BEFORE AN INDEPENDENT HEARINGS COMMISSIONER
AT INVERCARGILL

COUNCIL REF: APP 20222765

UNDER THE	Resource Management Act 1991
IN THE MATTER OF	Applications by Pahia Dairies Limited for land use consents to use land for intensive winter grazing, to expand an existing dairy farm and to discharge contaminants to land at 171 Ruahine Road West, Orepuki, Southland

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STATEMENT OF EVIDENCE OF DR BARBARA HELEN BEATTIE ON BEHALF OF NEW ZEALAND ANIMAL LAW ASSOCIATION (ANIMAL WELFARE)

28 September 2023

KATE SHEPPARD CHAMBERS

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QUALIFICATIONS AND EXPERIENCE

1. My full name is Dr Barabara Helen Beattie.

2. I hold the qualifications of a Bachelor of Veterinary Science, a Graduate Certificate in Tertiary Learning and Teaching, a Certificate in Animal Welfare Investigations and a Certificate in Mata ā Ao Māori.

3. I have been a registered veterinarian for 25 years, across a variety of roles that include being a clinical veterinarian (mixed, companion, shelter, educator), an animal welfare inspector and the Chief Veterinary Officer for the New Zealand Veterinary Association. I have a special interest and expertise in the discipline of animal welfare. I grew up on a farm and have seen a range of farming systems in practice, including during my veterinary training.

4. Since 2017, I have been a member of various advisory groups within and outside of government including the Farm to Processors Animal Welfare Forum convened by the Ministry of Primary Industries. I was a member of the Ministerial Taskforce on Winter Grazing and also a member of Pāmu's Veterinary One Health Advisory Group. These roles included advising on improvements needed to intensive winter grazing (**IWG**) practices to improve both animal and environmental welfare.

5. I am the Minister of Agriculture's appointment to the Telford Farm Training Institute Board, and I am currently the Managing Director of Veterinarians for Animal Welfare Aotearoa.

Compliance with Code of Conduct

6. I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Practice Note 2023 and agree to comply with it. The issues addressed in this statement are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

BACKGROUND

7. My evidence is given on behalf of the New Zealand Animal Law Association (**NZALA**), a submitter on Pahia Dairies Limited's (**PDL's**) resource consent applications to expand its existing dairy farm in Orepuki, Southland and carry out IWG activities.

8. In preparing my evidence I have:

   8.1. read PDL's consent application and the information provided in the Assessment of Environmental Effects (AEE)

   8.2. read the evidence statements of Ms Mesman, Mr Anderson and Dr Wouda filed on behalf of PDL

   8.3. I have reviewed aerial maps of PDL though I have not visited PDL

   8.4. considered the multiple Southland farm visits I undertook in 2021 with the specific purpose of observing various winter grazing scenarios and outcomes

   8.5. read:

      8.5.1. National Animal Welfare Advisory Committee's Evaluation Report and draft Code for the Code of Welfare | Dairy Cattle

      8.5.2. the Winter Grazing Taskforce Report

      8.5.3. the Winter Grazing Action Group's Close-out report on the implementation of recommendations to improve animal welfare during winter

      8.5.4. the Winter Grazing Action Group's Short term expected outcomes for animal welfare

      8.5.5. Ministry for Primary Industries Technical Paper No: 2021/18 - Health and welfare issues for sheep, deer and beef cattle managed in muddy conditions

8.5.6. Ministry for Primary Industries Technical Paper No: 2023/10 - Thermal stress summary for dairy cattle, beef cattle, sheep and deer in Aotearoa New Zealand

8.5.7. Ministry for the Environment's Intensive Winter Grazing Module November 2022

8.5.8. Ministry for the Environment's Paru mauti Pugging Guidance for intensive winter grazing; and

8.5.9. various farming sector organisations (e.g. Beef and Lamb NZ, DairyNZ, Deer Industry New Zealand) advice to farmers on winter grazing.

9. In addition, I have read the statements of evidence of:

9.1. Oska Rego, and

9.2. James Hook

10. All images are from my personal photo repository, unless otherwise stated.

SCOPE OF EVIDENCE

11. My evidence:

11.1. describes aspects of PDL's proposal

11.2. describes aspects of agricultural intensification, including the sediment, nutrients, pathogens, agrichemicals and other contaminants associated with farming, farm animals and winter grazing activities that can end up in fresh and coastal water receiving environments

11.3. describes aspects of IWG and the impact it can have on cattle welfare

11.4. discusses the potential for mutual benefits through the activities PDL proposes to undertake

11.5. identifies where I agree and disagree with evidence from Dr Wouda, Mr Anderson and Ms Mesman

11.6. reviews PDL's proposal and the adequacy of the mitigation and conditions where these directly affect animal welfare

11.7. recommends additional mitigation measures and conditions that will improve animal welfare, and

11.8. sets out conclusions based on my assessment.

SUMMARY

12. IWG can cause poor environmental and animal welfare outcomes. These poor outcomes are primarily a result of farming system conversions and intensification that pushes the environment beyond the limits of what it can assimilate. It is for this reason that, generally, I do not support IWG in Southland. The climate and conditions are extremely unlikely to provide for acceptable animal or environmental welfare outcomes over winter.

13. Poor outcomes associated with IWG include:

13.1. compromised cattle welfare, due to:

13.1.1. poor lying experiences

13.1.2. lack of access to shelter due to back fencing

13.1.3. exposure on hill tops through top-down grazing

13.1.4. variability in ready access to water

13.1.5. health impacts for cattle from diet and environment

13.1.6. psychological impacts of high stocking rates, and

13.2. impacts of sediment, nutrients, pathogens and agrichemicals on receiving environments and animals in them.

14. In my experience, adverse welfare effects are often compounded by poor management, and siloed regulation and implementation that fails to consider animal welfare alongside environmental welfare.

15. Although Resource Management Act regulations[1] are now starting to improve the environmental effects of IWG, animal welfare management practices are still largely regarded as 'self-regulated guidance.' Practices are not transparent nor are they applied consistently across farms in the country. To achieve acceptable outcomes, IWG requires careful, proactive land use management and planning that includes making sure animal welfare outcomes are acceptable.

16. While it is encouraging to read in PDL's evidence statements the extent to which PDL currently provides for, or intends to provide for, animal welfare concerns in IWG, in my view there would be increased transparency and accountability if animal welfare had proactive protections included via conditions imposed on PDL's consent (if granted).

PDL's PROPOSAL

17. PDL has an existing dairy effluent consent for 1,000 cows. It has applied to Environment Southland to expand its existing farm's area and carry out IWG while reducing the overall cropping area.

18. PDL states that the total area cropped is likely to reduce from 64 hectares to 55 hectares, resulting in fewer adverse environmental effects, and that the technical stocking rate for the farm will fall from 2.8 cows/hectare to 2.3 cows/hectare. However, I note that the 'functional stocking rate' (i.e., the stocking rate on the crop during break feeding) will be significantly higher while the cows are on the crop. It is this stocking rate and intensification during crop feeding that creates poor animal and environmental welfare outcomes.

19. In my evidence, I outline the negative impacts on animal welfare resulting from IWG, the associated increase in agricultural intensification, and a lack of prioritisation of or

[1] Resource Management (National Environmental Standards for Freshwater) Regulations 2020.

thought given to animal welfare. I also outline how the animal welfare system has regulatory gaps.

20. While generally I do not support IWG in Southland given the impacts of the harsh winter climate on cattle and environmental welfare, if PDL is granted consent, conditions should be imposed requiring specific management practices to be followed in order to ensure better welfare outcomes.

AGRICULTURAL INTENSIFICATION

21. The Farm to Processors Animal Welfare Forum, convened by the Ministry for Primary Industries, defines intensive farming systems as, *"High density operations that rely on externally sourced resources/supplements and mechanisation/environmental control to meet the animal's needs."*[2]

22. The reference to 'high density operations' refers to the intensification of agriculture. This is generally characterised by high inputs such as increased capital, labour, irrigation, fertiliser, pesticides, herbicides, fungicides, antimicrobials, palm kernel expeller, electricity, high yielding crops and increasing mechanisation to ensure increases in production per hectare.

23. From a farmed animal perspective, concerns about intensive farming have been raised as far back as the mid-1960s.[3] Intensification can increase stress on animals and require more inputs to support the system which in turn lead to more environmental and other impacts.

24. The most intensive farmed animal systems (e.g dairy, pigs, poultry) require the most antimicrobials[4] to support the health (though not welfare) of the animals, given the inherent stresses and disease risks associated with high stocking rates.

[2] Farm to Processors Animal Welfare Forum Terms of Reference: https://www.mpi.govt.nz/animals/animal-welfare/safeguarding-our-animals-safeguarding-our-reputation/farm-to-processor-animal-welfare-forum/

[3] Brambell, FRS, Report of the Technical Committee to Enquire into the Welfare of Animals kept under Intensive Livestock Husbandry Systems (1965).

[4] Hillerton, Eric & Bryan, Mark & Beattie, BH & Scott, D & Millar, A & French, N. (2021). Use of antimicrobials for food animals in New Zealand; updated estimates to identify a baseline to measure targeted reductions. New Zealand Veterinary Journal. 69. 1-6. 10.1080/00480169.2021.1890648.

25. Agricultural intensification can result in higher levels of nutrients, sediment and microbial contamination of rivers, lakes, wetlands and groundwater,[5] which affect animals, people and the environment. The "One Welfare" framework recognises that animal, environmental and human welfare are interconnected.[6]

26. Community water supply contamination with nutrient pollution,[7] faecal coliforms,[8] and veterinary drugs[9] has also been linked to farming.

Image showing surface pooling, ephemeral streams and receiving water body.

27. The intake of microbes and nitrates through contaminated water presents a human health risk (e.g., gastroenteritis and organ dysfunction). Nitrogen derivatives entering

[5] Agricultural intensification factsheet; September 2020; Ministry for the Environment and Ministry for Primary Industries; Publication number: INFO 971

[6] https://www.onewelfareworld.org/

[7] Jayne Richards, Tim Chambers, Simon Hales, Mike Joy, Tanja Radu, Alistair Woodward, Alistair Humphrey, Edward Randal, Michael G. Baker, Nitrate contamination in drinking water and colorectal cancer: Exposure assessment and estimated health burden in New Zealand, Environmental Research, Volume 204, Part C, 2022, 112322, ISSN 0013-9351, https://doi.org/10.1016/j.envres.2021.112322.

[8] Report of the Havelock North Drinking Water Inquiry; (2017).

[9] Chee-Sanford JC, Aminov RI, Krapac IJ, Garrigues-Jeanjean N, Mackie RI. Occurrence and diversity of tetracycline resistance genes in lagoons and groundwater underlying two swine production facilities. Appl Environ Microbiol. 2001 Apr;67(4):1494-502. doi: 10.1128/AEM.67.4.1494-1502.2001. PMID: 11282596; PMCID: PMC92760.

waterways accelerate algal growth which is toxic to rivers[10] and animals.[11] In addition, from the animal perspective, sediment in the waterways blocks light, harms fish gills, reduces visibility for fish, alters water flow patterns and when it settles in the interstitia, covers or affects access to the habitats of the waterway's inhabitants.[12]

Image showing sediment from Pomahaka River entering the Clutha River

28. Agricultural intensification can do more than adversely affect water quality. A research report from Canterbury titled the 'Public Health Implications of Land Use Change and Agricultural Intensification' states:[13]

> *"Apart from water quality, agricultural intensification and urban expansion have the potential to affect health through increased greenhouse gas emissions, loss of biodiversity and ecosystem services, and weaker rural communities. Furthermore, agricultural intensification could also affect health through increased zoonotic disease risk and increased antimicrobial resistance. The evidence for the health implications of these effects is not specific to Canterbury, but national and international evidence*

[10]Stats NZ, https://www.stats.govt.nz/indicators/river-water-quality-nitrogen
[11] www.ecan.govt.nz/your-region/your-environment/water/health-warnings/keeping-dogs-safe-from-toxic-algae/
[12] https://niwa.co.nz/our-science/freshwater/tools/kaitiaki_tools/impacts/sediment
[13] Public Health Implications of Land Use Change and Agricultural Intensification with respect to the Canterbury Plains: A Literature Review: Prepared by Dr. Jackson Green & Dr. Cheryl Brunton: Community and Public Health CDHB July 2014.

demonstrates that the kinds of changes occurring in Canterbury are likely to have similar effects as elsewhere."

29. While recent government policy is trying to address the environmental effects of intensified farming practices, animal welfare policy is lagging, as I discuss further below.

30. Since 1990, the total number of cattle in the South Island has increased by 591%. Regions with the greatest growth were Southland (1,584%), Canterbury (973%), and Otago (706%).[14] This intensification and the growing number of cattle has been made possible by the growing use of irrigation (though not in PDL's farming operation), fertiliser, different cattle feeds (e.g., fodder beet; palm kernel expeller), feeding methods (e.g., IWG), infrastructure (e.g., barns) and land use change (e.g., conversion of sheep and beef country to dairy).

INTENSIVE WINTER GRAZING

31. PDL is seeking resource consent for IWG, a form of intensified agricultural farming. IWG involves holding farmed animals over winter (generally from about 1 May to 30 September) at a high stocking density in outdoor feeding areas that are planted with annual forage crops such as swedes, kale, turnips and fodder beet. Annual forage crops are crops other than pasture that are grazed in the place where they are grown, or they may be 'lifted' or 'cut and carried' and fed elsewhere (e.g., on a feed pad, another paddock such as a sacrifice paddock or in a barn). When one section of forage is eaten,

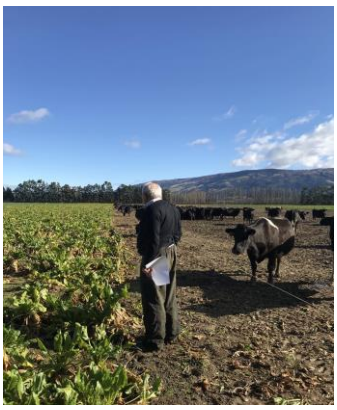

Image on left accessed from web (September 2023)[15]

[14] Livestock numbers, Stats NZ, accessed January 19, 2023, www.stats.govt.nz/indicators/livestock-numbers.

[15] https://nzarm.org.nz/key-winter-grazing-information#Key%20Consultation%20Documents%C2%A0

animals are given access to a new break. Animals may be given supplementary feed such as silage or hay at the same time.

32. Relatively high stocking densities are typical of intensive winter grazing systems due to the large amounts of feed available per unit area (often between 10 – 30 tonne of dry matter per hectare (T DM ha-1)). When combined with typical daily feed allocations to animals, these result in relatively high grazing intensities on each break (typically between 0.5 – 2.0 Relative Stock Units[16] per m^2 per equivalent daily break).

Example of stocking rate in Canterbury paddock
Image accessed from web (September 2023)[17]

Example of stocking rate during IWG
Images accessed from web (September 2023)[18,19]

[16] Relative Stock Units - where one heifer was assumed to represent 5 RSUs; Parker, 1998.
[17] https://www.interest.co.nz/rural-news/116224/guy-trafford-takes-critical-looks-mike-joys-latest-attack-impact-dairying
[18] https://www.mpi.govt.nz/dmsdocument/44866-20212022-Intensive-Winter-Grazing-Module
[19] https://www.farmersweekly.co.nz/news/winter-grazing-applications-down-in-the-south/

33. In other types of farming systems, stocking rates are generally set in line with that land's capability when growth is not at its maximum (i.e., they may be set for the summer). This practice allows preservation of the spring pasture flush that exceeds the animals' needs, and/or preservation of spring/summer grown crops (e.g. lucerne or meadow hay; silage), both of which are then fed during winter over various parts of the farm. These traditional practices are changing due to agricultural intensification.

34. IWG has been developed to manage feed supply in some pastoral farming systems at a time of year when pasture growth is limited by cool temperatures and short daylength.[20] Crops can also be included in a pasture feeding system to improve production through providing more energy to the farmed animals.

35. Sometimes, IWG is used in areas that carry animals that are not well suited to the land's capability (i.e. heavy cattle on heavy soils), where the stocking rate or land use exceed the land's natural carrying capacity and/or where relatively large amounts of rainfall occurs during winter. In these situations, stock can cause significant damage to the environment (i.e. pugging and runoff). IWG systems are adopted to help preserve soil structure and pasture quality on other parts of the farm by focusing that damage in one spot (i.e., on the cropped area).

36. When cows feed on forage crops, their trampling can lead to soil pugging resulting in a semi-liquid mix of soil, water and effluent (i.e., slurry) on the soil surface.[21] Pugging during IWG reduces soil surface infiltration, soil pore volumes and connectivity which in turn increases overland flow and loss of nutrients, sediment and microbial pathogens into surface and groundwater.[22] Pugging can also significantly impact drainage, water storage, root penetration and plant yield.[23] Additionally, most of these farm systems

[20] Ministry for the Environment, Intensive Winter Grazing factsheet, August 2022, p2, https://environment.govt.nz/assets/publications/freshwater-policy/IWG-Factsheet-INFO1067-Update-August-22-FINAL.pdf.

[21] Ministry for the Environment. 2023. Pugging: Guidance for intensive winter grazing, Publication number ME 1746, page11,https://environment.govt.nz/assets/publications/Pugging-Guidance-for-intensive-winter-grazing.pdf.

[22] Above and also Ministry for the Environment. 2023. Pugging: Guidance for intensive winter grazing, Publication number ME 1746, page 5, https://environment.govt.nz/assets/publications/Pugging-Guidance-for-intensive-winter-grazing.pdf.

[23] Ministry for the Environment. 2023. Pugging: Guidance for intensive winter grazing, Publication number ME 1746, pages 10 - 11, https://environment.govt.nz/assets/publications/Pugging-Guidance-for-intensive-winter-grazing.pdf.

require annual tillage and use of herbicides and/or pesticides during crop establishment. The images below show pugging in Southland 2021 – the first is from a fodder beet wintering system I visited and the second, a grass and baleage wintering system.

37. Pugging also means surfaces are not considered by cattle to be acceptable for lying[24] which fails to comply with key provisions in the Animal Welfare Act 1999.[25] The image below is from a grass and baleage system near Tuatapere (winter 2021).

[24] Chen, Jennifer M., Stull, Carolyn L., Ledgerwood, David N.,Tucker, & Cassandra B., (2017), Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete; *Journal of Diary Science, 100(3), 20902103.*

[25] Section 10 of the Act says that the owner of an animal, and every person in charge of an animal, must ensure that the physical, health, and behavioural needs of the animal are met in a manner that is in accordance with both—

38. IWG has become common in Southland and although it is also used elsewhere in New Zealand, some of the worst outcomes for the environment and animals have been seen in Southland. Annually, some of these poor outcomes have been highlighted in the media and by those concerned about the environment and animals' lived experiences.[26,27,28,29,30,31]

39. Based on site visits I have conducted and my research, the use of land in Southland in intensively run dairy farming systems has extended much of the land beyond its

(a)good practice; and
(b)scientific knowledge.
Section 4 defines "physical, health, and behavioural needs as including—
(a) proper and sufficient food:
(ab) proper and sufficient water:
(b) adequate shelter:
(c) opportunity to display normal patterns of behaviour:
(d) physical handling in a manner which minimises the likelihood of unreasonable or unnecessary pain or distress
(e) protection from, and rapid diagnosis of, any significant injury or disease,—
being a need which, in each case, is appropriate to the species, environment, and circumstances of the animal.

[26] https://www.odt.co.nz/rural-life/dairy/vets-open-pan-industry-initiative-grazing
[27] https://www.newsroom.co.nz/pro/beef-with-maccas-over-mud-farming
[28] https://www.nzherald.co.nz/the-country/news/winter-grazing-environmentalist-angus-robson-heading-to-southland/FQO2K3R5LBBFURDBRL3KP5ZIL4/
[29] https://www.newsroom.co.nz/councils-winter-grazing-approach-raises-concern
[30] https://www.rnz.co.nz/news/country/446276/some-farmers-still-slipping-up-on-use-of-winter-grazing-advocate
[31] https://www.odt.co.nz/news/dunedin/protesters-call-out-%E2%80%98cruel%E2%80%99-winter-%E2%80%98mud-farms%E2%80%99

capability. This has resulted in poor environmental, human and animal welfare outcomes. The animal welfare protections provided for in sections 10 and 4 of the Animal Welfare Act are in reality virtually impossible to comply with in Southland IWG farming systems. Therefore, in my view, IWG should not be allowed to take place in Southland due to the significant adverse impacts it causes on animal welfare.

ANIMAL WELFARE

40. Animal welfare refers to an animal's quality of life which is determined by how the animal responds to their environment.

41. An internationally accepted contemporary model used to assess and discuss animal welfare is the Five Domains as described by Mellor and Reid (1994). The Five Domains are nutrition, environment, health, behavioural interactions, and mental state, all of which contribute to the animal's overall welfare.

42. That an animal's welfare matters and that mental state contributes to overall welfare is recognised in the Animal Welfare Act 1999 which in its long title, acknowledges that animals are sentient. Sentience is the ability to have subjective experiences, and is sometimes described as animals 'having feelings that matter to them.[32]

43. Despite the media exposing the seriousness of the animal and environmental welfare compromise, the animal agricultural sector has repeatedly defended the practice of IWG. This is despite recognition that New Zealand's reputation[33,34] is critically important to our trading relationships and that our leadership on animal care and welfare underpins this.

44. That these poor outcomes and the exposure matters to us as a nation, was evidenced by the establishment of the Winter Grazing Taskforce in August 2019 by Minister O'Connor. The Taskforce's purpose was to investigate and make recommendations on animal welfare compromise associated with the practice of IWG. I was one of the members appointed to the Taskforce.

[32] https://www.nawac.org.nz/animal-sentience/
[33] Ong, R; Whose Interests Are We Really Protecting? Regulatory Capture in the New Zealand Animal Welfare Regime; 2020.
[34] Reputation, regulatory capture, and reform: the case of New Zealand's bobby calves; Danielle Duffield 2020.

45. In its Report,[35] the Winter Grazing Taskforce noted, '*Firstly, it is clear to us that animal welfare is not sufficiently prioritised, by anyone along the supply chain: we see this as the key barrier to adopting good or improved practice.'*

46. To prioritise animal welfare**,** we must understand through the animals' eyes what they need to achieve acceptable welfare (e.g., a suitable lying surface) and then meet these needs.

47. Including consent conditions via this RMA process is an important way of prioritising animal welfare in IWG systems. Consent conditions would enable animal welfare protections through a transparent and proactive mechanism rather than a reactive process via the Animal Welfare Act 1999.

48. The Taskforce and subsequent Winter Grazing Action Group's work, including their reports,[36] and other collateral[37] that was issued, set the first meaningful, cross-sector agreement about what are considered to be acceptable IWG practices and outcomes.

49. Among other recommendations, the Winter Grazing Taskforce found that:[38]

    49.1. Work is needed to understand and mitigate the long-term animal welfare consequences of IWG practices

    49.2. Further research is needed to establish baseline animal welfare performance of IWG systems in order to monitor the progress of improvements

    49.3. Work is needed urgently to better utilise and expand on our knowledge of barriers to adopting improved animal welfare practices, recognising that responsibilities for animal welfare lie through the whole-of-supply-chain process.

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[35] Winter Grazing Taskforce, Final Report and Recommendations, *Improving Animal Welfare on Winter Grazing Systems,* https://www.mpi.govt.nz/dmsdocument/38210/direct

[36] Winter Grazing Action Group Close-out report on the implementation of recommendations to improve animal welfare during winter, https://www.mpi.govt.nz/dmsdocument/50959/direct

[37]Winter Grazing Action Group Expected outcomes for animal welfare, https://www.mpi.govt.nz/dmsdocument/41683/direct

[38] Winter Grazing Taskforce, Final Report and Recommendations, *Improving Animal Welfare on Winter Grazing Systems,* https://www.mpi.govt.nz/dmsdocument/38210/direct

50. The excerpt below is taken from the Taskforce report and summarises the key factors that cause animal welfare concerns. These points have subsequently been included in the Winter Grazing Action Group's Expected outcomes for animal welfare,[39] meaning these set evolving best practice that are aimed at addressing fundamental deficiencies in current animal welfare legislation.

'Certain issues are clear cut and change can happen over the short term. Some things should never happen and action must be taken immediately to prevent them:

- *Animals giving birth on mud*
- *Avoidable deaths in adverse weather events*
- *Mass mortality events on winter grazing systems.*

The issues above have a range of poor animal welfare outcomes that arise before they actually come about (e.g. subclinical disease), and that also needs to be addressed.

Equally, there are some things that should always happen, and action must be taken immediately to ensure they do happen:

- *Provision for animals to lie comfortably (on a soft dry substrate) for as long as they want to*
- *Ability to readily move animals to shelter/dry land in adverse weather before harm occurs*
- *Continuous convenient access to fresh, clean water*
- *Access to an adequately balanced diet, including appropriate supplementary feeding for animals on fodder beet and other crops, that keeps animals warm and doesn't cause acute or chronic malnutrition and metabolic problems.'*

51. While to date there have been no regulatory tools developed as a response to the Taskforce's recommendations, the National Animal Welfare Advisory Committee in its draft Code of Welfare | Dairy Cattle, recommended regulation to ensure cattle had:

51.1. access to suitable lying surfaces, and

51.2. ready access to water, and

51.3. an appropriate environment in which to calve (i.e, they do not calve on mud).

[39]Winter Grazing Action Group Expected outcomes for animal welfare, https://www.mpi.govt.nz/dmsdocument/41683/direct

These regulations would have provided some necessary, meaningful and enforceable protection for dairy cattle during IWG.

52. The Ministry for the Environment developed Freshwater Regulations in 2020. The notified draft initially included fairly comprehensive regulation of IWG due to the major environmental impacts of IWG. However, the final version was significantly weakened due to push back from the sector, and the regulations failed to provide meaningful protection for animals during winter grazing. There have also been a number of subsequent amendments that have further weakened freshwater protections.

53. The evidence statements filed by PDL identify a range of 'good management practice' (GMP) measures to mitigate animal welfare risks. These measures are well intentioned but in my view, demonstrate how the system fails the animals. GMPs are not designed to protect animal welfare (though there are mutually beneficial outcomes in some instances) but focus more on environmental concerns (e.g., B+LNZ's GMP[40]) and animal health (rather than welfare). Dependence on GMP is problematic for two reasons:

53.1. Even when adhered to, outcomes may not be acceptable for the environment or the animals;

53.2. Some environmental GMPs create direct conflict for good animal welfare outcomes (discussed below).

Access to water

54. Requiring ready access to water was recommended for regulation and identified by the Taskforce and the Action group as minimum requirements for animals during IWG. 'Readily accessible' means cows are able to easily move through their environment to access water, and that there is enough water to satisfy their needs; there must be enough troughs of sufficient size such that competition for trough space does not unacceptably compromise welfare. This is not adequately addressed by environmental regulation.

[40] https://beeflambnz.com/sites/default/files/factsheets/pdfs/fact-sheet-215-ten-tips-for-winter-grazing.pdf

Access to shelter

55. The GMP of back fencing has environmental benefits as it prevents cattle from treading back over bare ground which leads to more pugging. However, very often back fences prohibit cattle from accessing shelter which is commonly found on the permanent fence line of the paddock (i.e., the paddock's boundary fence/s).

56. Where fences, including back fences, prevent the whole mob from accessing adequate shelter, the IWG system is non-compliant with ss 10 and 4(b) of the Animal Welfare Act 1999. This non-compliance also applies when land has been razed of shelter.

57. Environmental protection advice through GMP also compromises animal welfare where top-down grazing is required while animals are fenced at the top of a hill during inclement weather. This principle applies also to any areas used for IWG, where fencing prevents access to shelter in areas that are particularly exposed to inclement weather (e.g., seawards or south side of a paddock; exposure to prevailing cold winds).

Behavioural needs

58. Dairy cows have an inelastic need to lie to rest, ruminate and sleep. They require between 10-12 hours of rest per day to meet their physiological and behavioural needs. They will prioritise lying even when they are deprived of food and water.[41]

59. To meet their behavioural needs, cattle must have an appropriate place to lie down.[42] This is discussed in more detail later in my evidence.

Mental state

60. Due to the high density of cows on each break and the hierarchal nature of cattle, IWG has impacts on psychological welfare and therefore, overall welfare.[43] Cows will experience competition for food, water and lying space as well as having a limited

[41] J.H.M. Metz,The reaction of cows to a short-term deprivation of lying, Applied Animal Behaviour Science, Volume 13, Issue 4, 1985, Pages 301-307, ISSN 0168-1591: https://doi.org/10.1016/0168-1591(85)90010-3.

[42] Chen, Jennifer M., Stull, Carolyn L., Ledgerwood, David N.,Tucker, & Cassandra B., (2017), Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete; *Journal of Diary Science, 100(3), 20902103.*

[43] Jon N. Huxley, Cattle Behavior and Implications to Performance and Health University of Nottingham

ability to choose to engage in or avoid social interactions from other cows. Cows will experience negative mental states due to these interactions, whether that is through defending their resources (dominant cows) or having those resources limited (less dominant cows).

61. Cattle are a prey species and require safe, secure footing for both physiological and psychological safety. Cows rely on their ability to flee as part of their "flight or fight" response to danger, whether that be real or perceived. Wet, slippery, and/or pugged ground does not provide for this as it can physically restrict their movement and have a psychological impact on their perceived ability to "flee" from more dominant animals and people.

Impacts on marine species

62. It is noted in PDL's application that, *'Due to the vicinity of the property to the coastline it is expected that groundwater will flow to off the coast rather than to surface water bodies.'* Bony and cartilaginous fish and any octopus, squid, crab, lobster, or crayfish (including freshwater crayfish) are considered sentient and afforded protection under the Animal Welfare Act 1999 (see section 2) and subsequently, groundwater contaminated with pathogens, nutrients and sediment flowing into coast waters is no more acceptable to the receiving environment nor the sentient animals in the water body, than such water flowing into a land-based waterbody and affecting freshwater fish.

63. Multiple examples (e.g., Little Waihi estuary at Pukehina) of the impact of pathogen, sediment and nutrient runoff into estuaries is available; this includes the impact on ecological system (e.g., sediments settling and smothering aquatic life; impacts of nutrients), on the kai moana itself (e.g., death) and the food safety risks of subsequent gathering of kai moana. Animal management and farm systems that provide acceptable welfare outcomes for animals as well as the environment would mean disallowing grazing systems where animals live in wet, muddy conditions with no appropriate - as assessed by the cow - lying surface, and where there is a lack of access to shelter, no readily accessible water, and where cows do not have a balanced diet.

64. Given the inherent risks of IWG as I have outlined above, robust animal welfare mitigations should be a requirement of any IWG consents. Where these mitigations cannot be implemented in practice, then IWG consent should not be granted.

65. Fundamental deficiencies across regulatory frameworks, in part due to their siloed development, implementation and reading, mean consent conditions are critical to protect animal welfare in IWG systems.

MUTUALLY BENEFICIAL OUTCOMES

66. Including animal welfare conditions in IWG consents could have mutually beneficial outcomes because environmental and animal welfare outcomes are often correlated.

67. Generally, where there are positive environmental outcomes, it is also likely that the lived experience of the farmed animals in IWG systems will be more acceptable, to a greater or lesser extent. For example, lying surfaces that cattle find acceptable are often tightly aligned with better environmental outcomes (i.e., soil remains covered, surfaces are firm, and dry[44]).

68. Concern for environmental compromise (e.g., pugging, runoff, water quality) is evidenced by the necessity for this consent in the first instance and it is well known and researched that cattle do not like lying on wet, muddy surfaces. Increasing muddiness results in cattle choosing to lie on concrete[45] even though this has been proven to increase stress levels.[46, 47]

[44] In this context, I take 'dry' to mean approximately 74%DM or more, per Chen et al (2017).

[45] Chen, Jennifer M., Stull, Carolyn L., Ledgerwood, David N.,Tucker, & Cassandra B., (2017), Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete; *Journal of Diary Science, 100(3), 20902103.*

[46] Fisher, A. D., M. Stewart, G. A. Verkerk, C. J. Morrow, and L. R. Matthews. 2003. The effects of surface type on lying behaviour and stress responses of dairy cows during periodic weather induced removal from pasture. Appl. Anim. Behav. Sci. 81:1-11.

[47] Fisher, A.D., Verkerk, G.A., Morrow, C.J., & Matthews, L.R., (2002), The effects of feed restriction and lying deprivation on pituitary-adrenal axis regulation in lactating dairy cows. Livestock Production Science 73: 255-263.

69. This co-beneficial relationship is noted in recent Ministry for the Environment guidance which states:[48]

> ***Intensive winter grazing in wet conditions that result in pugging and muddy soils can result in little opportunity for cows to lie down.*** *If lying time and rest is limited, cow health can be negatively affected and increase the risk of lameness (Schütz et al, 2019; Neave et al, 2022). Soil pugging depth has commonly been thought to have a big impact on cows' lying time during winter grazing on crops. However, recent research shows cows spent less time lying down as soil conditions deteriorated, especially when surface water pooling increased during rainfall events (Neave et al, 2022). The research showed that surface wetness and the amount of water pooling, not the depth of soil pugging, had the biggest impact on cows' lying time in winter crop paddocks (DairyNZ, 2022).*
>
> (emphasis added).

70. It should be noted that the mutual benefits above do not always hold. For example, on light, leaky soils in Canterbury, where there may be acceptable lying surfaces, there are poor outcomes for receiving waterways due to leakage through the soil.

MY RESPONSE TO EVIDENCE FROM DR WOUDA, MR ANDERSON AND MS MESMAN

71. PDL's experts seem to accept that IWG can adversely impact animal welfare.[49] However, they consider that concerns are "predominantly linked to management of stock"[50] and can be addressed by following "best practice winter management principles"[51] and that these "assurances"[52] address NZALA's concerns.

72. In my view, the management practices outlined by PDL's experts will not provide for appropriate animal welfare outcomes. In addition, even if the proposed management practices are strengthened to ensure more positive welfare outcomes, unless these measures have regulatory effect through the resource consent, they are likely to be

[48] Ministry for the Environment. 2023. Pugging: Guidance for intensive winter grazing, Publication number ME 1746, page 25, https://environment.govt.nz/assets/publications/Pugging-Guidance-for-intensive-winter-grazing.pdf

[49] See for instance, paragraph 9 of Dr Wouda's evidence statement.

[50] Statement of Evidence of Dr Wouda, paragraph 18.

[51] Statement of Evidence of Dr Wouda, paragraph 11.

[52] Statement of Evidence of Ms Mesman, paragraph 33.

regarded as 'optional guidance' rather than as mandatory requirements. I discuss below the adequacy of the animal welfare measures proposed by PDL and propose amendments to better manage and minimise animal welfare concerns if consent is granted.

Proper and sufficient food

73. I agree with Dr Wouda that IWG management practices, including nutrition and the transition from pasture to crop, can either improve or compromise animal welfare outcomes.

74. I also agree with Dr Wouda that fodder beet can be a higher risk feed and that some of its short-term effects can be managed to the best of scientific knowledge. However, as acknowledged by Dairy NZ, much is still unknown about the long-term impacts of fodder beet and other low protein intake on performance in farming systems. [53]

75. PDL propose to use 60% of the cattle's diet as fodder beet. This is at the top end of the recommended range for dairy cows and would be extremely difficult to ensure at a per cow level - the more dominant cows will eat more than their subordinates in the same, confined area. Dairy cattle are very hierarchical, and less dominant cows often have compromised nutrition in a confined and or restricted feed environment.

76. Regarding Dr Wouda's evidence on humeral fractures:

76.1. I agree that the information in paragraph 9(c) of NZALA's submission is incorrect. The relevant paragraph in the referenced paper states:

> *'It is estimated that 4% of dairy farms are affected by humeral fractures a year with an on-farm prevalence of 2–25% of replacement heifers resulting in a significant welfare issue.'* [54]

76.2. I note that I was not engaged by NZALA when it prepared its submission.

[53] https://www.dairynz.co.nz/feed/crops/fodder-beet/transitioning-and-health-risks/

[54] Broken shoulders in dairy heifers in NZ: investigating the relationship between live weight and bone morphology in bovine forelimb, M.J. Gibson.

76.3. However, more recent research ties a number of bone pathologies to grazing fodder beet and low copper: [55]

> *'Cows with humeral fracture have osteoporosis due to decreased bone formation and increased bone resorption, likely associated with inadequate feed quality and perhaps copper deficiency leading to a reduction in bone strength and fracture.'*

76.4. While PDL may never have experienced humeral fractures, the nutritional deficiencies of fodder beet are undisputed and the impacts of this require more research.

76.5. Research is starting to fill knowledge gaps, such as the impacts of feeding cows fodder beet over winter and then feeding those heifer offspring on fodder beet.[56] Again, more research is required.

77. It is unclear what Dr Wouda means when she refers to 'best practice winter management principles' in paragraph 11 of her evidence. If Dr Wouda is referring to the recommended best practice (RBP) included in the Code of Welfare | Dairy Cattle or GMP, then I disagree that this will mitigate the animal welfare concerns raised by NZALA.

77.1. The Code of Welfare | Dairy Cattle already contains not only RBP but also a Minimum Standard (MS) on lying needs for cattle, that if adhered to, would provide animals with an area "*to lie and rest comfortably for sufficient periods to meet their behavioural needs."* Given that the MS existed *prior* to the Winter Grazing Taskforce being established to address animal welfare issues in winter grazing systems, it tells us that the MS, and in fact, the requirements of the Animal Welfare Act 1999 (i.e., ss 4(b), (c) and 10), were not delivering the necessary outcomes for animals.

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[55] Wehrle-Martinez A, Lawrence K, Back PJ, Rogers CW, Gibson M, Dittmer KE. Osteoporosis is the cause of spontaneous humeral fracture in dairy cows from New Zealand. Vet Pathol. 2023 Jan;60(1):88-100. doi: 10.1177/03009858221122500. Epub 2022 Sep 12. PMID: 36112824.

[56] Woods R. R., Dalley D. E., Edwards J. P. (2023) Effects of feeding fodder beet or kale in winter to dams and their heifer offspring on the heifer growth and production. *Animal Production Science*; https://doi.org/10.1071/AN22474

NAWAC recommended three regulations relating to winter grazing in its 2022 draft Code of Welfare | Dairy Cattle; a suitable place to lie, no calving on mud and ready access to water. Given these draft standards were all opposed by DairyNZ, my assumption is they were considered unachievable (other proposals were accepted), meaning GMP, RBP and MS's must be failing to deliver acceptable outcomes for animals, which conflicts with Dr Wouda's statement.

77.2. GMP is environmentally focused and does not always provide adequate protections for animals, and in fact, it sometimes conflicts with good animal welfare outcomes.

77.3. I understand PDL will put portable water troughs in breaks. These need to be of sufficient size and strategically placed to ensure that all cows have functional access to water. In confined spaces and with limited access, cows can guard resources such as water and prevent subordinates from access. Conditions around the base of the trough will also have an impact on functional access – if it is too boggy or muddy, cows may struggle to reach the trough. The same applies to supplementary feed provided in troughs. Functional access must be provided to all cows.

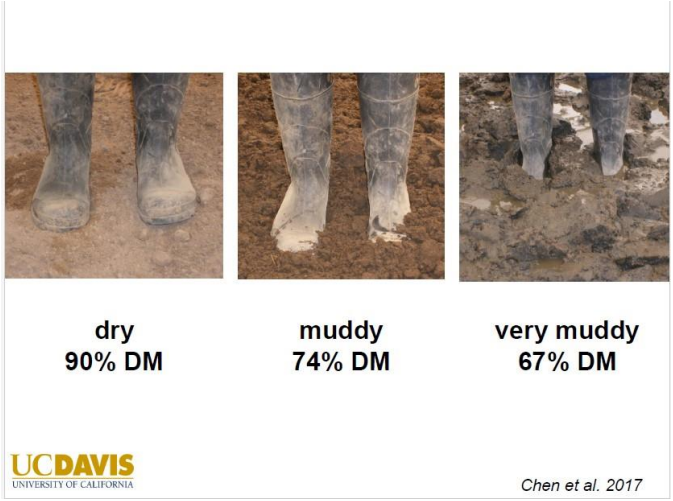
Behaviour and shelter

78. I agree with comments made by Dr Wouda and Mr Anderson, that the colloquial understanding of 'dry ground' in relation to a lying area is not practical in an outdoor environment although Mr Anderson does describe measures he undertakes (such as the laying of fresh straw, moving stock off winter feed and building walls of haybales to provide shelter) to "make sure animals are kept out of water that settles on the ground, and out of areas that animals would usually pace" (paragraph 16 of Mr Anderson's evidence). The meaning of "dry ground" in this context is well understood in the farming context. Chen et al (2017)[57] and other research suggests that a suitable 'dry lying' area

[57] Chen, Jennifer M., Stull, Carolyn L., Ledgerwood, David N.,Tucker, & Cassandra B., (2017), Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete; *Journal of Diary Science, 100(3), 20902103.*

will be more than 67% dry matter (DM) in the soil and that somewhere around 74% DM is likely to provide cattle with a substrate on which they are content to lie.

79. For the mitigations proposed by Mr Anderson to be effective, they would need to be deployed when soil moisture is somewhere below 74% DM and well before there is only 67% DM (per the 'gumboot test'[58,59,60]).



Gumboot test per Chen (2017)

Image taken from Schutz PowerPoint presentation to Taskforce[61]

80. Mr Anderson talks in his evidence about PDL using fresh straw usually every couple of days to create dry areas. I accept that straw *could* be used to provide some better lying surfaces, however it would be good to have clarification about how many farms in the local area engage this technique, how often Mr Anderson has used the technique, what the ground conditions are when he places the straw and how much straw is needed to make a meaningful difference to the lying surface. I have never seen this technique used though it was discussed at length during Taskforce deliberations, and then discarded as not being practical. A colleague who spends a lot of time in Southland over the winter investigating IWG, said they have only rarely seen this deployed and with varying, though always limited success.

81. Regarding Mr Anderson's suggestion of setting up a hay bale windshield, clarification of the method would again be useful as getting tractors on to crop paddocks without

[58] Above.
[59] Winter Grazing Action Group Expected outcomes for animal welfare.
[60]https://www.dairynz.co.nz/media/5795909/gumboot_score_method_chart_sept2022_update_v2.pdf
[61] https://1drv.ms/b/s!AvusbQdPBRgDgYl4T0tCUkBcGSb-pw?e=bQJ7ls

getting stuck can be a real challenge. I would also think that without leaving the back fence in place behind the bales, the shield would need regular, potentially daily, moving. A large number of bales would be needed to provide "adequate shelter" for the mob as required by s 4(b) of the Animal Welfare Act. This does not seem feasible, nor practical.

82. I disagree with comments made by Dr Wouda and Mr Anderson that moving cattle off crop and onto stand-off areas in response to an extreme event is sufficient. Given the many days of inclement winter weather in Southland, the necessity to shift the animals must be determined by the outcomes (e.g., when soil dry matter falls somewhere below 74% and definitely when it falls to near 67%, as determined by the 'gumboot test', *and* when this means that *sufficient lying area* is no longer provided to all the cows). What is also important to protect welfare is understanding the impact of lower critical temperature of cattle and the effect of wind and/or rain on this.[62] It would be useful for Mr Anderson to explain the weather situations in which he would provide his cows access to shelter. The images below of PDL show that meaningful shelter may be difficult to provide in some areas of the farm.

Images accessed from google maps (September 2023)

[62] https://www.thedairysite.com/articles/837/cold-stress-in-cows

83. I agree with Dr Wouda that muddy, wet lying surfaces impact lying time (paragraph 14 of her evidence). There is a multitude of research[63,64,65] on this issue, with reduction in lying times in muddy conditions being shown to be as much as 50-75%.[66,67,68]

84. I strongly disagree that using laneways is a suitable workaround or contingency for moving cattle off wet, muddy crops as proposed by Dr Wouda (paragraph 14). Laneways are generally constructed of hard, compacted materials that can withstand high hoof traffic from the herd regularly walking on them (i.e., to and from the milking shed, twice daily). Research shows that cattle prefer to lie on concrete over laneways concrete.[69]

85. I acknowledge Mr Anderson's statements regarding PDL's transitioning system and that it has not had a cow calve on crops for years. To provide for welfare needs and in line with best practice as documented in the Taskforce Report, NAWAC's proposed revisions to the Code of Welfare, their recommendations for regulation and Southern Dairy Hub research (*pers Comm.*, Daly (2021)), cows should be date scanned at pregnancy testing and moved off crop 14 days prior to that scanned calving date.

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[63] Fregonesi, J. A., D. M. Veira, M. A. G. von Keyserlingk, and D. M. Weary. 2007. Effects of bedding quality on lying behavior of dairy cows. J. Dairy Sci. 90:5468-5472.

[64] Tucker, C. B., A. R. Rogers, G. A. Verkerk, P. E. Kendall, J. R. Webster, and L. R. Matthews. 2007. Effects of shelter and body condition on the behaviour and physiology of dairy cattle in winter. Appl. Anim. Behav. Sci. 105:1-13.

[65] K.E. Schütz, N.R. Cox, Effects of short-term repeated exposure to different flooring surfaces on the behavior and physiology of dairy cattle, Journal of Dairy Science, Volume 97, Issue 5, 2014, Pages 2753-2762, ISSN 0022-0302, https://doi.org/10.3168/jds.2013-7310.

[66] Muller, C. J. C., J. A. Botha, and W. A. Smith. 1996. Effect of confinement area on production, physiological parameters and behaviour of Friesian cows during winter in a temperate climate. S. Afr. J. Anim. Sci. 26:1-5.

[67] Fisher, A. D., M. Stewart, G. A. Verkerk, C. J. Morrow, and L. R. Matthews. 2003. The effects of surface type on lying behaviour and stress responses of dairy cows during periodic weather-induced removal from pasture. Appl. Anim. Behav. Sci. 81:1-11.

[68] Chen, Jennifer M., Stull, Carolyn L., Ledgerwood, David N.,Tucker, & Cassandra B., (2017), Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete; *Journal of Diary Science, 100(3), 20902103.*

[69] Fisher, A. D., M. Stewart, G. A. Verkerk, C. J. Morrow, and L. R. Matthews. 2003. The effects of surface type on lying behaviour and stress responses of dairy cows during periodic weather-induced removal from pasture. Appl. Anim. Behav. Sci. 81:1-11.

Effects from injury and disease

86. I note that both Dr Wouda and Mr Anderson refer to 'health' several times (for example in their statements about managing mastitis risk).[70] Contemporary animal welfare science sees health as a subset of welfare. The assessment of an animal's lived experience must include not only their health, but all domains, including mental state.

87. I strongly disagree with Dr Wouda that there are no studies that establish conclusively the concerns raised by NZALA.[71] Research has established a range of potential health risks such as lameness, mastitis, acute and chronic stress,[72,73,74,75] and possible immunosuppression.[76] In addition, as I stated above, there are gaps in scientific knowledge about the long-term impacts of a nutritionally deficient diet such as fodder beet. In addition, managing health risks do not guarantee animal welfare. Health is a subset of welfare as outlined in the Five Domains model of animal welfare assessment.[77] Health, environment, nutrition and behaviour (or psychological experiences) affect overall welfare. The ability to express normal behaviours such as lying to rest, ruminate and sleep *and be content to do so* (as opposed to lying as a result of exhaustion), is a critical and inelastic need for cattle (i.e., they need and want to lie for 10-12 hours/day)

[70] Statement of Evidence of Dr Wouda, paragraph 17.

[71] Statement of Evidence of Dr Wouda, paragraph 18.

[72] Fisher, A. D., M. Stewart, G. A. Verkerk, C. J. Morrow, and L. R. Matthews. 2003. The effects of surface type on lying behaviour and stress responses of dairy cows during periodic weather-induced removal from pasture. Appl. Anim. Behav. Sci. 81:1-11.

[73] Fisher, A.D., Verkerk, G.A., Morrow, C.J., & Matthews, L.R., (2002), The effects of feed restriction and lying deprivation on pituitary-adrenal axis regulation in lactating dairy cows. Livestock Production Science 73: 255-263.

[74] Tucker, C. B., A. R. Rogers, G. A. Verkerk, P. E. Kendall, J. R. Webster, and L. R. Matthews. 2007. Effects of shelter and body condition on the behaviour and physiology of dairy cattle in winter. Appl. Anim. Behav. Sci. 105:1-13.

[75] Munksgaard, L., Simonsen, H.B., 1996, Behavioral and pituitary adrenal-axis responses of dairy cows to social isolation and deprivation of lying down, Journal Animal Science, Apr; 74(4):769-78.

[76] Chen, Jennifer M., Stull, Carolyn L., Ledgerwood, David N.,Tucker, & Cassandra B., (2017), Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete; *Journal of Diary Science, 100(3), 20902103.*

[77] Mellor DJ, Beausoleil NJ, Littlewood KE, McLean AN, McGreevy PD, Jones B, Wilkins C. The 2020 Five Domains Model: Including Human–Animal Interactions in Assessments of Animal Welfare. *Animals*. 2020; 10(10):1870. https://doi.org/10.3390/ani10101870

and it affects their behaviour, psychological state and welfare when they cannot do so. I refer again to Chen et al (2017),[78] who amongst others, has published on this matter.

CONSENT PROCESS

88. I do not have the expertise and therefore do not comment on PDL's claims that its application appropriately manages water quality effects from IWG activities. However, I strongly disagree with Ms Mesman that the Animal Welfare Act 1999 and a pugging consent condition will address all animal welfare concerns. Regarding the Animal Welfare Act - it can only respond reactively once the animals' welfare is compromised. Welfare is best considered holistically and provided for through proactive land management. It is therefore appropriate that these issues are considered through the consent process.

89. A consent condition for pugging might help address one aspect of animal welfare (i.e, lying time), but it does not address other concerns such as access to shelter and water, avoiding exposure on hill tops and avoiding calving on mud).

90. Below, I have annotated Table 6 in the Officer's Report[79] to include a column to represent the animal's perspective on three aspects of the proposed IWG activities that impact on animal welfare. This shows that neither the mitigation measures (ie the additional steps PDL proposes to take) or the GMP supported by the Officer appropriately provide for acceptable animal welfare outcomes.

Mitigation/GMP	**Implementation timeframe**	**Mitigation measure or GMP?**	**Animal Perspective**
Decrease in crop area from permitted baseline of 64 ha to 55 ha.	14% reduction in crop area from first exercise of consent.	Mitigation Measure	Increased time on increased density (energy/ha) of fodder beet crop, with associated

[78] Chen, Jennifer M., Stull, Carolyn L., Ledgerwood, David N.,Tucker, & Cassandra B., (2017), Muddy conditions reduce hygiene and lying time in dairy cattle and increase time spent on concrete; *Journal of Diary Science, 100(3), 20902103.*

[79] s42A Recommending Report and Appendices APP-20222765; Hearing of Application – APP-20222765, Pahia Dairies Limited., Compiled by Jade McRae, Senior Consents Officer

			poor animal welfare outcomes
IWG excluded from certain areas	Exclusion zone map as per appendix 2 of the LUC	Mitigation measure	Pugging / wet areas in 'non-excluded areas', mean cows not provided with acceptable lying surfaces and/or space
Back fence stock off land that has already been grazed.	From first exercise of new consent.	Good management practice	Back fence limits access to shelter
Use portable water troughs and portable feeders when supplementary feed is fed on crop paddocks.	From first exercise of new consent.	Good management practice	Ready access to sufficient water should be provided at all times

Modified; taken from s42A Recommending Report and Appendices APP-20222765

RECOMMENDATIONS TO IMPROVE ANIMAL WELFARE

91. First and foremost, the use of the land needs to meet its capability, in a genuine manner. In some instances, this will mean land use change is needed as the physical weight of the stock class on the soils in the specific environment is unlikely to deliver outcomes that are acceptable for the animals nor the environment. For the reasons I explained earlier, generally I do not think that IWG practices are compatible in Southland's geophysical attributes and winter climate.

92. Therefore, the recommendations I set out below should be considered as workarounds for land use that exceeds the land's capability to assimilate impacts of that use.

93. Land use change options might include shifting to a dry stock farming system with lighter animals, growing crops suitable for the area, or milking sheep due to their smaller size and therefore lesser environmental impact, or a combination of the above (i.e, a biodiverse farming system). Sheep welfare in IWG systems is also shown to be compromised, so simply shifting the system to a new one is not necessarily protective

for animal welfare in itself. Foot rot, thermal comfort, and other health and welfare challenges would also need to be managed for sheep in an outdoor, Southland-based, farm system.

94. Another option includes housing cattle over the winter period. While use of a barn relieves the immediate welfare compromise of cattle living in unacceptably muddy conditions, animal welfare experts have concerns about housing cattle given the impacts they have on prohibiting normal behaviour (e.g., grazing and foraging).[80,81] It is worth noting that poorly managed barns/housing facilities may seriously negatively affect animal welfare.

95. Significantly reducing stocking rate (i.e., providing a much greater area to cattle during winter grazing and/or having less animals overall or in an area) through growing less tonnes per hectare may improve welfare outcomes. There is an inherent trade off in that the cropped area's soil structure is essentially sacrificed (i.e., completely destroyed) during grazing, and this protects the wider farm's soil structure. From a practical perspective, the area needed to protect welfare would mean a stocking rate so low that the farm system would likely not be viable under current conditions (e.g., payout and debt). This comes back to the key issue; land use change is needed so farming systems are inside the capacity of the land rather than exceeding it.

96. Shifting to a winter grazing system such as grass and baleage (G & B; see image below) where winter grazing does not leave entirely bare soil but rather leaves some residual dry matter, may improve welfare through providing a more acceptable lying surface (i.e, the surface is not just mud, meaning there *may* be less surface pooling).

97. That said, dry matter per hectare in G & B systems can achieve 30 T DM/ha which is equivalent to a well grown fodder beet crop, and outcomes can be as bad, or worse than annual crop. The worst IWG outcomes I have seen have come from a G & B grazing system. The image in paragraph 37 is also the result of a G & B grazing system and is from the same farm as the images below

[80] VAWA Kaituna Barns 2023; https://1drv.ms/b/s!AvusbQdPBRgDzELQTPnH8ehDy1L6?e=b3AfQ7

[81] RNZSPCA Kaituna Barns 2023; https://1drv.ms/b/s!AvusbQdPBRgDgY1BRAq-oY9UW9zlAQ?e=sWEiL9

98. G & B systems are not captured by the Freshwater Regulations 2020 which may increase risks to environmental and animal welfare given there are no conditions attached to G & B use (i.e., farmers can use as much as they like when, where and how they like, and no consent is needed).

99. A ‘strip tillage’ system as proposed by PDL can have variable outcomes for the environment and animals as shown in the images below. While there is, in theory, residual dry matter left where the grass strips are, the images below show firstly a reasonable surface in such a system and another example (see second photo below), that shows the amount of pugging may mean cattle are less content to lie.

100. ‘Cut and carry’ of the crop to a barn, stand-off or other lighter/appropriately stocked sacrifice paddocks *with a suitable lying surface* would improve animal welfare. This involves a significant increase in workload and resourcing.

101. Use of the crop in situ for daily (or twice daily) feeding and then a stand-off or use of lighter/appropriately stocked sacrifice paddocks *with a suitable lying surface* would also

provide better animal welfare outcomes. Again, this involves a significant increase in workload and resourcing.

102. In terms of the methods described in paragraphs 99 and 100, the animal welfare outcomes of using these methods are determined by the impact the animals have in the sacrifice area or the type of stand-off area that is provided. If the sacrifice area ends up severely pugged with surface slurry, cattle will still not be content to lie. Stand offs also need to have a suitable surface and area as cattle do not like to lie on hard surfaces (e.g., lane ways).

103. Grazing off (e.g., at a run off or via a grazier) during the winter in a region where land capability can comfortably carry cattle over winter could also be considered and is a common practice. If this mitigation is used, an holistic approach to the land's suitability/carrying capacity is needed. Not only must animal welfare be considered but also the impact on the alternate environment (e.g., nutrient leaching into waterways on gravelly, leaky soils). The Taskforce noted that in the instance that a grazier is engaged, and/or the grazing situation is remote to the person in charge of the animals, there still needs to be an holistic approach to animal welfare outcomes that includes the seed merchant, grazier and the animal owner and/or person in charge.

104. As stated in the Taskforce Report:

> *"…. some dairy farm owners do not own or manage the livestock on their farm and become further removed from animal welfare issues during winter grazing when the livestock owner sends these animals to a grazier, current grazier contracts are silent on animal welfare, seed merchants don't consider animal welfare in cropping advice and financiers don't appear to understand the potential animal welfare consequences of intensive winter grazing practices."*[82]

The Taskforce recommended that steps are taken to ensure *'everyone understands the role that they have to play in improving animal welfare.'* This means it is not an 'out of sight, out of mind' scenario; and legally the owner of animals retains responsibility for the grazed-off animals under the Animal Welfare Act 1999.

[82] Winter Grazing Taskforce Final Report & Recommendations

105. More specifically, within PDL's proposed IWG system, to improve animal welfare, top-down grazing should not be used when animals are fenced on to a hilltop and exposed to inclement weather. As long as there are no adverse effects on the environment (e.g., runoff into critical source areas or receiving water bodies) there is no reason, other than inconvenience, why a crop can't be broken into at a different point (i.e., part way down a slope, and away from the exposed hilltop). This principle applies also to any areas used for IWG that are exposed to inclement weather (e.g., seawards or south side of a paddock).

106. When shelter is only available at the paddock's back (excluding front or side for this point) boundary, the back fence on the break is inconsistent with s 10 of the Animal Welfare Act 1999 (failing to meet the cattle's physical, health and behavioural needs which includes "adequate shelter" under s 4(b)). In reality, despite shelter being a legal requirement, I accept a compromise is needed to limit environmental damage while ensuring animal welfare outcomes are acceptable (through the animals' eyes). In inclement weather, either:

106.1. the back fence needs to be removed to allow access to shelter, or

106.2. the animals are moved to a (sacrifice) paddock with adequate shelter, or

106.3. fencing needs to be used such that access is allowed through for example, a temporary fence or nearby lane way.

107. There are inconsistencies in the application regarding back fencing (e.g., *Back fencing is* ***used where possible*** *during intensive grazing of fodder crops*; and elsewhere, '*Extra care is taken observing grazing, with animals removed if needed in extreme conditions.* ***Back-fencing is always used.*****).** While the best outcome (and the legal requirement) for animal welfare is ready access to shelter at all times, I accept that a compromise needs to be made for environmental welfare, meaning back fencing should be provided only when animals can be thermally comfortable without accessing shelter.

108. The wider supply chain (i.e., seed merchant, grazier, owner, share milker) should be involved in regular check-ins during grazing and then a debrief at the end of the winter, with the view to modifying and improving outcomes for the following year, including

lowering sowing rates. Continual progress towards better outcomes for animals and the environment ought to be considered a minimum standard.

109. Completing a comprehensive IWG plan that includes, at a minimum, the conditions set out by Mr Hook is a good first step. The plan will then need to be fully implemented and adjusted as the cows' and environment's needs dictate.

110. If IWG is to occur, then a combination of the following measures would improve animal welfare (and also environmental) effects:

110.1. reduced intensification through:

110.1.1. reducing stocking rate; and/or

110.1.2. reduced energy/ha of crop; and/or

110.1.3. some animals grazed off; and/or

110.1.4. use of a barn and/or use of a stand-off; and

110.2. ensuring cattle welfare needs are met, including having:

110.2.1. a suitable place to lie and calve; and

110.2.2. ready access to sufficient water; and

110.2.3. ready access to a balanced diet; and

110.2.4. access to sufficient shelter for ensure thermal comfort; and

110.2.5. enough space to support behavioural needs.

111. I accept that if IWG proceeds on PDL's farm, it is not possible to completely avoid all animal welfare compromise. On balance, and although this is not my preference from a welfare perspective, I consider that the conditions set out in Mr Hook's evidence will deliver considerable animal welfare improvements. Compliance with these conditions will ensure at least the cattle's basic animal welfare needs are met including access to water, shelter and suitable lying areas.

112. Finally, *expert and independent* animal welfare advice should be sought before and during the IWG period - from a veterinary perspective, this is unlikely to come from the farm's clinical veterinarian, given they are unlikely to be independent,[83] and per Littlewood et al (2020),[84] are unlikely to have the necessary animal welfare expertise.

CONCLUSIONS

113. Agricultural intensification has led to significant welfare compromise for animals and the environment. This means in many instances the land's carrying capacity has been exceeded. For IWG systems, multiple mitigations and/or conditions must be applied over and above GMP to attempt to offset this fundamental flaw in the system and improve welfare outcomes.

114. As previously stated, adverse welfare effects are often compounded by poor management, and siloed regulation and implementation that fails to consider animal welfare alongside environmental welfare.

115. In my view, if the conditions proposed by Mr Hook are accepted (which have been developed in light of my evidence on animal welfare), the welfare of the cattle will likely be better than what would be achieved through the GMP and mitigation measures proposed by PDL and accepted by the Council officer.

116. If conditions are not included to promote better animal welfare outcomes, granting consent is also likely to create additional adverse environmental effects on the farm. If the system's intensity is lower through a lower yielding crop, the compromise to both welfare and environmental outcomes may be less.

117. Because of the increased intensity in the IWG activity proposed (i.e., more fodder beet and less hectarage overall for cropping) where the proposed conditions are not included, animal welfare is highly likely to be seriously compromised, and I oppose the consent being granted.

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[83] https://www.rnz.co.nz/news/national/424777/rural-veterinarians-empathetic-but-compromised-over-animal-welfare-reporting-vet-says

[84] Littlewood KE, Beausoleil NJ. Two Domains to Five: Advancing Veterinary Duty of Care to Fulfil Public Expectations of Animal Welfare Expertise. *Animals*. 2021; 11(12):3504. https://doi.org/10.3390/ani11123504

118. Where the conditions Mr Hook proposes are included, implemented, monitored and modified as needed (e.g., allowing access to shelter as needed), I do not oppose this consent being granted.

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