

Intensive Winter Grazing – Paddock Selection

Standard Operating Procedure

Purpose

To manage the risk of environmental damage from Intensive Winter Grazing activities, as defined by the Resource Management National Environmental Standards for Freshwater Regulations 2020 (NES).

To minimise damage to sidlings; assist with retaining soil in its current location within the paddock; minimise loss of contaminants to ephemeral flow paths (EFP) and other waterways; and provide an auditable document for annual compliance. Even in a well-managed winter grazing programme there is always some risk of impacts on sidlings and ephemeral flow paths (EFP).

Scope

This process is recommended by Perrin Ag for all farmers undertaking fodder crop activities, where grazing occurs between 1 May and 30 September in any given year. It is required from the current planting season (spring 2022) until further notice.

This SOP aligns with NES Freshwater, in particular with sub clause (26) (4):

- (26) (4) (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;
- (26) (4) (b) the **max slope of a paddock** that is used for intensive winter grazing must be **10 degrees or less**; and
- (26) (4) (c) on a paddock that is used for intensive winter grazing:
 - (i) pugging at any one point must not be deeper than 20 cm; and
 - (ii) pugging of any depth must not cover more than 50% of the paddock; and
- (26) (4) (d) livestock must be kept at least 5 m away from the bed of any river, lake, wetland, or drain (regardless of whether there is any water in it at the time); and
- (26) (4) (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. Companion planting is deemed to be 'replanted'

Cropping sown by any means is covered by this SOP:

- Cultivation (full cultivation, minimum till, direct drilling)
- Non-tillage ground sowing
- Heli-cropping*

* Ballance Agri Nutrients has a good guide to heli-cropping – <https://ballance.co.nz/helicropping>

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Procedure

1. Pre planting

- 1.1. Pre-planting make a decision on whether you are able to crop only land with a max paddock slope of 10 degrees or less.
- 1.2. This is one of the rules for permitted activity for intensive winter grazing. If this is not possible, or desirable your winter crop for this season will automatically become a **restricted discretionary** activity and require a consent or a certified farm plan where consideration will have to be given to all aspects of any adverse effects on receiving water and anyone associated with it. Mitigations or remedies to reduce the loss of contaminants to water may be considered.

2. Confirmation

- 2.1. Confirm your maximum winter cropping area for any period from 1 July 2014 to 30 June 2019, this is the reference period for the NES Freshwater as defined in the interpretations (page 8 of the NES). This is the maximum area available for winter cropping going forward.
- 2.2. This must not exceed 50 ha in total or 10% of the farm area, whichever is greater. (It is understood B+LNZ have had discussions with MfE to clarify this clause. It is believed the intent of the plan is for cropping up to 50 ha or 10% whichever is the lesser. At this stage there is no clarification).
- 2.3. If you wish to extend the winter crop area from the reference period for this, or any season, it will automatically become a **restricted discretionary** activity and require a consent or a certified farm environment plan showing mitigations and that contaminant losses (nitrogen, phosphorous, e-coli and sediment) will not increase when compared with loads on 02 September 2020.
- 2.4. If you wish to crop above the 50 ha/10% threshold, this is also a **restricted discretionary** activity.

3. Individual paddocks

- 3.1. On a paddock by paddock basis:
 - 3.1.1. Access a slope map for the property, noting steep and un-croppable areas in each paddock. By accessing, or creating a digital paddock scale map it is possible to calculate the slope of potential crop paddocks. Example in Appendix 1.
 - 3.1.2. Assess ephemeral flow paths (EFP – see Appendix 2 for description) and at what point they require protection within each paddock. EFP with significant catchment areas should be excluded from cropping along their entire length. As a minimum the outflow from the crop paddock should be protected with a 10 m exclusion buffer (measured along the length of the EFP from the fence).

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- 3.1.3. Ensure buffers of stock exclusion are created around waterways – 5 m under NES Freshwater and 10 m under PC1. This is measured from the bank of the waterway at peak flow, whilst still within its regular course, where stock do not graze and crop activity does not occur.
- 3.1.4. Clearly identify the appropriate croppable areas in a GIS farm mapping system (FarmIQ, TracMap, GoogleMyMaps, ArcSoft GIS).
- 3.1.5. Calculate croppable areas and calculate winter feed budget, taking into account planned yield and supplements available.
- 3.1.6. With the new limitations on crop area and the focus on environmental impacts, focussing on a well grown crop on the best country will be important. Excellent weed control will be a priority. For crops prone to white butterfly, diamond back moth and leaf miner infestations, weekly checking of crops and immediate spraying for control is essential. Diamond back and leaf miner caterpillars and larvae are found within the leaf structure and white butterfly caterpillars on the surface. Aphids are also a pest issue and will be found feeding on the underside of leaves. Any slight discolouration of the crops or apparent wilting should be visually inspected as a matter of urgency.

4. Paddock preparation

- 4.1. After final spring grazing, and before any preparation work is begun, mark paddock out with electric fence tape and portable standards/waratahs (or other temporary fence) to define croppable areas. This will remain in place until after the final grazing.
- 4.2. All spraying, cultivation and grazing will occur inside the area marked as croppable by the temporary fence.
- 4.3. Contractors need to be inducted into the farm management process for the winter cropping regime and made full aware of the exclusion zones within the paddocks. These areas should be treated as a formal set aside area for the period of the crop rotation.
- 4.4. Consider direct drilling or minimum tillage for sowing the crop. Crops sown with full cultivation are more prone to erosion and pugging.
- 4.5. If paddocks are being contoured before cropping, positively, this will reduce the mean slope, however it is important any work is carried out by an experienced contractor. It is also essential to ensure that the type and volume of work being undertaken does not require resource consent for earthworks.
- 4.6. In order to minimise pugging and remove the risk factor of re-sowing the paddock post-grazing but before 01 October (all North Island), a companion crop is advised. There are several options, for example:
 - 4.6.1. 1 kg/ha plantain seed added to kale and/or swede at planting.
 - 4.6.2. Winter oats sown with Italian ryegrass.

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4.6.3. Grass seed flown over fodderbeet crops in early autumn.

4.7. Enter details into Appendix 4 – Paddock preparation

5. Grazing plan

5.1. The grazing plan will be formulated at sowing time an example is in Appendix 3 – Example of paddock set up.

5.2. MetService provides long term weather projections, these should be consulted and used to inform the plan. Paddock scale map should be created in digital, showing blocks for the breaks and direction of travel. This will have animals grazing predominantly from the top of slopes to the bottom.

5.3. To minimise pugging the bare ground should be back-fenced to minimise the animals walking distance. This is explained in Appendix 3 – Example of paddock set up.

5.4. The grazing plan may require additional portable troughs to ensure water is available. Running overland pipes and placing water troughs is most easily carried out at this time.

5.5. Assess whether gateways will require additional mettle/pumice to minimise soil damage/pugging from either tractor access or stock being moved on and off crops.

5.6. Once grazing of the crop has occurred, the temporary electric fences and any temporary water troughs may then be removed.

5.7. Once the crop has been re-established as grass, the set aside areas can be grazed with animals appropriate to the slope and weather conditions, i.e. if it is a wet spring younger cattle or sheep should be used not mature cows.

6. Compliance

6.1. All cropping activity to be entered into Appendix 5 – Paddock monitoring.

6.2. Download GIS maps or take screen shots of each paddock, marked up with exclusion zones, file and label:

[Farm Name]-[Yr-Yr]-Pdk[xxx]-[Crop] – these will be used in the Management for Intensive Winter Grazing SOP

6.3. Use the order in the following form to ensure activities are carried out at the appropriate time.

6.4. Optional - provide paddock preparation and monitoring sheets to Perrin Ag for review.

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SOP control information

All SOPs should be reviewed annually

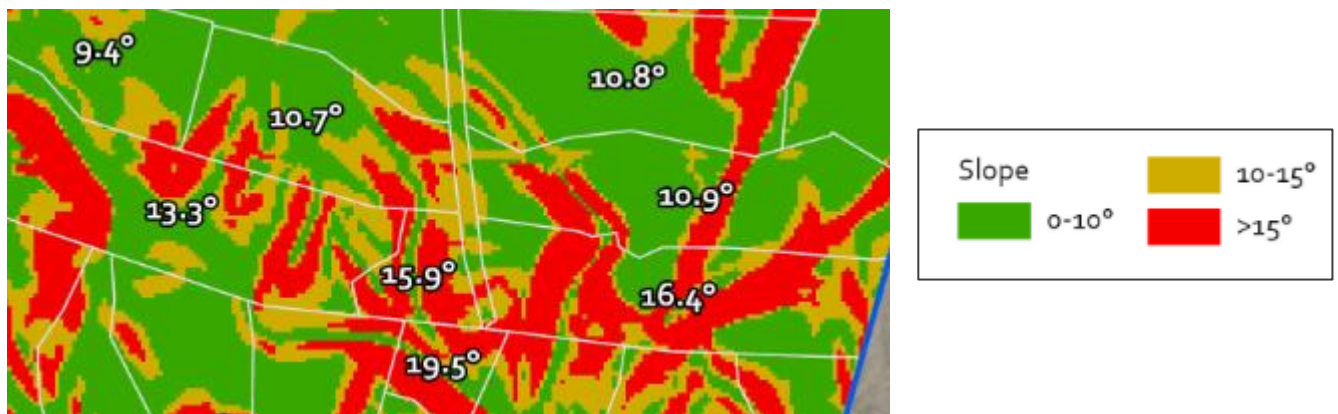
Version	Date	Author	Change/review type
1.1	02 September 2020	Perrin Ag Consultants	Created
1.2	14 September 2020	Perrin Ag Consultant	Amended
1.3	31 Auguts 2021	Perrin Ag Consultants	Amended

Further resources attached:

- Appendix 1 – Example of slope map for allocating winter cropping paddocks
- Appendix 2 – Description of EFP
- Appendix 3 – Example of paddock set up
- Appendix 4 – Paddock preparation
- Appendix 5 – Paddock monitoring

Appendix 1 – Example of slope map for allocating winter cropping paddocks

This map was created by Perrin Ag for a client to enable informed decision making around the overall and mean slopes of potential cropping paddocks.



This map was created when mean slope of 10 degrees was permissible. However the mapping still shows the slope under 10 degrees in green, allowing for appropriate paddock selection. Within any paddock where there are areas over 10 degrees these can be excluded from the cropping activity, allowing compliance with the maximum 10 degree slope.

It will be important to ground-truth these maps, unless they have been created with drone imagery rather than regionally available LIDAR data. This will be done at stage 4.2 above.

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Appendix 2 - Ephemeral Flow Paths

An Ephemeral Flow Path (EFP) is a pathway where water flows overland in rainfall events or when ground is saturated. It is not a creek or stream which dries up from time to time. It is more usual for it to be dry than wet. However, in rainfall events, especially extreme ones, it channels the water from the surrounding area as it flows towards the nearest stream, river or pond. EFP are the lowest points in the paddock, and can sometimes be tens of metres wide, especially in historically erodible country (such as in the Taupō pumice country).

An EFP should not have defined channels in it and should ideally be in grass at all times. When an EFP is in a steady state, water will run over the surface (often seen by flattened grass after rain) but no scouring will occur. These pathways are often slightly greener than the surrounding area of the paddock due to the additional sediment and nutrients that are deposited on them over time.

When cropping occurs through an EFP, the path is usually bare for at least a few weeks, or a few months. Any rainfall in this time will continue to wash down the pathway but will be able to scour away the bare soil as it flows. This causes channelling which then creates a new lower point for the water to flow down. Even when the paddock is re-grassed this new depth of flow path will be very hard to alter. Careful cultivation across the EFP can re-compact the channel but the damage may already be done. If the channel remains after re-grassing then the damage is almost always irreversible.

Protecting EFP is about maintaining the usability of your paddocks. Flat to rolling paddocks with channels through them are less ideal for silage making and create a hazard for vehicles. If the flow of the water is now an un-even slope, it is more likely that the water flow will create 'pools' as it drops from a pristine pathway to a disturbed one. This can result in 'holes' in the paddock where the water washes out deeper and deeper because the soil is now exposed.

To protect EFP it is important to identify them on farm, and especially within cropping paddocks. If the catchment is small above the EFP, then it may not be necessary to exclude the whole EFP from cropping but if in doubt, exclude. Prevention of damage really is the best course of action for EFP. If you want know where your EFP are, go out next time there is a heavy downpour – and you'll see the work they do for you and why they need all the help they can get!

Examples of EFP in various states.



Image 1: EFP in crop



Image 2: Damage from eroded EFP

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Image 3: Overland flows in heavy rainfall



Image 4: Eroded EFP in crop

Appendix 3 – Example of paddock set up

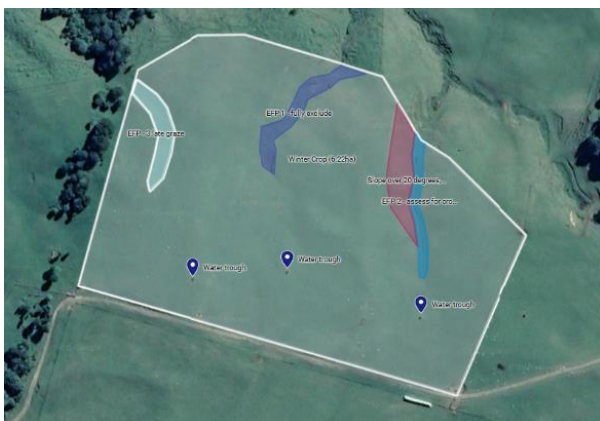
By grazing the winter crop in blocks it is possible to reduce damage by restricting animals to areas where there is still crop. The following 5 images show the process of croppable area selection and a basic block set up for the paddock and explains the application of back fences. (In the context of winter cropping this refers to excluding animals from an area where the crop has been finished.)

1. Paddock selection



Paddock chosen is 6.22 ha total area. Assess how much of the paddock is suitable to crop.

2. Exclusion zones and set up



There are three clearly identifiable EFP:

- The dark blue one (EFP 1) is very defined and wouldn't be suitable for cropping and will be permanently fenced out
- The medium blue one will need to be excluded and left in grass but remain in the paddock long term
- The light blue one could be grazed at the very end of the crop cycle.

This paddock already has three water troughs and grazing blocks will be set up around this.

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3. Block set up within paddock



Sort grazing blocks taking into account water trough locations, paddock access and contour:

- Always aim to graze down slopes, towards water, leaving a buffer at the bottom of the slope
- Decide which order to graze the blocks in and which to 'back fence' once grazing is complete.

In this scenario, blocks will be grazed in order 1 through 5 (lightest yellow to orange) with block 2 taken out (back-fenced) upon completion of grazing, similarly for block 3.

When block 4 is grazed, block 1 can be back-fenced. Block 5 will be grazed after block 4 is finished. Finally EFP 3 can be grazed at the completion of grazing block 5.

Back fencing can be used to remove parts of any block, or areas that are wet/more prone to pugging. Always ensure that stock have access to dry and preferably sheltered campsites.

4. Direction of grazing



Clearly identify which direction the blocks should be grazed in, taking into account contour. Break fences will generally be run at right angles to the arrows. Break fences may be across the whole or part of the slope.

5. Feed-out areas



Finally identify the areas for silage feed out, and any other supplements like mineral blocks. Ensure these are on the driest part of the paddock and are easily tractor accessible

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Appendix 4 – Paddock preparation

Manager					Signed
Indicative timing					
August - October	Paddock name/number				
	Crop type				
	Effective area (ha)				
	Croppable area (ha)				
	Retired sidelings (ha)				
	Retired EFP (ha)				
	Set aside fence off (date)				
October - December	Crop sown (date)				
	Cultivation type				

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Appendix 5 - Paddock monitoring

Manager						Signed
Indicative timing						
November - January	Paddock name/number					
	Portable troughs installed (date)					
January - March	Side dressing fert (date)					
May onwards	Start grazing (date)					
	Livestock type					
	End grazing (date)					
August - 01 October	Re-sown					
	Species					
	Excluded buffers grazed					