Control intensive winter grazing

Self-managing intensive winter grazing has not worked – more stringent rules are urgently required to improve water quality!

Our NPS-FM position in a nutshell

Intensive winter grazing is an extremely high-risk farming activity because it is a high loss activity that occurs during a time of the year with a high risk of contaminant loss.

Intensive winter grazing contributes a disproportionately large proportion of nutrient (nitrogen and phosphorus), faecal and sediment loss from the total farm system.[1] Significant damage to soil health can occur during this time through exposure of bare soil, pugging, and structural compaction. Intensive winter grazing poses high environmental risk to water quality and soil health, as well as risks to animal welfare[2]. The risk associated with intensive winter grazing are significant because of how commonly this activity is now practiced throughout Aotearoa New Zealand.

The intensive winter grazing standards[3] in the Resource Management (National Environmental Standards for Freshwater Management) Regulations 2020 (NES-F) are a minimum requirement. You will need to determine whether more stringent standards in your regional plan are required to achieve the community's long-term visions[4] and environmental outcomes.

Greater controls on intensive winter grazing in your region, including wider setbacks from riparian margins, exclusion of critical source areas, slope thresholds, area limitations, and stricter limits on how this activity is practiced, are key methods that could help you achieve your target attribute states under the NPS-FM.

Intensive winter grazing is not a critical part of a farm system - there are many examples of farmers designing farming systems that do not rely on intensive winter grazing. This has resulted in benefits for freshwater quality, the land, people, and the welfare of animals, without loss of profitability.

The NPS-FM directive

The NPS-FM requires you to identify attributes and set target attribute states (TASs) that will meet the community's environmental outcomes, values, and long-term vision for freshwater management units (FMU). To help achieve TASs and ultimately the long-term vision, you must control intensive winter grazing. Control intensive winter grazing by setting limits when you develop your regional plan. For example, you should prohibit intensive winter grazing near critical source areas.

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[1] 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

[2] 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*

[3] Link to: Subpart 3 – Intensive winter grazing in the NES-FM

[4] Link to: Long-term visions PN

The NES-F includes standards that seek to address some of the risks of intensive winter grazing in Part 2, subpart 3 – Intensive winter grazing. These standards must be met for the intensive winter grazing activity to be a permitted activity, practiced without a resource consent. These include standards on slope thresholds[5], limits on the total area that can be put into winter grazing[6], keeping stock at least five metres away from water bodies[7], and critical source area restrictions.

The NES-F expressly states a regional rule may be more stringent than these regulations[8]. You must justify why a proposed rule needs to be more stringent in the context of your region through your section 32 evaluation[9].

The NPS-FM objective states that you must ensure that resources are managed in a way that prioritises the health and well-being of water bodies and freshwater ecosystems[10]. More stringent rules than the NES-F are likely needed to achieve your target attribute states, realise the community's long-term vision, and meet the objective of the NPS-FM.

The best information available (see our practice note on this[11]) should be used to justify why more stringent rules are required in your regional plan. There is clear evidence than intensive agricultural activities, including intensive winter grazing, are a high risk to freshwater ecosystem health[12].

What do we want to see?

We want to see rules controlling intensive winter grazing, that are more stringent than the minimum standards in the NES-F. More stringent rules will be needed to assist you to meet the target attribute states that you set for your FMUs to meet the freshwater long-term vision and environmental outcomes established by the community.

Intensive winter grazing activities should be non-complying activities if they cannot meet the permitted activity default conditions[13], rather than	There is well documented evidence that intensive winter grazing is a high-risk activity and can have adverse effects on the environment and water bodies[15]. During winter, there is high rainfall and limited plant vegetation that will grow and take up nutrients or trap sediment. This leads to an extremely high risk that nitrogen will be leached to

[5] Link to: Regulation 26(4)(b) – Intensive winter grazing in the NES-FM

[6] Link to: Regulation 26(4)(a) – Intensive winter grazing in the NES-F

[7] Link to: Regulation 26(4)(c) – Intensive winter grazing in the NES-F

[8] Link to: Regulation 6 of the NES-F

[9] Link to: Section 32(4) of the RMA

[10] Link to: Clause 2.1 Objective of the NPS-FM

[11] Link to: Best information available PN

[12] 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

[13] Link to: Regulation 27 of the Intensive winter grazing in the NES-F

[15] 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

restricted discretionary[14].	groundwater and sediment and faecal matter will be collected by surface water and discharged to water bodies. Applicants that seek discharge consents for intensive winter grazing should be required to demonstrate under s.104D of the RMA (non-complying activities) that the adverse effects of the proposed activity on the environment are minor or that it is not contrary to the relevant plan objectives and policies.
Certified freshwater farm plans (FWFP) should not be used as an alternative to the resource consent process.	There is uncertainty around how FWFPs would effectively show that environmental effects are consistent with the conditions in the NES-F in a robust and transparent manner. This is because there is currently no model available to estimate the magnitude of diffused contaminant loss by intensive winter grazing (sediment, nutrient, or microbial). Your regional plans should have rules that require resource consent applications from those who seek to undertake intensive winter grazing that would not meet the default conditions in the NES-F.
All riparian buffer zones should be vegetated and have a minimum setback of 10 meters from water bodies (including drains), rather than 5 metres.	There is a well-documented link between vegetated riparian margins on slopes less than 10 degrees and the health of freshwater ecosystems including evidence that, generally, the wider the setback the greater the level of protection for the water body. With higher risk activities such as intensive winter grazing, greater precaution should be taken by requiring wider riparian buffers to protect water bodies. Research which assessed the cost/benefit of a national riparian restoration program in New Zealand found net positive benefits associated with buffer widths ranging from 5 – 50m[16]. Rivers, streams, and drains should have a minimum setback of 10 metres where the slope of the land is less than 10 degrees. This has potential to filter out more than 80 percent of sediment and 70 percent of nutrients (nitrogen and phosphorous) in overland flow[17]. 20 metres should be a minimum buffer for land steeper than 10 degrees in slope and more sensitive receiving environments such as wetlands and lakes should have at least 20 – 30 metre setbacks[18].

[14] Link to: Regulation 27 of the Intensive winter grazing in the NES-F

[16] 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

[17] 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

[18] Link to: Riparian margins and stock exclusion PN

Activities that expose or damage the soil in critical source areas should be prohibited.

Activities in critical source areas that would expose bare soil, such as intensive winter grazing and cultivation, or pugging[19] soil, should be prohibited at all times of the year. Pugging and heavy treading damage reduces soil infiltration rates, resulting in more water moving across the soil via overland flow, which increases the loss of sediment and nutrients.

Research shows that protecting critical source areas during intensive winter grazing of dairy cows on forage crop in South Otago reduced contaminant loss by overland flow and subsurface drainage by approximately 80% for sediment and 60 – 70% for nutrients (N and P)[20].

This highlights the importance of identifying and managing critical source areas in your regional plans, including directing all practical steps to be taken to manage pugging.

Avoid intensive winter grazing where there are sub-surface drains.

Artificial subsurface drainage (such as tile drainage) is one of three main pathways (along with surface runoff and leaching) that transport contaminants from land to water. There is potential, via artificial subsurface drainage, for contaminants to bypass the soil matrix – resulting in less time for contaminants to be held and absorbed in the soil, especially nitrogen and phosphorus, sediment, and faecal organisms[21]. Discharges to surface water from sub-surface drains below areas of intensive winter grazing are essentially point source discharges of contaminants direct from intensive winter grazing.

You must provide guidance and require applicants to take all practicable steps to identify, locate and map subsurface drainage networks, including outfalls, and then avoid them before undertaking intensive winter grazing.

You should also ensure that sub-surface drainage discharges to open drainage channels and surface water bodies are treated as point source discharges and are required to comply with measurable output-based or receiving environment standards.

Prohibit intensive winter grazing on slopes greater than 10 degrees

There is very little, if any, research demonstrating the efficacy of mitigations to reduce contaminant loss, including sediment loss on slopes beyond a maximum threshold of 10 degrees[22].

[19] Link to: Pugging (definition) in the NES-F.

[20] 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.

[21] 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.

[22] 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.

Modelling undertaken by Ministry for the Environment demonstrates that sediment loss increases markedly when intensive winter grazing is undertaken on sloping land exceeding 10 degrees[23].

How should the NPS-FM be implemented?

Use digital data and models to map and avoid high risk areas.

Your regional plans should identify critical source areas using a digital elevation model[24] and map them along with vegetated riparian buffer zones.

LiDAR (light detection and ranging) 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.

LiDAR survey data should also be used to map paddock slope for the purposes of Reg 26(4)(b) at fine scale resolution, including areas exceeding the maximum threshold of 10 degrees. Once mapped, the information can be made available for farmers at a paddock scale, to inform their management.

Where Li-DAR is not available NASA's Shuttle Radar Topography has national scale coverage and can be used to make an assessment at a less refined scale than LiDAR. The national River Environment Classification (REC), a landscape-based classification of surface waterways, does not identify ephemeral waterways nor associated drainage areas and so is not suitable for identifying critical source 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 included below as an example.

Several GIS layers already exist that can be used to identify surface and subsurface drainage networks. For example, 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 we recommend that it is used in national and regional modelling applications[25].

Expect extreme weather events and plan for them

Plan for and expect more extreme weather events when managing intensive winter grazing activities. Climate change models predict more frequent and extreme weather events are likely to occur including an increased likelihood of high intensity rainfall events, particularly during the

[23] 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.

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

[25] Manderson, A., (September 2018). *Mapping the extent of artificial drainage in New Zealand*. Manaaki Whenua Landcare Research contract report (LC3223) for Lincoln Agritech.

winter period. This has the potential to cause greater erosion and sediment loss. Extreme weather events should not be an excuse for failure to comply with environmental standards. Climatic changes need to be planned for and mitigations implemented (or effects avoided) in a proactive way.

Locate intensive winter grazing activities in your region

To effectively monitor the compliance of intensive winter grazing, you need to know where this activity is occurring. You should include randomised aerial surveys and not rely on 'complaints' about intensive winter grazing breaches, before taking action to enforce the standards set in your regional plan. Drones are a great (and affordable) tool to help with this sort of monitoring[26].

Consider and encourage alternative farming practices to intensive winter grazing

Intensive winter grazing has seen a shift in scale from primarily sheep farming – in traditionally isolated locations of Southland and Otago – to being a farming practice used extensively across Aotearoa New Zealand, including for the dairy expansion from the 1990s onwards. This has contributed to an entrenched cultural idea that intensive winter grazing is a critical part of the farming system, despite this being untrue. Wide-scale intensive winter grazing is a recent introduction to our farming systems and isn't critical to a farm system.

There is an opportunity for councils to encourage questioning of whether intensive winter grazing is an inevitable part of farming and encourage alternative ways of feeding animals that can provide improved conditions for the welfare of animals, employees, the land/ soil, and water quality in the region. There is potential for new practices to also be incorporated into farming systems with a lower environmental footprint if they are incentivised or directed.

How we know the NPS-FM is being achieved

More stringent rules for intensive winter grazing than those identified in the NES-F will be included in your regional plan. Appropriate monitoring and enforcement will accompany those provisions. Farmers will be encouraged to move away from using intensive winter grazing on their farm. These methods will contribute to the target attribute states that have been set to meet the community's freshwater long-term visions and environmental outcomes.

[26] You will have to comply with Civil Aviation law and have appropriate permissions to fly over private land, etc. if that is part of your monitoring program.

Implementation Toolbox

The toolbox will continue to be developed as new information becomes available:

Tools:	are helpful diagrams, processes, or ways to support how you should implement the NPS-FM.
Examples:	provide text suggestions to help draft objectives (values and environmental outcomes), policies, and rules (limits) in your regional plans, including how monitoring could be achieved. It includes examples of how attributes and base line states, target attribute states, environmental flows and levels, and other criteria, where appropriate, can be written or presented to help achieve environmental outcomes.
Case studies:	illustrate where the NPS-FM has been well applied (or not) throughout the country and provides national or international lessons to help implement the NPS-FM.
Evidence:	provides relevant case law to support how the NPS-FM must be applied.
Resources:	provide links to supporting literature and best information available to implement the NPS-FM.

Tools

[When available]

Examples

Application of Digital Elevation Models (DEM) – Attached.

Case studies

Kepler Farm has phased out intensive winter grazing[27]

"*I don't think anyone here would go back to winter cropping*".

Kepler Farm in the Te Anau basin no longer include winter cropping in their farming practice. To achieve this shift, changes were made to stock ratios and the systems used to feed animals. Kepler Farm went from 80 percent sheep to 50 percent sheep and 50 percent cattle. Feed systems were adjusted to use a long-grass (deferred grazing) system where animals eat pasture all year round. As a result of deferred grazing, the farm no longer needs to grow crops for winter feed, which has eliminated the use of pesticides.

Removing intensive winter grazing from the farming practice has not impacted the productivity or income of Kepler Farm. In addition, animal health and the natural environment has improved along with staff work conditions. Employees of Kepler Farm used to operate seven days a week, with staff rostered on for 30 hours. However, since implementing the changes, only one employee is required to check everything is functioning appropriately, which takes 3 hours per week.

Although the new Kepler Farm systems are working well, it is acknowledged that each farming system is unique and the methods employed on that farm may not be viable elsewhere. However, other alternatives to intensive winter grazing activities are being explored in different locations and across various farm systems. For example, in the Waitepeka area (near Balclutha), a dairy support business manager for Pāmu is moving out of winter cropping and into barns, providing shelter and feed for cows during the winter.

Regional council should encourage farmers to investigate and implement alternative practices to intensive winter grazing using best practices and ongoing monitoring to measure how effective a new farm system is. These alternative practices have the potential to bring about environmental, economic and social benefits when implemented correctly.

Evidence

[When available]

Resources

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.

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.

Forest & Bird. (Spring 2021). Future of Farming: Changing farmscapes. No. 381. Pg. 24 - 25. Source: https://issuu.com/forestandbird/docs/f_b_magazine_381_spring_2021

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.

Manderson, A., (September 2018). *Mapping the extent of artificial drainage in New Zealand*. Manaaki Whenua Landcare Research contract report (LC3223) for Lincoln Agritech.

[27] Forest & Bird. (Spring 2021). Future of Farming: Changing farmscapes. No. 381. Pg. 24 - 25. Source: https://issuu.com/forestandbird/docs/f_b_magazine_381_spring_2021

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*.

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.

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.

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.

Fish & Game, Forest & Bird and Choose Clean Water have written this practice note to communicate their expectation on how regional councils should implement the National Policy Statement for Freshwater Management 2020 (NPS-FM) into their regional plans. This is one in a series of practice notes which have been prepared on various topics relating to NPS-FM implementation.