Bale grazing in northern Southland - experiences to date

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Project objectives

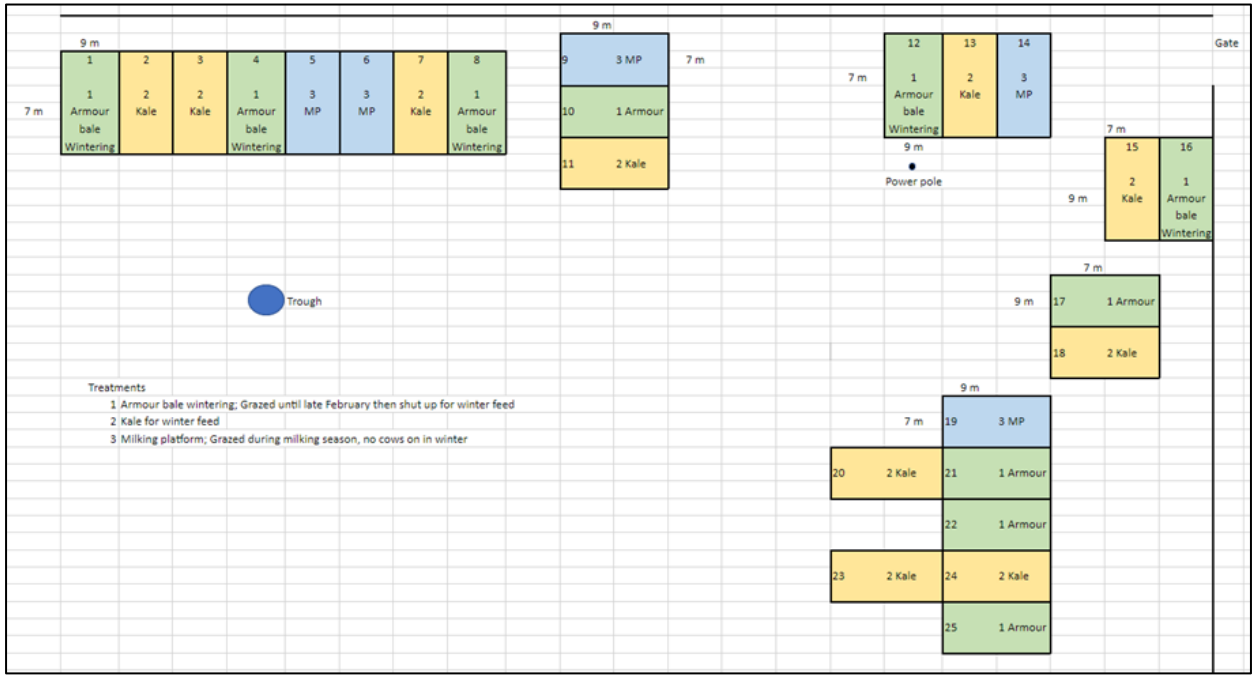
- Quantifying the effects of a bale grazing wintering approach on environmental, animal welfare and GHG outcomes
  - ‘soil armour’ management practices

1) **Soil and water quality** (2021, 2022 and 2023)
2) **Animal welfare** (2022)
3) **Nitrous oxide emissions** (2022)

Approach

Well-drained soil

Ceramic cup soil solution samplers used to measure N losses in drainage



Two treatments:

Bale grazing v kale wintering

16 m^2/cow/day

0.5 RSU/m^2/d

Offered:
5.5 kg pasture DM/cow/d
17.5 kg hay “

(RSU = Relative Stock Units)

8 m^2/cow/day

1.0 RSU/m^2/d

Offered:
12.5 kg kale DM/cow/d
4.5 kg baleage “

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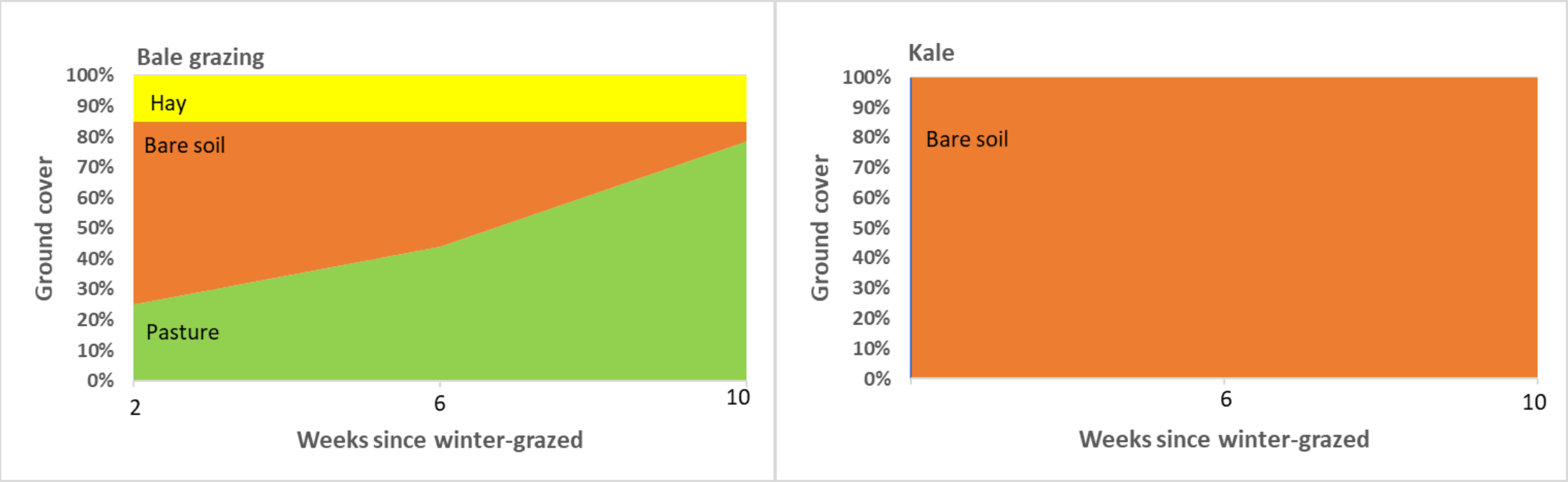
Return of ground cover post winter grazing (2021)



Soil and plant conditions post winter grazing - bale grazing plots (2021)

- Immediately after grazing on 17 June

- 41% bare soil 1 month after grazing

<10% bare ground

2.5 months after grazing

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Welfare key findings

- Bale grazed cows had greater cow comfort:
  - Spent more time lying (on day one) and in postures indicative of greater thermal comfort
  - Spent more time ruminating
  - Were warmer (skin temperature) and cleaner

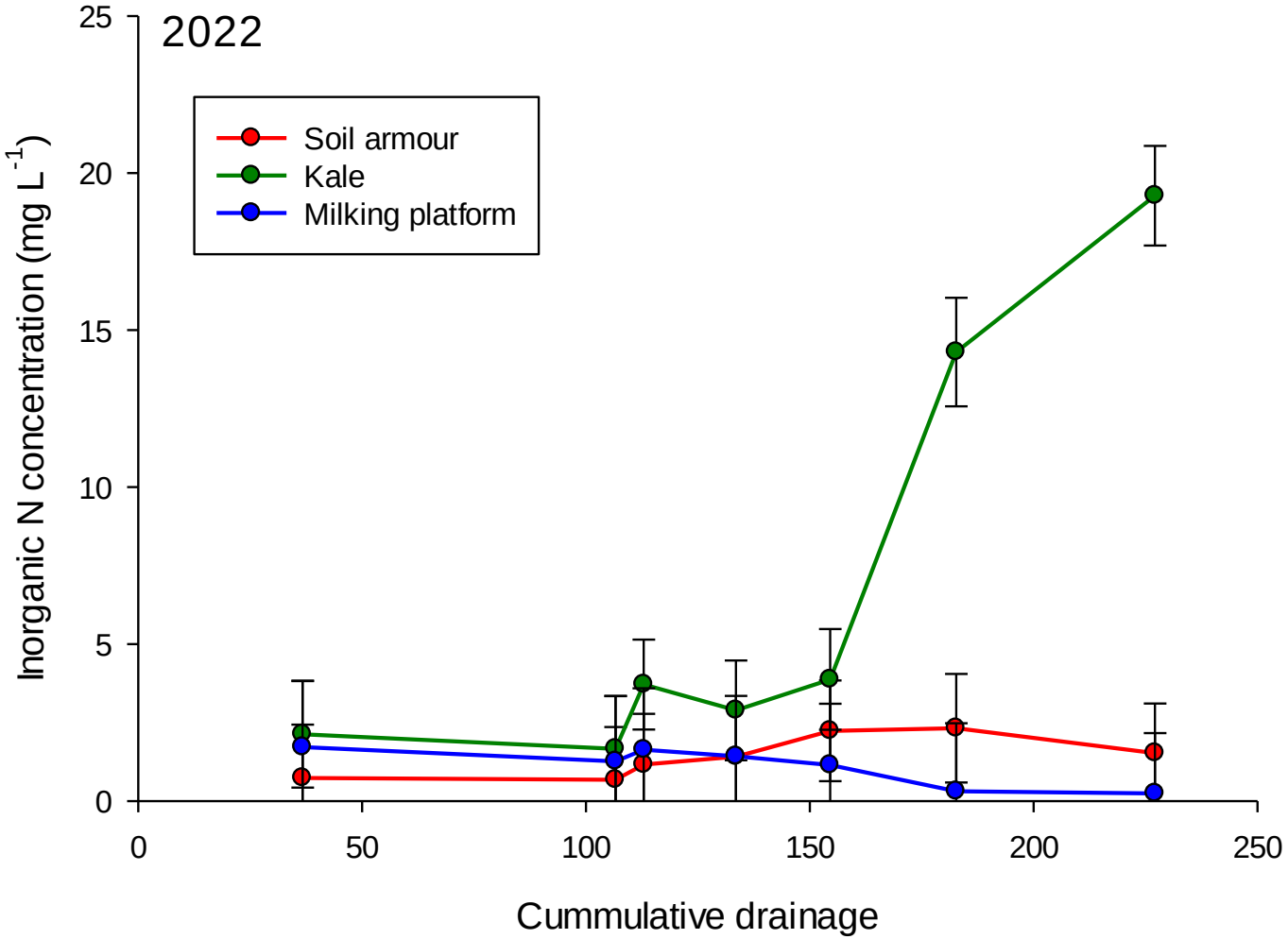
- Lying behaviour varied with weather conditions
  - Crop cows more variable in their response to weather including rebound responses

- Long term physiological impacts?
  - Potential changes in energy mobilisation (NEFA), thermo-regulation (T4), health & immune function (RBC, WBC) (descriptive data only)

Results: N concentrations in drainage at Glenlapa

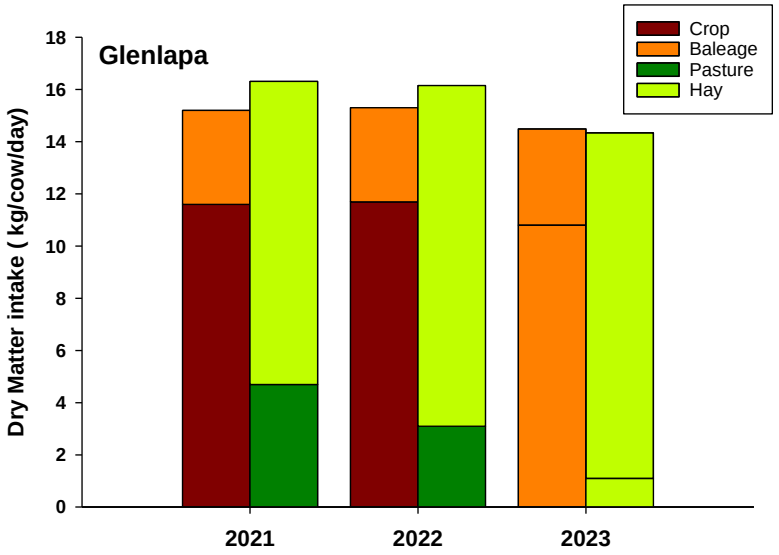
- Lower N concentrations in the Bale Grazing (“Soil Armour”) treatment for all events in 2022.
  - ➢ N leaching loss approx. one quarter that estimated for kale treatment

  (per cow wintered)

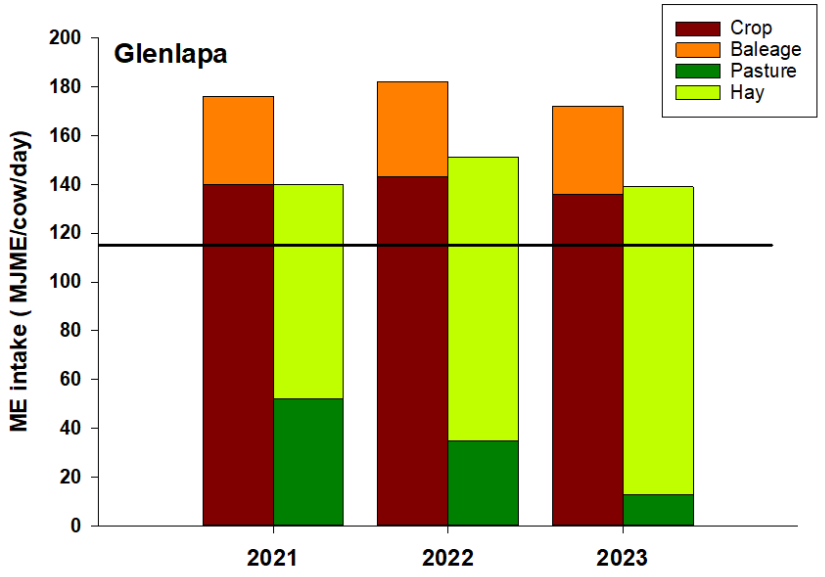


Animal intakes

Dry matter intake

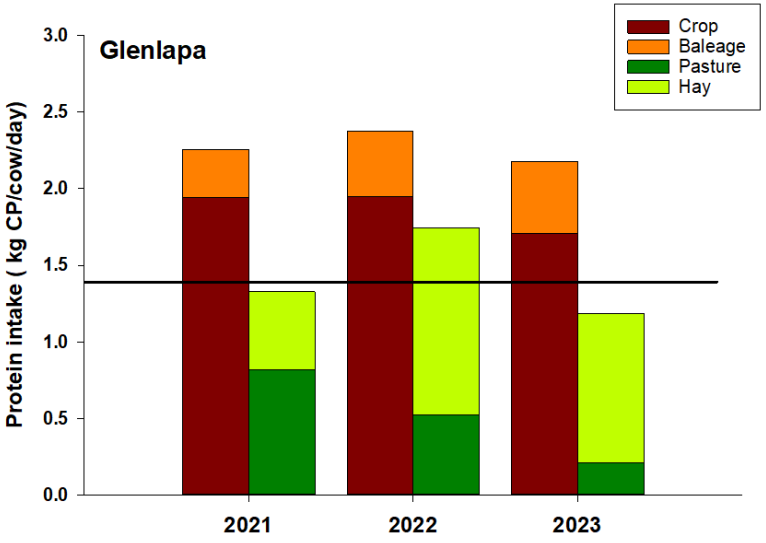


ME Intake



The line indicates the ME requirements for a 450 kg cow covering maintenance + pregnancy (8 weeks pre calving) + 0.5 BCS gain.

Protein intake



The line indicates the CP intakes for a cow consuming 12 kg DM/day with a CP of 12%.

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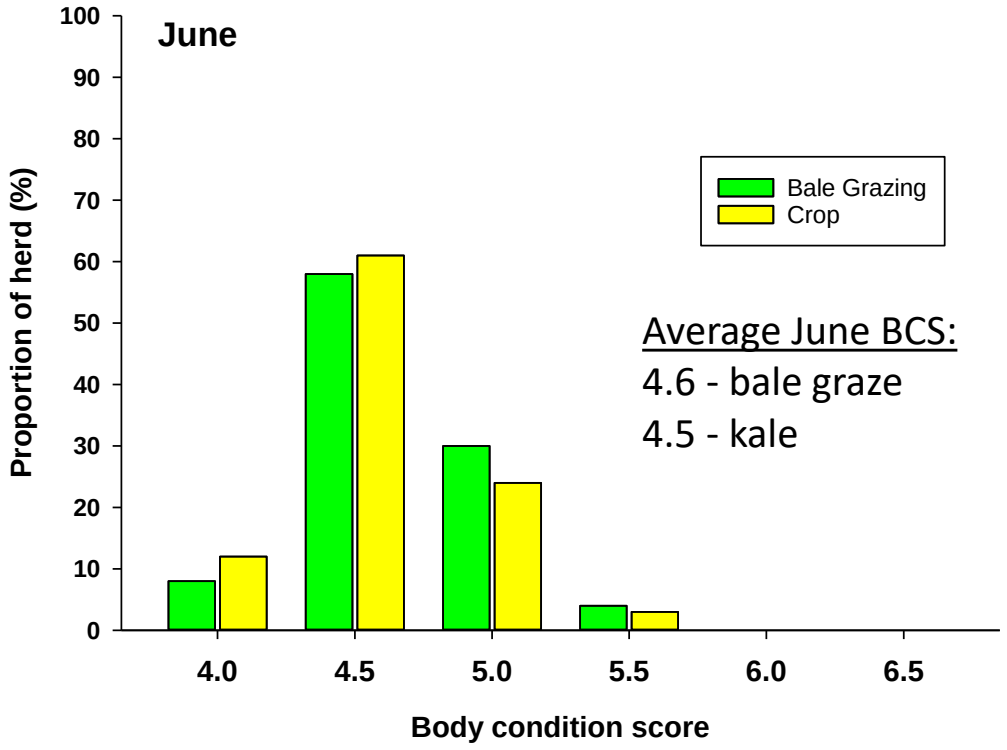
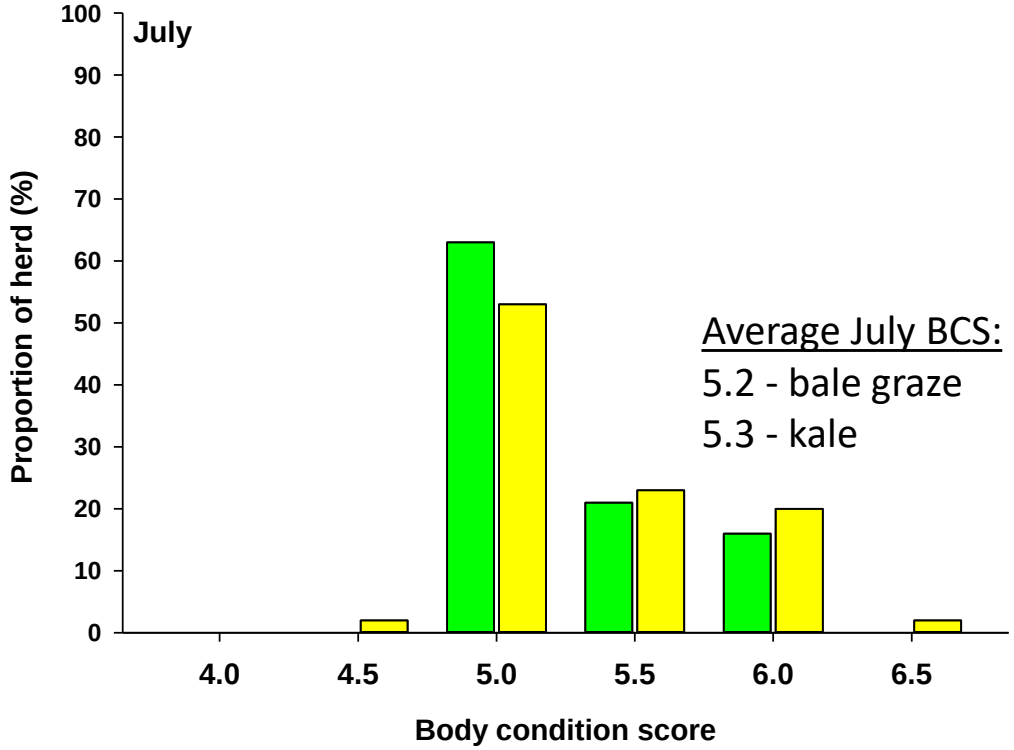
Effect of bale grazing on body condition score Glenlapa, 2023





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Some key observations to date - bale grazing v kale wintering

	Kale	Bale grazing
October plant cover, kg DM/ha	minor weeds	~ 3,000
Plant N uptake by mid Oct, kg N/ha	minor	49
N leaching (2022), kg N/cow wintered	0.90	0.24 ↓ 74%
Soil damage - surface roughness, % increase - VSA score	 8.8 6.0	 2.0 16.0
Soil loss risk - T/ha/yr - T/cow wintered	 1.6 0.09	 0.13 0.01
Nitrous oxide emissions, kg N/cow wintered	0.33	0.11 ↓ 68%

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Design ingredients that have probably provided benefits in the bale grazing treatment:

1. Lower grazing pressure (16 v 8 m^2/cow/day)
2. More soil armour/strength provided by established pasture
3. Well-drained soil (and dry-ish winters @ 150 - 200 mm rainfall)
4. Reduced cow trafficking/milling due to
   - ➢Loafing surface provided by residual hay
   - ➢3-day breaks at a time?

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Acknowledgements

- Freedom Acres farm team, including past members Megan and Jack Fattorini

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Extra slides if needed

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Data collection – plant, water, soil, climate, animal

- Plant: Annual yields and N contents; winter forage allocations, quality & N contents; winter feeding residuals.
- Water: drainage volumes; drainage N concentrations per event (~25 mm)
- Soil: % bare ground v vegetated; pug depth; surface roughness; macroporosity & bulk density*; aggregate size distribution#; infiltration rate+; nitrous oxide emissions
- Climate: rainfall; soil and air temp
- Animal: grazing pressure, RSUs $m^{-2}d^{-1}$; various welfare assessments

*measured in 2021; #measured in 2022; +measured in 2022 at Glenlapa site only; RSU = Relative Stock Unit

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Bare ground estimates using drone footage
Winter runoff paddocks (end Sept)

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Bare ground estimates using drone footage
Bale-grazed winter runoff paddocks (as at 1 Oct 2022)

	Northern Southland winter pastures n = 8	South Otago winter pastures n = 17	Southern Southland winter pastures n = 3
% bare ground	49	43	44
% green	42	43	39
% bale area	10	14	17