Ministry for the Environment
Manatū Mō Te Taiao

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20-D-00965

s 9(2)(a)

Greenpeace Aotearoa/New Zealand
s 9(2)(a) @greenpeace.org

Dear s 9(2)(a)

Thank you for your email of 11 June 2020 requesting the following under the Official Information Act 1982 (the Act):

> *The fertiliser application rates cited in the Cabinet paper "ACTION FOR HEALTHY WATERWAYS – DECISIONS ON NATIONAL DIRECTION AND REGULATIONS FOR FRESHWATER MANAGEMENT" differ from the statistics that I was able to access on synthetic nitrogen use in NZ through StatsNZ. So I am looking for the following information:*
>
> *1) The dataset or detailed information on synthetic nitrogen use in NZ that was used in the above cabinet paper.*
>
> *2) If it is available I would specifically like to know the average rates of synthetic nitrogen per hectare by different land-uses, and by region.*
>
> *3) The advice that Minister Parker and O'Connor were given by MfE officials on the Synthetic Nitrogen cap, which is referenced in the cabinet paper."*

The Ministry for the Environment has identified 14 documents in scope of your request, as listed in the attached document schedule.

Eight of these documents are being refused for release under s18(d) of the Act, as they are, or will soon be, publicly available.

Three of these documents are publicly available, addressing the first and second parts of your request. They can be found on the Ministry for the Environment's and Ag First websites. The other five documents will soon be made publicly available. These documents address the third part of your request.

One document has been partially withheld, as it contains out of scope content. One phone number has also been withheld under section 9(2)(a), to protect the privacy of natural persons. The remaining five documents have been released in full.

Although not covered by this request, we note that the Fertiliser Association has recently put out two reports which may provide information that you are seeking.

http://www.fertiliser.org.nz/Site/research/projects/impact-of-the-190kg-fertiliser-nha-limit.aspx

http://www.fertiliser.org.nz/Site/research/projects/farm-level-cost-of-a-carbon-tax-on-nitrogen-fertiliser.aspx

You have the right to seek an investigation and review by the Office of the Ombudsman of my decision to withhold information relating to this request, in accordance with section 28(3) of the Act. The relevant details can be found on their website at: www.ombudsman.parliament.nz.

Please note that, due to the public interest in our work, the Ministry for the Environment publishes responses to requests for official information on our OIA responses page shortly after the response has been sent.

If you have any queries about this, please feel free to contact our Executive Relations team: ministerials@mfe.govt.nz.

Yours sincerely

Lucy Bolton
Acting Director, Water

Document schedule

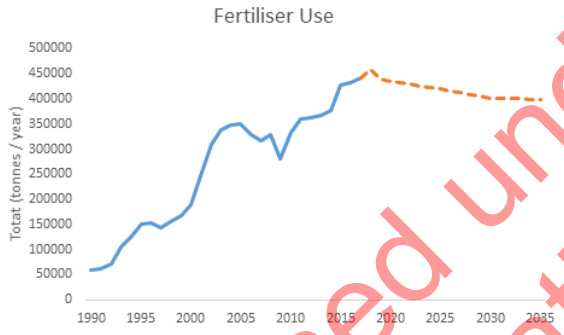
Document no.	Document date	Content	Decisions	OIA sections applied
1	May 2020	Report: Action for healthy waterways part 2: Detailed analysis	Refused	18(d) www.mfe.govt.nz/regulatory-impact-statements/action-for-healthy-waterways-part-11
2	May 2020	Report: Action for healthy waterways Summary of submissions on national direction for our essential freshwater	Refused	18(d) www.mfe.govt.nz/publications/fresh-water/action-healthy-waterways-summary-of-submissions-national-direction-our
3	26 February 2020	Internal Paper: Fertiliser National Target and default mechanisms v.2	Released in full	
4	8 April 2020	Internal Paper: Some extra fert refs information that may be useful	Released in full	
5	02 June 2020	Spreadsheet: Fertiliser Cap Literature Directory	Released in full	
6	20 March 2020	Spreadsheet: N cap Data	Released in full	
7	November 2019	Report: The value of Nitrogen Fertiliser to the New Zealand Economy	Refused	18(d) www.agfirst.co.nz/wp-content/uploads/2020/03/Value-of-N-Fertiliser-Report-2.pdf
8	9 May 2019	Briefing: 19-B-05576 Essential Freshwater 50~ Recommendations on Outstanding Policy Options for National Direction on Rural Land Use	Released in part	Partially out of scope s9(2)(a)

9	16 December 2019	Briefing: 19-B-06271 Essential Freshwater 81: Update on options to address key consultation themes	Refused	18(d) Will be made publicly available soon
10	March 2020	Briefing: 20-B-06431 Essential Freshwater 83, Policy decisions following consultation	Refused	18(d) Will be made publicly available soon
11	10 March 2020	Briefing: 20-B-06544 Essential Freshwater 84, Event note – meeting with Greenpeace 12 March 2020	Refused	18(d) Will be made publicly available soon
12	13 March 2020	Briefing: 20-B-06569 Essential Freshwater 85: Options for a nitrogen fertiliser cap	Refused	18(d) Will be made publicly available soon
13	1 April 2020	Briefing: 20-B-06609 Essential Freshwater 86 Progressing multiple initiatives to address excessive nitrogen quickly	Refused	18(d) Will be made publicly available soon
14	January 2020	Talking Points: Fertiliser Cap – Talking Points	Released in full	

A framework for monitoring and driving reductions in nitrogen fertiliser use

Background

1. Pastoral farming pre-1990 was largely dependent on legume sources of nitrogen, with trials in the 1980s indicating that such pastures were nitrogen-deficient. Nitrogen fertiliser use has increased as a cost-effective way to increase pasture production, especially in spring, when clover growth is slow. Some dairy farmers use nitrogen in spring and autumn to extend the season, and others using it routinely throughout the growing season.
2. Nitrogen use in the dairy sector varies. System 1 (low intensity) farms use an average 45 kg of nitrogen/ha/year; whereas system 5 (highest intensity) farms use an average of 126 kg/ha/year. Dairy research indicates that nitrogen use efficiency is highest at 100-200 kg N/ha/year, and a reduction in nitrogen fertiliser use is likely to increase profit if applications are in excess of 200 kg/ha/year[1]. Most vegetable growing is dependent on synthetic nitrogen fertiliser, with recommended applications rates for some crops well in excess of dairy rates.
3. Nitrogen fertiliser use is projected to fall under *current* policy settings:



Source: Climate Change Inventory

4. We expect nitrogen fertiliser use to drop faster than the projections in the graph above as regional plan rules implement the NPS-FM. For example some farmers in Canterbury are already reportedly reducing fertiliser use in response to regional council rules limiting nitrogen discharges. Climate change pricing proposals may also drive reductions in nitrogen fertiliser use.

A national target for reductions in nitrogen fertiliser use

5. A target could be set for total national use of nitrogen fertiliser to fall by specified increments over time. However any national target is likely to be seen as insufficient and toothless by the ENGO sector. Greenpeace for example, suggests a target of zero synthetic nitrogen fertiliser by 2025, achieved through sinking lid caps at the per hectare scale.
6. Should you wish to set a national target, there is a spectrum of approaches you could use:
    a. **Setting a target reduction centrally**, similar to the "Predator-free 2050" target, with back-up regulations prepared to enforce reductions if the targets are missed. The target reduction could be marginal (eg, 10 percent in two years) to drive more efficient use, or it could be more demanding (over a longer timeframe) to drive system change. It is critical that a defensible target and timeframes are set, based on scientific research and understanding of farm systems and practice, because (unlike

[1] https://www.dairynz.co.nz/news/latest-news/tactical-use-of-nitrogen-fertiliser/

"Predator-free 2050") achieving an "aspirational" target for nitrogen fertiliser reductions would have significant economic and social impacts on individual businesses and communities. We do not currently have data to support advice on the appropriate percentage reductions.

b. **Setting a target reduction agreed with the primary and fertiliser sectors,** with back-up regulations prepared to enforce reductions if the targets are missed. To be effective this agreement would need to include agreed primary sector actions to achieve the targets eg, a programme of advice to raise awareness and signal to growers and farmers that excessive fertiliser use is not acceptable. This option is most likely to be successful, because it builds in sector commitment to both the targets and the programme to achieve them. However, the approach may be criticised as too lenient, given the involvement of the sectors in selecting the targets.

c. **Primary sector sets target reductions** jointly with the fertiliser sector, with no explicit regulations in place to enforce the reductions if the targets are missed. This would be more effective if accompanied by a commitment to provide audited reports annually to the Government and the public as media and ENGO attention could drive greater effort to deliver on targets.

7. A national target reduction would be most effective if combined with advice on good management for fertiliser use, since the impact of management (eg, timing of fertiliser applications) is often at least as significant as the total amount of fertiliser applied, in terms of the impact on nitrogen losses to air and water.

Monitoring changes in fertiliser use at the national scale

8. Systems are already in place that could be used to monitor nitrogen fertiliser use:
   a. Statistics NZ estimates and reports on nitrogen (and phosphate) fertiliser use every two years using sales data.
   b. Fertiliser manufacturers and importers are already reporting emissions (based on tonnages) to the EPA under the Climate Change Response Act.

Next Steps

9. Further work would be needed to develop the scientific basis for targets and consider the nature of any back up regulations, should you wish to progress this option. We estimate this could take six to eight months. Officials could begin discussions with sector organisations if you prefer the approach in paragraph 6b, to jointly agree on a schedule of targets.
10. Future work could also investigate the potential role of a Water Commission in relation to national targets, for example assessing progress on agreed actions and recommending any follow-up actions by Government.

Some fertiliser refs that may be useful for assessing impacts of an N fertiliser cap

The Pastoral 21 farmlet trial compared a "current farm" system with a "future farm" system – N fertiliser rates were 135 kg N/ha on the "current" and 60 on the future farm, stocking rates were reduced by ~19%, and a stand-off pad was used – higher genetic value cows were used on the future farm and grain was also fed (but not in the current farm). N losses fell by 43% but profitability fell by 13% (average payout $6.08/kg).
There are variants on the "future farm" that would reduce the impact on profitability while still achieving reductions in N losses according to work by Dave Clark at DairyNZ – reducing profit by 2-8% depending on the pay-out while reducing N losses by 37% compared with the "current farm" (https://www.smallerherds.co.nz/knowledge-hub/feed/the-opportunities-and-challenges-of-de-intensifying-your-dairy-system/

DairyNZ says to split dressings: "Use applications of maximum 25 to 40kg N/ha. N applications of 40kg N/ha are useful only when conditions for pasture growth are optimal and pasture su plus to requirements for grazing is harvested for silage, to avoid high pre-grazing covers and residuals" https://www.dairynz.co.nz/news/latest-news/tactical-use-of-nitrogen-fertiliser/

Clark, **Contribution of farmlet scale research in New Zealand and Australia to improved dairy farming systems (online, sciquest)**
In a review of six New Zealand farmlet experiments using N fertiliser, Clark (1997) calculated that the maximum MS response per ha occurred at 450 kg N/ha/year but there was a poor relationship between N applied and economic farm surplus (EFS) per ha. At commerc al rates of 80-150 kg N/ha/year, responses varied from -25 to 160 kg MS/ha per year with EFS varying from -$260 to $350/ha per year. Despite this variability and the low average EFS response of $100/ha per year overall, N fertiliser use steadily increased on New Zealand dairy farms. New Zealand N fertiliser use rose from 50,000 t in 1989/90 to 350,000 t in 2007/08 (Fert Research, 2009) with the majority attributed to dairy farming. The reasons for this increased use are not clear-cut but may include: availability and ease of use, decreases in white clover N f xation due to invasion by clover root weevil (*Sitona lepidus*); the move to ea lier, concentrat d calving patterns increasing late winter feed deficit; increased stocking rate ; the increase in the milk price: N cost ratio; and the increased use of responsive annual ryegra ses The development of cows with a higher intake demand and greater loss of BCS [body condition score] post-calv ng may also have led to increased use of N and bought-in supplements. It i un kely that N fertiliser is used tactically in most circumstances because so few farmers use either formal feed assessment or feed budgeting (Mata *et al.,* 2007) rather, farmers seem to now apply N fertiliser in much the same way other fertiliser is applied – as an annual requirement. It would, therefore, seem to be a long-term risk management strategy rather than a short-term response to a easonal feed deficit.

https://www.fisheries.govt.nz/dmsdocument/4122/direct

White clover or nitrogen fertiliser for dairying?

D.A. CLARK and S.L. HARRIS
Dairying Research Corporation Ltd, Private Bag 3123, Hamilton

published in 1996 from the Joint Symposium **White Clover: New Zealand's Competitive Edge** held at Lincoln University, Canterbury on 21-22 November 1995.
https://www.agronomysociety.org.nz/uploads/94803/files/SP11_23._W_clover_or_N_fertiliser_for_dairying.pdf

Table 1: Seasonal pasture and milksolids production on DRC farmlets during 1993/94 and 1994/95 (Harris et al. 1994, Penno pers. comm.). Farmlets received 0, 200 or 400 kgN/ha/yr and were stocked at either 3.2 (L) or 4.5 (H) Friesian cows/ha.

Treatment	L0	L200	L400	H0	H200	H400
1993/94						
Pasture production (kgDM/ha)	14346	16964	18827	14892	18710	18463
Extra (kgDM/ha)		*2618*	*4481*		*3818*	*3571*
Milksolids (kg/ha)	1321	1335	1357	1692	1765	1778
Extra (kgMS/ha)		*14*	*36*		*73*	*86*
1994/95						
Pasture production (kgDM/ha)	16444	20591	23501	17830	21405	22146
Extra (kgDM/ha		*4147*	*7057*		*3575*	*4316*
Milksolids (kg/ha)	1276	1320	1354	1742	1849	1858
Extra (kgMS/ha)		*44*	*78*		*107*	*116*

Although a response of 10 kg DM per kg N applied is commonly accepted, such response is not always predictable…. The proba ility of achieving a 1O:I response is 0.2 to 0.4 in autumn increasing to 0.8 to 1 .O in spring and early summer.

Figure 5: UDDER prediction of the effect of N fertiliser rate on gross margin/ha.

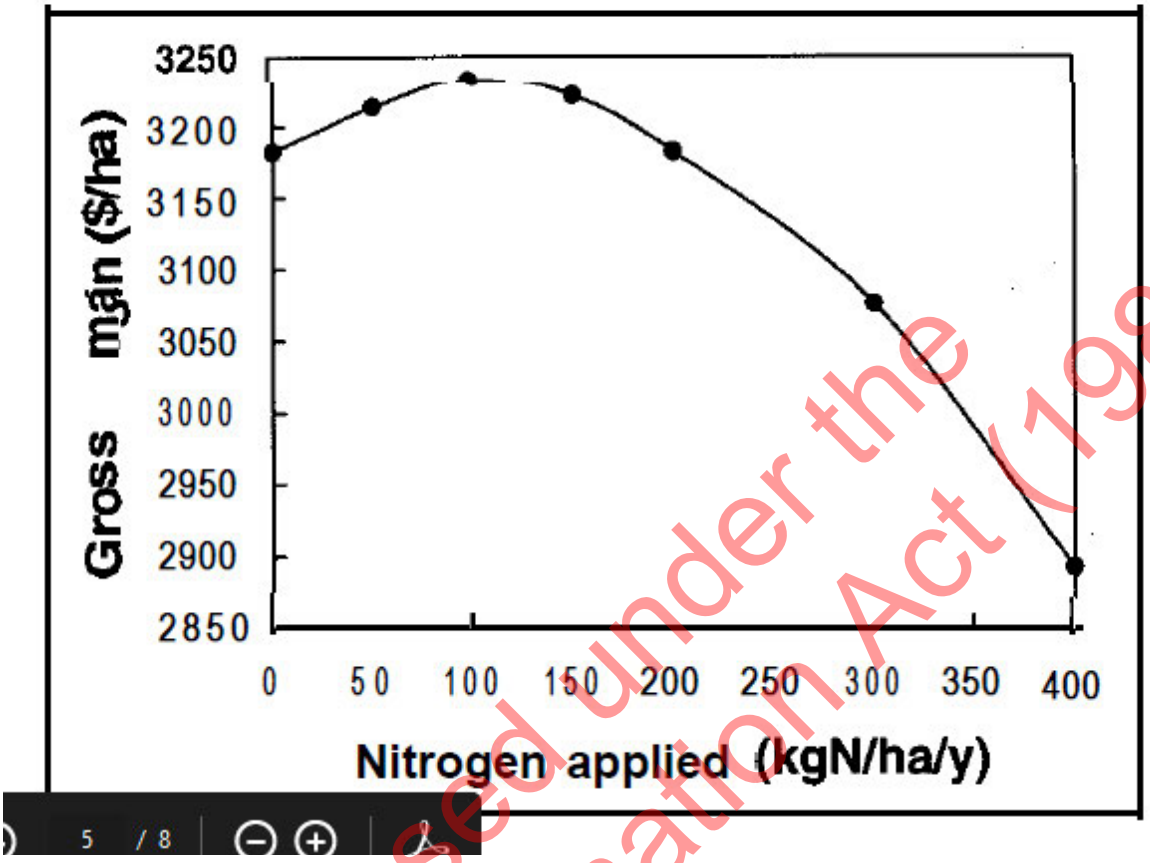


Table 3: The effect of N fertiliser rate, at optimum stocking rate, on production parameters as predicted by UDDER.

N rate (kgN/ha/yr)	Gross Margin ($/ha)	Stocking rate (cows/ha)	Pasture yield (kgDM/ha)	Milksolids (kg/ha)	Milksolids (kg/cow)
0	3180	3.7	16.2	1295	349
100	3230	4.2	17.7	1395	334
200	3180	4.3	18.4	1430	330
300	3080	4.6	19.1	1470	317
400	2890	4.6	19.1	1450	313

In examining the effect of N rate on the economics of dairy farm systems we need to consider the following factors: costs associated with N fertiliser, milksolids price, N response, effect of N on clover content, effect of clover on intake potential and diet digestibility, and stocking rate. To investigate these complex interactions we used a dairy farm simulation model called UDDER (Larcombe 1995). Assumptions made were: $600 per tonne urea, $3.40 per kg milksolids, a variable N response starting at 14 kgDM/kgN for 100 kg N/ha/yr and decreasing to 8 kgDM/kgN at 400 kgN/ha/y, clover content assumed to be 20% at 0 kgN/ha/yr with a linear decline to 0% at 400 kgN/ha/y, a 3.25%

increase in intake with each 10% increase in clover content, a 0.5% increase in diet digestibility with each 10% increase in clover content. Stocking rates were optimised for gross margin per ha at each N level. The model was run using initial values and management representative of an intensive Waikato dairy farm. Under these conditions the model showed 100 kgN/ha/yr gave the highest gross margin/ha (Figure 5). However, there was little change in gross margin/ha from 0 to 200 kgN/ha/yr. Associated changes in stocking rate, per cow and per ha performance are shown in Table 3.

Management factors which may result in increased clover contents include irrigation and adequate drainage, application of P, K and S fertilisers to ensure optimal nutrient ratios, grazing regimes to ensure there is minimal removal or burial of clover growing points, use of companion grass species compatible with clover growth, periodic cropping to reduce soil N levels and therefore promote clover growth, use of herbicides to suppress ryegrass and combining pure clover and N-boosted grass swards within a single farm system.

Fertiliser Nitrogen and Factors Affecting Pasture Responses

Xuezhao Sun[1], Nina Luo[2], Bob Longhurst[2] and Jiafa Luo[*,2]
[1]*AgResearch, Grasslands Research Centre, Palmerston North, New Zealand*
[2]*AgResearch, Ruakura Research Centre, Hamilton, New Zealand*
***The Open Agriculture Journal*, 2008, *2*, 35-42**
https://benthamopen.com/contents/pdf/TOASJ/TOASJ_2-35.pdf

Table 1. Total Pasture Consumed and N Efficiency after Application of Differing Amounts of Nitrogen after Each Or Every Second Grazing

N Treatment (kg N per Grazing)	Total N (kg N ha^{-1} per yr)	Total Pasture Consumed (t DM ha^{-1})		N Efficiency (Increased kg DM kg^{-1} N Applied)	
		Year 1	Year 2	Year 1	Year 2
0	0	9.1	6.3		
25	175	10.8	8.2	9.5	15.4
50	350	11.5	8.8	6.8	10.3
75	525	12.8	9.8	7	9.5
100	700	12.1	9.4	4.3	6.3
50/2nd	150	11.4	8.6	15.5	15.5
100/2nd	300	11.0	9.8	6.3	11.7
150/2nd	450	12.2	10.2	6.8	8.7
200/2nd	600	11.9	9.5	4.7	5.4

Trial conducted in Victoria, Australia during the irrigation season, N fertiliser (urea) applied at 0, 25, 50, 75 and 100 kg N ha^{-1} every grazing and 50, 100, 150 and 200 kg N ha^{-1} every second grazing.
Adapted from McKenzie *et al.* [46].

A farmer's experience with high N fertiliser inputs on grass/clover pastures

STEPHEN BARR
Nopera Rd, RD 32, Opunake

Agronomy Society of New Zealand Special Publication No. 11 / Grassland Research and Practice Series No. 6 (pub 1996)
https://www.agronomysociety.org.nz/files/SP11_22._A_farmer_s_experience_with_high_N_fert.pdf

Table 1: Nitrogen application and milksolids production 1989–1995.

	No. Cows	kgN/ha	kg Milksolids	kgMS/ cow	kgMS/ ha	Feed Conserved kgDM/ha	Bought in Feed (kgDM/ha)
1989/90	370	20	111607	302	996	991	1346
1990/91	380	20	111683	294	997	763	1346
1991/92	380	82	118233	311	1056	509	1346
1992/93	400	200	135800	340	1213	482	2180
1993/94	400	453	144381	361	1289	1339	2052
1994/95	400	446	136509	341	1219	1607	1344

* Bought in feed is hay, proliq and winter cow grazing.

Table 3: Feed costs vs milk income 1989–95.

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
kgsMS/ha	996	997	1056	1213	1289	1219
Milk Income /ha @$3.40/kgMS	$3,388	$3,390	$3,589	$4,123	$4,383	$4,144
kgN/ha	20	20	82	200	453	446
Nitrogen Cost @ $1.10/kgN ($/ha)	$22	$22	$90	$220	$498	$491
Silage/Hay Making ($/ha)	$50	$38	$25	$24	$67	$80
Hay, Proliq, Cow Grazing ($/ha)	$245	$245	$245	$417	$365	$253
Milk Income Less Feed ($/ha)	$3,071	$3,085	$3,229	$3,462	$3,453	$3,320

A dairy farmer's experiences in managing variou levels of fertiliser nitrogen (N) inputs over the 1991–95 seasons is discussed and compared to previous years when very little N fertiliser was used. N requirements were assessed by regular herbage tests. Fertiliser N increased pasture growth in spring, early summer and autumn. Animal intakes were greater on N-boosted pasture. Higher rates of N fertilisers (450 kgN/ha/yr) generated large spring surpluses which were harvested as silage. Several changes in management were required to maintain pasture quality and effectively utilise these surpluses. Feed costs vs milk returns are compared for a number of seasons. Moderate fertiliser N usage (200– 300 kg N/ha/yr) is considered likely to give the most profitable balance.

Ministry for the Environment
Manatū Mō Te Taiao

Making Aotearoa New Zealand the most liveable place in the world
Aotearoa – he whenua mana kura mō te tangata

Ministry for Primary Industries
Manatū Ahu Matua

Essential Freshwater 50: Recommendations on Outstanding Policy Options for National Direction on Rural Land Use

Date Submitted:	9 May 2019	MfE #: 2019-B-05576 MPI #: B19-0250	
Security Level	In confidence, budget sensitive	MfE Priority:	Urgent

	Action sought:	Response by:
To Hon David Parker, Minister for the Environment	Agree on policy recommendations for inclusion in Cabinet package	17 May 2019
To Hon Damien O'Connor, Minister of Agriculture	Agree on policy recommendations for inclusion in Cabinet package	17 May 2019
CC: Hon Nanaia Mahuta, Associate Minister for the Environment	Note content	

Actions for Minister's Office Staff	**Return** the signed report to MfE.
Number of appendices and attachments: 1	Titles of appendices and attachments (ie separate attached documents): 1. Out of Scope

Ministry for the Environment/ Ministry for Primary Industries contacts

Position	Name	Cell phone	1st contact
Responsible Manager	Nicola Scott	s 9(2)(a)	
Director (MfE)	Martin Workman	022 517 3268	✓
Director (MPI)	Charlotte Denny	021 393 812	

Essential Freshwater 50: Recommendations on Outstanding Policy Options for National Direction on Rural Land Use

1. This briefing outlines options and recommendations to address outstanding policy issues in the recommended provisions for the *Essential Freshwater* national direction on rural land use. This briefing is supplementary information to briefing *Essential Freshwater 45: Recommendations for National Direction on Rural Land Use* (Essential Freshwater 45) sent to you on 18 April 2019, outlining the *Essential Freshwater* proposals for national direction on rural land use (MfE# 2019-B-05440/ MPI# B19-0172).
2. You met with officials on 30 April to discuss these, and other Essential Freshwater proposals. Your feedback on Essential Freshwater 45 and at the meeting highlighted three outstanding policy issues. These issues relate to:
    a. proposals for reducing excessively high nitrogen leaching (nitrogen cap),
    b. Out of Scope
3. We have conducted further analysis and developed a range of options to help address these issues. These options are discussed below, and our recommendations for preferred options are provided.
4. We are seeking your agreement to include the recommended policy options in the Essential Freshwater Cabinet package. The package will include a redrafted National Policy Statement for Freshwater Management (NPSFM), draft national environmental standard (NESFM), consultation material, regulatory impact statement and Cabinet paper. This package will seek Government agreement to consult.
5. We recommend that the following options are included in the Cabinet package.

Proposal	Recommended option
Provisions for reducing excessively high nitrogen leaching (nitrogen cap)	Option 2
Out of Scope	

MPI comment

6. MPI supports the intent of the proposals included in this paper to address the risk of Out of Scope and provisions for reducing excessively high nitrogen leaching.
7. Out of Scope

8. We support the preferred option (option 2) for reducing high nitrogen leaching (nitrogen cap) builds on the proposed Farm Environment Plan policy as it takes a risk based approach to farm management.

9. MPI has some concerns around implementing these policy options without placing too much of an administrative burden on regional councils and impacts on farmers. Further analysis on the impacts of these options, including feasibility of monitoring and compliance of them, should be undertaken to better consider the on-farm impacts against the overall aims of the Essential Freshwater programme.

10. The planned consultation on these options could help to provide further thinking on the practical implications of bringing in these options and any unintended consequences arising from them. MPI intends to commission further impact analysis to support the next stage of decision making.

Next steps

11. If you agree to the recommended proposals, these options will be included in the Cabinet material currently being prepared to go to Cabinet in late June.

Provisions for reducing excessively high nitrogen leaching (nitrogen-cap)

12. The nitrogen-cap proposal was developed in response to advice from the Freshwater Leaders Group (FLG). We have undertaken further analysis of the nitrogen-cap proposals, including consideration of matters raised by the regional sector[1] and the draft first report of the FLG. We have developed 3 additional options for consideration (described in Table 1). On balance we consider that option 2 is likely to be most effective in quickly implementing a regime that will bring down discharges from high leachers, and would be simpler and faster to implement than the original proposal (option 1).

13. Option 1 would only apply to high leachers who are over the threshold. Options 2 and 3 applies to all farmers in the high-N impacted catchments, with greater requirements applying to those over the threshold.

14. A key consideration is the timeliness of such a policy, given that the FLG recommend it as a short-term measure (until 2025). A policy which is complex and cumbersome to implement would not achieve the rapid reductions in nitrogen leaching sought by FLG, and additionally would take council resources away from the critical task of setting limits and regional rules to achieve them. Three particular aspects have been analysed as ways to streamline and improve option 1:

    a. Option 1 (provided in Essential Freshwater 45) relied on an initial collection of Overseer results from intensive land uses in high nitrogen (N) impacted catchments, and analysis of the Overseer distributions to set threshold N leaching levels, catchment by catchment. A much quicker, cheaper and less cumbersome approach would be to require a simple nitrogen surplus (N-surplus) calculation from affected farms:

        i. **N-surplus** addresses the FLG advice that the policy should target practice change (rather than land use change). It measures the difference between N brought onto a property (fertiliser, supplements, livestock) and N leaving the property in farm products, so focuses on factors that farmers can control (farm practices). It can be

[1] Regional Sector Water Subgroup feedback on Essential Freshwater Policy Proposals, 26 April 2019.

quickly and easily calculated by farmers.[2] A further advantage of N-surplus is that a national threshold could be set (by sector, and potentially by crop type for vegetable and arable crops) for the N-surplus that high dischargers must achieve[3], compared with catchment-by-catchment setting of Overseer-based thresholds. Recent research has indicated a very high correlation between N-surplus and N-leaching for individual farms[4]. We have incorporated an N-surplus approach in options 2 and 3.

ii. **Overseer** calculates the N-surplus and then estimates the impact on N discharges below the root zone, including the impact of soil and climate. It goes beyond the focus of this policy proposal, which is focused on improving practice, rather than factors that individual farmers have no control over (i.e. soil and climate).

b. We have also considered whether an early start could be made on addressing high nitrogen discharges through a non-regulatory, negotiated Government-Industry Accord. Work could start on developing the Accords immediately, and, subject to successful negotiations, high nitrogen leachers in high N-impacted catchments could begin to be identified before the end of 2019, rather than waiting for gazettal of the NES. This approach could be added to option 2.

c. Options 2 and 3 also address a potential risk with our initial proposal that increases in discharges from farms under the nitrogen-cap could erode any water quality gains achieved by reductions in discharges from high-leaching farms.

Table 1: Options for reducing excessively high nitrogen leaching (nitrogen cap)

Option	Strengths	Weaknesses
Option 1 (as proposed in Essential Freshwater 45, appendix 5 page 39-40) • Overseer returns required from affected farmers. • For each catchment or sub-catchment a distribution of Overseer results is developed by Councils. • Farmers over the 75th percentile require consent and Farm Environment Plan (FEP) and must reduce discharges within specified timeframe to 75th percentile.	• **Likely to be effective for consented farmers, once in place:** Consent requirements would provide a strong incentive for affected farmers to reduce discharges to threshold. However this improvement could be partly eroded if farmers under the threshold increase discharges up to the threshold (e.g. by increasing stock numbers) without triggering the intensification constraints in the proposed NESFM. • **Compliance monitoring and enforcement** can be cost-recovered from consented farms. • Will help to establish an Overseer database for some	• **Slow to take effect** – due to the process required to contact all intensive farmers in high N-impacted catchments, obtain Overseer returns, analyse, then identify the target farmers before consent process can begin. Some farmers are likely to delay compliance with the Overseer budget requirement as long as possible. • **Cost to develop Overseer budgets** for each intensive farm in high N-impacted catchments ($3000 upwards). • **Gaming:** Incentive to manipulate process to minimise Overseer estimates. • **May not be effective in reducing discharges from the**

[2] The calculation could be standardised using look-up tables (e.g. the quantity of N in types of fertiliser and supplements), a phone app and/or on-line calculator.

[3] A project would need to be initiated to determine the national thresholds. This could be done reasonably quickly using existing scientific knowledge.

[4] Pinxterhuis et al, 2019. N Surplus shows performance. https://www.dairynz.co.nz/news/latest-news/n-surplus-shows-performance/

	farmers that will help to inform the allocation process under development.	**catchment overall,** as non-consented farmers could still increase discharges up to the threshold by intensifying existing land uses, without triggering the intensification rules. • **Significant time and costs imposed on councils:** collection and analysis of Overseer returns to set thresholds, and administering the consent regime. • **No national consistency in approach or thresholds,** making the policy hard to understand and administer. Vegetables and (potentially) arable farms would need to take a different approach due to concerns about Overseer's applicability to these land uses. Thresholds would vary by catchment. • **Acceptability:** likely to be significant resistance from the primary sectors, including to Overseer budget requirement across all intensive farms. However the consent requirement is likely to meet with ENGO approval.
Option 2: Extend the FEP proposals using N-surplus to target high nitrogen leachers • Establish national N-surplus thresholds by sector. • Include high N-impact catchments in the first tranche of Farm Environment Plans (FEPs) (i.e. required by 2022). • All FEPs in high N-impacted catchments would be required to include an N-surplus calculation and measures to reduce it (whether over or under the threshold). • Those over the threshold would be required to show how they will achieve the threshold within a timeframe	• **Relatively quick to take effect if farmer acceptance of the FEP requirement is high**: all farms would have an FEP by 2022 and be implementing the actions. Sector involvement through the potential Accord would aid acceptance. • **Lower cost for farmers** than option 1 as no need for Overseer (N-surplus calculation done by the farmer). • **Less opportunity for gaming** as N surplus calculation audited, and less incentive to game as no consent requirement if over threshold. • **Effective in reducing discharges overall** as all farmers in high N-impacted catchments reduce N	• **Compliance and enforcement would be less effective than option 1.** As outlined in Essential Freshwater 45, council compliance monitoring and enforcement effort may be less where activities are permitted, because costs cannot be recovered. • **Acceptability:** ENGOs and the wider public may be sceptical that FEPs are sufficiently stringent to achieve improved farm practice and water quality outcomes. The primary sectors are likely to view this option more positively than a consent regime but may have concerns about the increased stringency of the content and audit requirements.

specified in the NES, with annual audits until the threshold is reached. • Councils could be more stringent (eg, require an Overseer budget). • An additional component could fast-track the identification of farmers over the thresholds, through Accords with the sectors, likely with the quid pro quo that the sectors are able to deliver the FEP regime for "their" farmers (while still meeting FEP specifications).	discharges, including those under the threshold, so gains are not eroded away. Accords with the sectors could help identify farmers over the threshold for early delivery of FEPs, meaning gains in water quality are achieved earlier (assuming the Accords are quickly agreed and implemented). • **No additional cost or resourcing burden on councils** to implement beyond that already imposed by the FEP proposals. • **Greater national consistency**, making the policy easier to understand and administer. The N-surplus approach means pastoral and arable farms and vegetables can all use the same approach; and the thresholds would be nationally set.	
Option 3: Composite approach (option 2 plus consent) • Establish national **N-surplus** thresholds by sector. • Include high N-impacted catchments in the first tranche of Farm Environment Plans (FEPs) (i.e. required by 2022). • All FEPs in high N-impacted catchment would be required to include an N-surplus calculation and measures to reduce it (whether over or under the threshold), as in option 2. • Those over the threshold would require a consent with the FEP as a condition of the consent.	• **Lower cost for farmers** than option 1 as no need for Overseer (N-surplus calculation done by the farmer). • **Less opportunity for gaming** as N surplus calculation audited, but greater incentive to game than option 2 due to consent requirement if over threshold. • **Effective in reducing discharges overall (if compliance with FEP is high)** as all farmers in high N-impacted catchments reduce N discharges, including those under the threshold, so gains are not eroded. • **Greater national consistency**, making the policy easier to understand and administer. The N-surplus approach means pastoral and arable farms and vegetables can all use the same approach; and the thresholds would be nationally set.	• **Slow to take effect:** many farmers will delay compliance with the FEP requirement, due to the consent requirement for those over threshold. • **Some additional cost and resourcing burden on councils** to implement consent regime but less than in option 1 due to simpler N-surplus based regime. • **Significant risk of derailing the FEP proposals: by** using the FEP process to identify those requiring a consent, there may be a farmer backlash against the FEP proposal in general.

	• **Compliance monitoring and enforcement** can be cost-recovered from consented farms. • **Acceptability:** the consent requirement is likely to meet with ENGO approval. However primary sector acceptance would be less than for option 2.	

15. As Table 1 indicates, a nitrogen-cap policy is particularly difficult to implement quickly. On balance we consider that option 2 is likely to be most effective in quickly implementing a regime that will bring down discharges from high leachers. While option 3 provides a stronger regulatory imperative once farmers are consented, the likelihood of slow or non-compliance with the initial FEP process needed to identify high leachers in option 3 and risks derailing the broader FEP proposal.

Out of Scope

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Out of Scope	•	•
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Out of Scope		

Out of Scope

Out of Scope

Recommendations

29. We recommend that you:

a. **Agree** that the policy options recommended below should be included in the Essential Freshwater Cabinet package

Policy Area	Option	Agree
Provisions for reducing excessively high nitrogen leaching (nitrogen cap)	• Option 2	Yes/No
Out of Scope	Out of Scope	Yes/No
Out of Scope	Out of Scope	Yes/No

b. Out of Scope

Yes/No

c. **Refer** this to Hon Nanaia Mahuta for noting

Yes/No

Signature

Martin Workman
Director MfE

Charlotte Denny
Director MPI

Hon David Parker
Minister for the Environment

Date

Hon Damien O'Connor
Minister of Agriculture

Date

Out of Scope

Out of Scope

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Fertiliser Cap –Talking Points

Talking points prepared for Martin Workman for discussion with Minister Parker's office, Feb 2020

Context

Minister Parker provided comments on Brief 81, in relation to our proposal not to progress a fertiliser cap as follows:

1. "I would like to discuss monitoring against a national cap on synthetic nitrogen fertiliser"
2. "What about a nationwide cap" (i.e. not just schedule 1?)
3. (Option 2 – fertiliser cap) "discarded too easily – Netherlands"
4. "Check" (re fertiliser cap being non-viable)
5. "probably correct" (re setting multiple caps by land use, climate, soil type being infeasible unless set on a farm by farm basis)
6. "What about limiting increases above historical application rates perhaps [via?] FWFPs? Is there base information?"

A national cap on synthetic nitrogen fertiliser – we have undertaken further analysis

1. **We do not recommend a national fertiliser cap e.g. set at a level that would affect the top end of application rates applied in the dairy sector:**
   - *Compliance would be hard to monitor and enforce* (as farmers can buy fertiliser from multiple sources). Setting up an institutional system for monitoring compliance is not justified for a short term policy. The EU manure cap has a significant bureaucratic cost for monitoring and is still subject to fraud.
   - *There is a significant risk that the cap could become a target, and overall fertiliser use may increase*.
   - *It would not increase farmer awareness of any fertiliser over-use for their particular enterprise*. Farmers under the cap could continue using fertiliser wastefully.
   - *It would be inefficient* - as it focuses only on a single input rather than the most cost-effective ways to reduce nitrogen losses e.g. farmers may substitute bought-in feed for fertiliser resulting in no net reduction in nitrogen losses, and an increase in costs.
   - *It would not prepare farmers for future allocation and nitrogen reduction requirements*
2. **We do not recommend using historical applications as the basis for a cap** because:
   - *Excessive fertiliser use by some farmers would continue*, and in effect, the cap would explicitly permit the over-use.
   - *It would rely on farmer declaration of historic use*, as we don't have individual fertiliser use information. Declarations would be hard to verify, especially if farmers buy fertiliser from multiple sources.
   - *It would be seen as "grandparenting"*, locking in existing low users, and therefore inequitable.
3. **We also considered setting multiple caps** across the main land uses, crops, soil types and rainfall; but consider this would be too complex to establish and monitor compliance. Farm plans provide the best instrument for determining the optimal amount of fertiliser for an individual farm, with monitoring achieved through the audit process. (Based on point 5 of the Minister's comments above, he appears to agree with this view).

Greenpeace comments on synthetic fertiliser

7. Greenpeace have written to you outlining the case for a synthetic nitrogen fertiliser cap. Greenpeace's assertion that increased nitrogen fertiliser application enables increased stocking rates is largely correct. Higher stocking rates can result in more nitrogen losses from urine patches (though good practice management means the increase is not inevitable).
8. **However our analysis indicates that greater gains in water quality outcomes can be obtained with an approach that targets *nitrogen losses*, and improved management of all inputs, rather than limiting or banning *a single input* (as illustrated in the Netherlands data).**
9. **Emerging New Zealand experience (for example, Lake Taupo and Canterbury) is that a strong regulatory system for managing nitrogen losses, and a tailored farm plan-based approach to embedding good management practice, will achieve the outcomes that Greenpeace is seeking (a sustainable agriculture sector in new Zealand).**
10. While Greenpeace cite the Canterbury region as an example of over-use of synthetic nitrogen fertiliser, the approach underway of regulating nitrogen losses, and requiring audited farm plans is already generating significant reductions in nitrogen losses (including through reduced use and better timing of fertiliser inputs[1]).
11. The Greenpeace approach takes no account of the following:

- *Input substitution:* If a fertiliser cap were to be imposed, farmers could potentially substitute feed or organic manure for fertiliser to maintain stocking rates, resulting in little net decrease in nitrogen leaching and increased costs of production. Greenpeace seem to be of the view that synthetic forms of nitrogen are worse than organic forms. Whereas in the European Union there is a *manure cap* in recognition that organic sources of nitrogen also result in nitrate leaching. There would seem to be no difference between synthetic nitrogen fertiliser and organic forms of nitrogen fertiliser (applied at the same rate per hectare) in terms of supporting increased stocking rates.
- *Impact on horticulture and arable sectors:* Use of synthetic nitrogen fertiliser is also very important to the arable and vegetable growing sectors, enabling timely production of high health products that meet consumer specifications.
- *The link between high fertiliser and stocking rates and increased nitrogen losses is not inevitable:* good management practices such as use of feed-pads or barns, good effluent management, and applying fertiliser to match plant growth can mean a highly-stocked and fertilised farm leaches less than a poorly-managed farm with lower stocking rates.
- *A cap would take no account of timing or fertiliser applications*. Avoiding winter application and the use of split dressings significantly reduces leaching losses.
- *A ban would have negative consequences for the international competitiveness and economic sustainability of New Zealand agriculture and horticulture.* While organic forms could be substituted, costs would rise and/or production would fall. We are not aware of any country that has banned the use of synthetic nitrogen fertiliser, and there are very few examples of countries with a synthetic nitrogen fertiliser cap (but a number of countries introduced a cap and then abolished it).

[1] A recent media article included an example of reductions in nitrogen losses of 17% on a very large dairy farm in Canterbury, largely through reduced fertiliser use and improved timing.

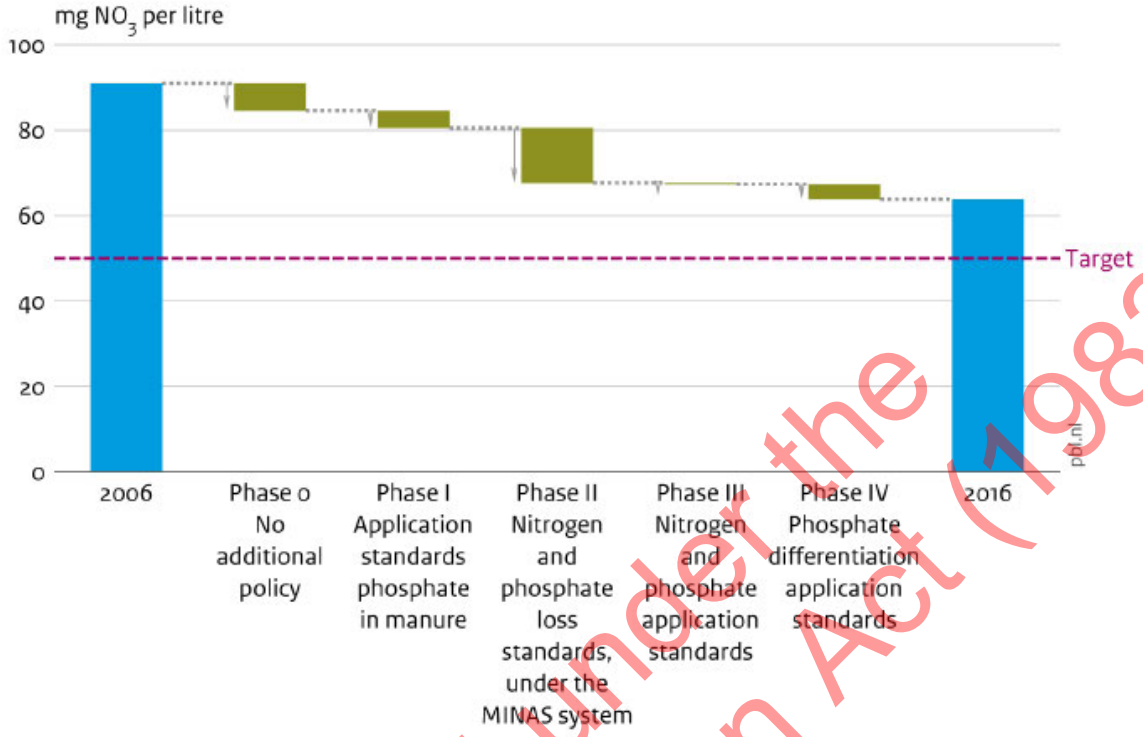
Our preferred approach

4. We consulted on three options on ways to reduce excessive nitrogen losses: a regulatory nitrogen discharge cap (option 1), a fertiliser cap (option 2) and nitrogen-focused far plans (option 3).
5. **We consider a combination of options 1 and 3 is the best approach, with some amendments to improve each.**
6. **An amended option 1** would target those farms with excessive nitrogen losses caused by poor management, with those over a threshold required to obtain a consent. The amendments required to option 1 are:
    - *alternative tools to Overseer* for identifying farms with excessive losses. We propose to contract expert advice on the alternatives. (Likely under the standing NIWA contract)
    - *revision of Schedule 1* to ensure that the policy is well-targeted and feasible in the timeframes allowed. We have already assessed a method using state and trend data, combined with sensitivity of estuarine receiving environments. (We have the offer of a group of Council staff to assist with this).
7. **An amended option 3** would require early roll-out of nitrogen-focused farm plans to all farms in Schedule 1 catchments, with amendments as follows:
    - *Including a nutrient budget, and a higher standard of good management practice for nitrogen in these farm plans*. This approach will minimise the risk identified in submissions of farmers below the regulatory threshold increasing N losses up to the threshold.
    - *clarifying that farmers under the threshold have flexibility for changes in farm management, even if these increase discharges slightly, provided good management practice is followed* (partially addressing the "grandparenting" objections raised by sheep and beef farmers).
8. This combination would help prepare *all* farmers in Schedule 1 catchments for future nitrogen limits and allocation, and make them aware of any fertiliser over-use for their particular farm and land use, as well as other management aspects that need improvement to reduce nitrogen losses.

In the Netherlands a fertiliser cap has been less effective than earlier policies

9. The Figure below shows the modelled effectiveness of nitrogen policy settings in the Netherlands, in reducing nitrate levels in groundwater.
10. The Mineral Accounting System policies (MINAS) were the most effective (phase II in the figure) while the fertiliser cap has been less effective (phases III and IV).
11. Fertiliser use declined significantly amongst dairy farmers under the MINAS policies, as a result of calculating their nitrogen and phosphate surpluses (accounting for inputs and outputs from the farm). The policy included a financial penalty if the surplus was over a threshold. Few dairy farmers were required to pay the levy as their surpluses were below the threshold, but farmers became aware that the amount of nitrogen they were applying was far in excess of plant demands, and they could save money by reducing fertiliser use.
12. Reductions in fertiliser use under a fertiliser cap from 2006 (phases III and IV in the figure below) were smaller. In addition total nitrogen fertiliser use increased (along with cow numbers) since the abolition of the EU milk quota in 2015.

Causes of the change in nitrate concentrations in upper groundwater in southern sand region, 2006 – 2016



Source: STONE model by Wageningen Environmental Research; adaptation by PBL