a paddock that is used for intensive winter grazing all identified critical source areas, buffers and land overlying subsurface drains must be:

i. left uncultivated, including a 5m buffer; and

ii. *livestock excluded from the uncultivated area of land and buffer*

to avoid the exposure of bare soil and / or pugging of the soil at any time of the year.

(5) But see regulation 29 (permitted activities and restricted discretionary activities: temporary further conditions).

Enforcement officer may require information

(6) A person undertaking a permitted activity under this regulation must provide any information reasonably required by a regional council enforcement officer for the purpose of monitoring compliance with the condition in subclause (4)(a), (d), or (e).

~~*Temporary extension for replanting on farms in Otago and Southland*~~

~~(7) If the farm is in the region of the Otago Regional Council or the Southland Regional Council, the latest date by which the land must be replanted under subclause (4)(e) is 1 November of the same year (rather than 1 October).~~

. . .

27 ~~Restricted discretionary~~ *Non-complying* activities

(1) The use of land on a farm for intensive winter grazing*, excluding cultivation of a critical source or livestock grazing of a critical source area,* is a ~~restricted discretionary~~ *non-complying* activity if the use does not comply with the applicable condition, or any of the applicable conditions, in regulation 26(3) or (4).

. . .

New regulation

X Prohibited activity

(1) The following activities on a paddock used for intensive winter grazing are a prohibited activity at any time of the year:

i the cultivation of a critical source area or buffer; or

ii livestock grazing of a critical source area or buffer

that results in the exposure of bare soil and / or pugging of the soil.

Appendix 2 – Application of Digital Elevation Models (DEM)

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31st July 2019

Application of Digital Elevation Models (DEM) to identify zones of critical contaminant transfer to waterways

Using simple topographic and hydrological methods it is possible to objectively identify and rank areas that represent a high risk to water quality from wintering. The following informal paper is in response to a request to provide a brief example of how Li-DAR could be used to identify 'critical transfer zones' (critical source areas) for the purpose of excluding these areas from intensive winter grazing. A similar, albeit slightly less resolved assessment than our example, can be undertaken utilising NASA's Shuttle Radar Topography DEM which has national scale coverage.

Li-DAR survey data, at a resolution of 1 m x 1 m, was used to objectively identify and rank areas of high risk of contaminant transfer across the entire Waituna Catchment, Southland as part of a project for Living Water (DOC-Fonterra Partnership) (Couldrey et al., 2018)[1]. Zones of highest risk of contaminant transfer are associated with ephemeral drainage pathways that are directly connected to waterways (Figures 1 and 2). When soils are saturated or rainfall intensity exceeds the infiltration capacity of the soil, ephemeral drainage pathways are activated. The episodic channelisation of overland flow via the ephemeral drainage network is the *key* mechanism by which nutrients, sediment, and microbes are transported directly to waterways. Identifying these 'critical transfer zones' and excluding them from wintering provides a topographically guided basis for mitigating runoff.

Leaving the transfer zone as a vegetated buffer aids in the reduction of contaminant export via physical filtering, the reduction of the velocity of runoff and as a result its capacity to transport contaminants. In Figure 3, buffer zones of 5, 10 and 30 m around the ephemeral drainage network (critical transfer zone) are provided as an example of how Li-DAR derived mapping can be used to objectively identify these high risk areas. Buffer widths can be further refined using soil hydrological properties and slope to allow a variable width buffer along the length of the critical transfer pathway. Importantly, the widely used River Environment Classification (REC), a landscape based classification of surface waterways, does not identify ephemeral waterways nor associated drainage areas.

For the Southland region, it would take approximately 6 months to map all critical transfer zones and rank them in terms of risk using a combination of NASA Radar Topography and existing Li-DAR

[1] The outputs of Couldrey et al. (2018) have been incorporated into Fonterra's Tiaki Farm Environment Plans for the catchment.

coverage. Scaling this work nationally would require additional time but could be undertaken in collaboration with other specialists.

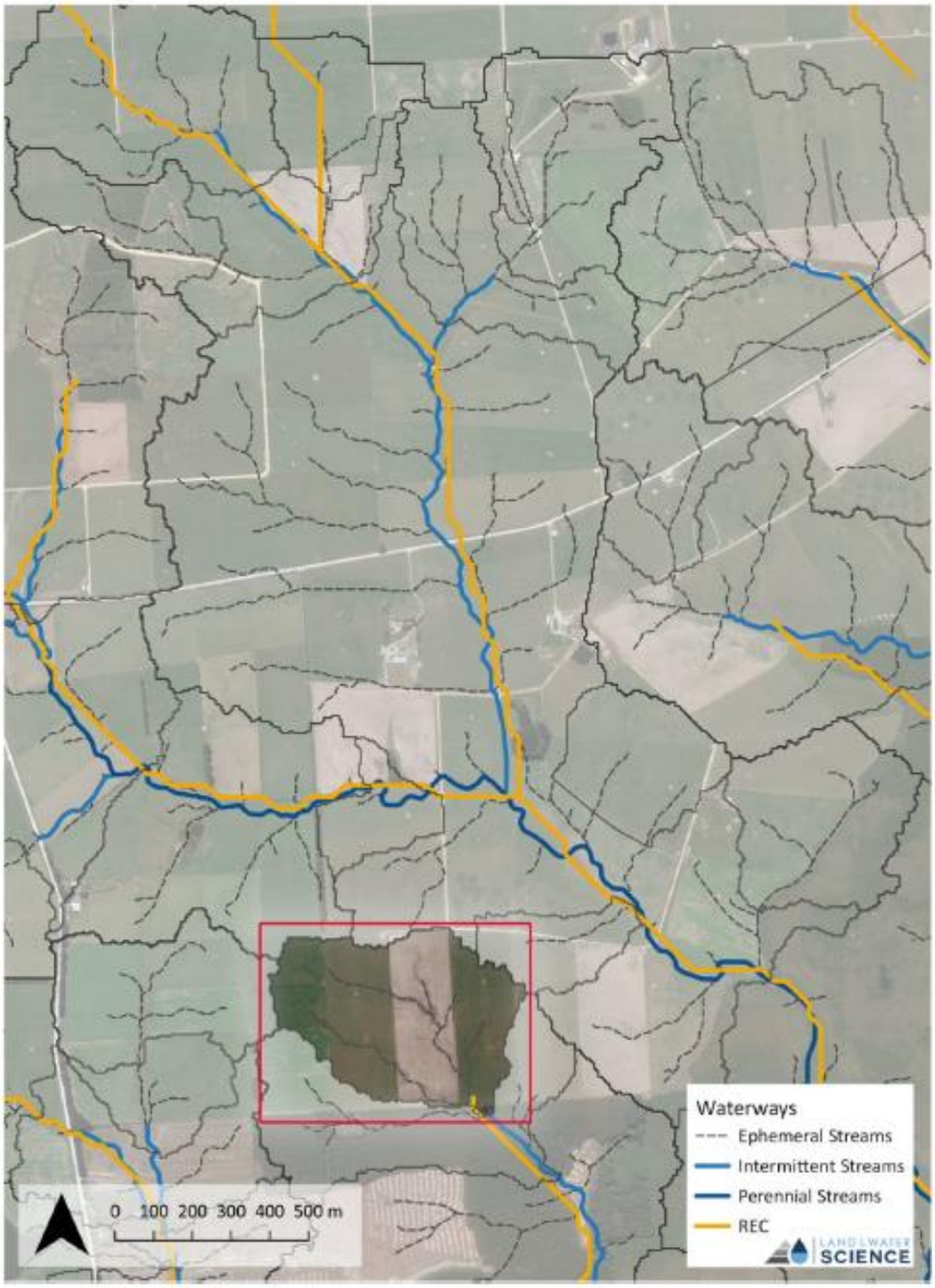

Figure 1: Drainage shed (unshaded = 22.5 Ha), associated ephemeral drainage network (dashed black lines) and their connection to the intermittent and perennial stream network. The drainage shed includes an area of winter grazing that drains directly to the surface water network. The waterways are derived from LiDAR, where REC is the national River Environment Classification for comparison.

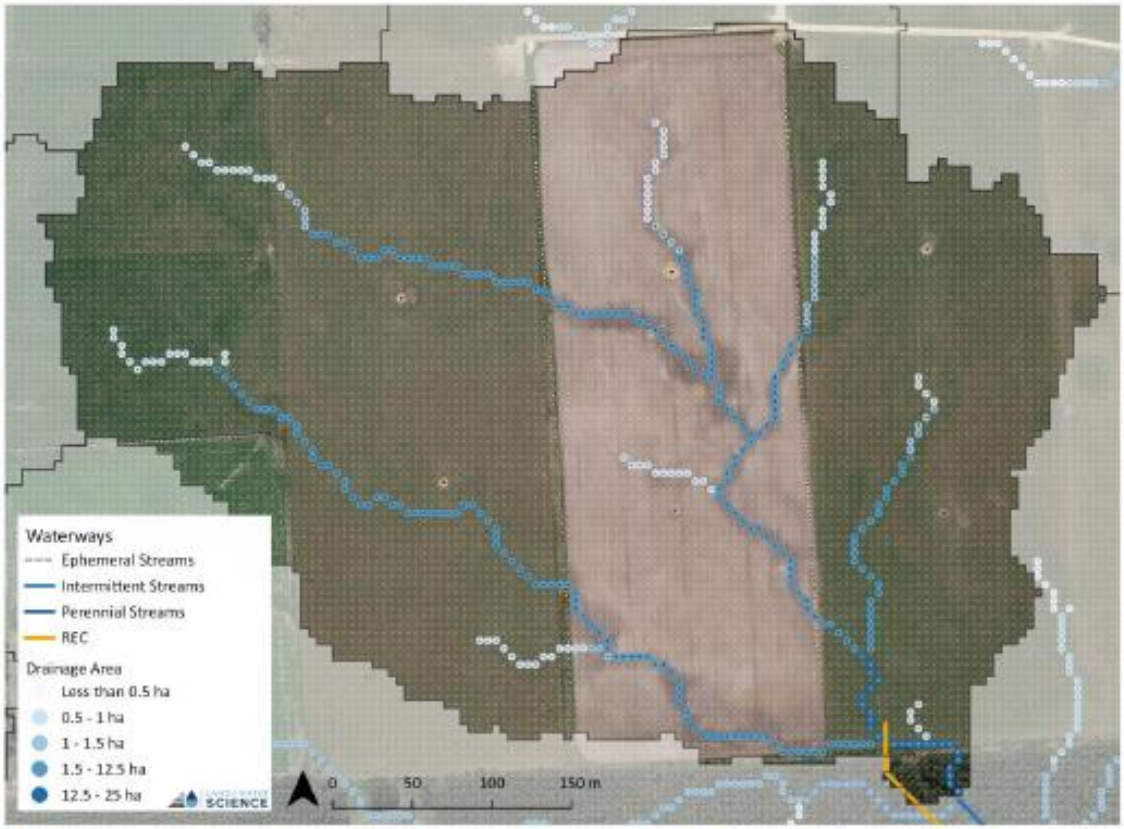

Figure 2. Close up of ephemeral drainage pathways and associated drainage area (unshaded) and their connection to the stream network. Note the area of winter grazing (bare ground) directly within the ephemeral drainage network. Small arrows (1 m^2) depict drainage water flow direction and coloured circles denote flow accumulation, which increases down gradient towards the intersection with the intermittent and perennial stream network.

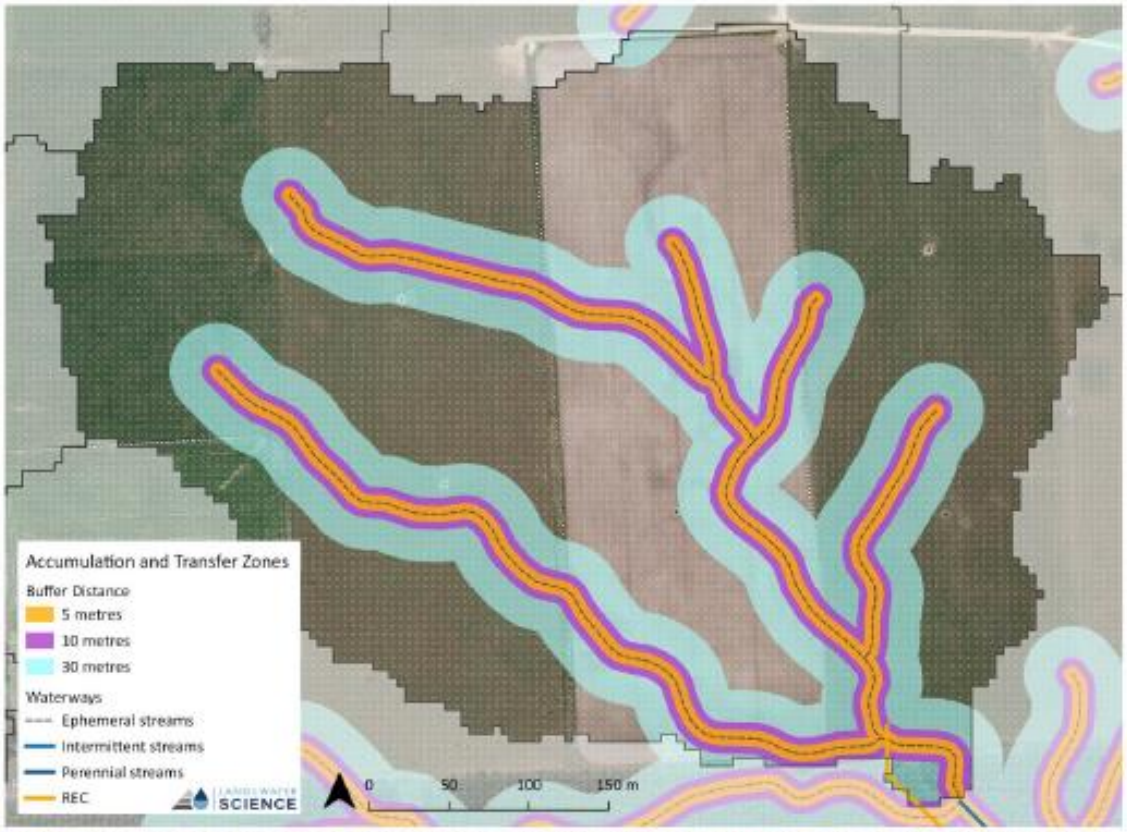

Figure 3. Five, ten and thirty meter buffers around the ephemeral stream network that act as critical transfer zones to surface waters. Excluding wintering from within these transfer zones is highly likely to reduce losses to waterways. Buffer widths can be refined according to local soil and topographic properties.

Identification of critical transfer zones and their associated risk profile can also be used to support other mitigation efforts on farm, such as the placement and scaling of peak runoff control structures (detainment structures) within the catchment.

Sincerely,

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Reference

Couldrey, M., Pearson, L., Rissmann, C., and Newe, H. (2018). Peak runoff control for farm contaminant retention in the Waituna Catchment. Land and Water Science Report 2018/12. 53p.