

s 9(2)(a)

19-D-02028

Dear s 9(2)(a)

Thank you for your email of 13 September 2019 requesting the following under the Official Information Act 1982 (the Act):

"...could I please have a copy of any advice provided to any Minister on the economic costs of the Essential Freshwater Package. Please include analysis of the impacts at a farm level, regional level, sector level and national level.

In regards to emails, please limit this to email sent in the last 2 weeks".

The Ministry for the Environment (the Ministry) has identified 28 documents in scope of your request, as listed in the table below.

Six documents are released in full (excluding some out of scope material) and seven documents have been refused under section 18(d) as they are publicly available (please view via the links in the table below). The remaining 15 documents have been refused under section 18(d) as they are soon to be publicly available.

You have the right to seek an investigation and review by the Office of the Ombudsman of my decision 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 website on our [OIA responses page](#) shortly after the response has been sent. If you have any queries about this, please contact our Executive Relations team at ministerials@mfe.govt.nz.

Yours sincerely



Annabelle Ellis
Acting Director, Water

Document schedule

Document no.	Document date	Title & document type	OIA sections applied
Material in scope below			
1	5-Aug-19	IMPACT OF PROPOSED CHANGES ON COUNCILS	
2	10-Sep-19	PQ answers	
3	10-Sep-19	RE: Draft LEG paper and Bill for Ministerial consultation - Proposed Resource Management Amendment Bill	
4	11-Sep-19	RE LGNZ report messages	
5	11-Sep-19	Fwd: Canterbury Freshwater Limits - Ashburton: Modelling done by Pāmu 2018-2019	
6	12-Sep-19	FW Oral PQ	
Reports already publicly available			
7	31-Jul-19	Report of the Freshwater Leaders Group to the Minister for the Environment. September 2019 https://www.mfe.govt.nz/publications/fresh-water/freshwater-leaders-group-report-minister-environment	18(d)
8	30-Jun-19	Freshwater Science and Technical Advisory Group report to the Minister for the Environment - September 2019 https://www.mfe.govt.nz/publications/fresh-water/freshwater-science-and-technical-advisory-group-report-minister-environment	18(d)
9	8-Aug-19	The Interim Regulatory Analysis for Consultation: Essential Freshwater Part One. Summary and Overview https://www.mfe.govt.nz/more/briefings-cabinet-papers-and-related-material-search/regulatory-impact-statements/interim-0	18(d)
10	13-Sep-19	Te Mana o te Wai - Kāhui Wai Māori report to Hon Minister David Parker. April 2019 https://www.mfe.govt.nz/sites/default/files/media/Fresh%20water/kahui-wai-maori-report.pdf	18(d)
11	14-Sep-19	Regional Sector Water Subgroup advice to the Minister for the Environment. July 2019 https://www.mfe.govt.nz/fresh-water/fresh-water-and-government/freshwater-work-programme/essential-freshwater-regional	18(d)
12	30-Aug-19	Interim RIS for Essential Freshwater Part I https://www.mfe.govt.nz/more/briefings-cabinet-papers-and-related-material-search/regulatory-impact-statements/interim-0	18(d)

13	30-Aug-19	Interim RIS for Essential Freshwater Part II https://www.mfe.govt.nz/more/briefings-cabinet-papers-and-related-material-search/regulatory-impact-statements/interim	18(d)
Reports soon to be publicly available			
14	23-Nov-18	2018-B-04987 Proposed sediment policy package	18(d)
15	2-Nov-18	2018-B-05038 Rural package - Improving farming practices and managing intensification of rural land use.	18(d)
16	12-Nov-18	2018-B-04915 Avoiding further loss and degradation of wetlands	18(d)
17	27-Nov-18	2018-B-04993 National direction on urban water	18(d)
18	31-Jul-18	2018-B-05123 Managing all aspects of Ecosystem Health	18(d)
19	26-Mar-19	2019-B-05416 Assisting Councils to Implement the NPS/FM	18(d)
20	8-Apr-19	2019-B-05468 A new planning process for the NPS - FM note to support a meeting with officials 11 April	18(d)
21	12-Apr-19	2019-B-05474 Seeking agreement to national direction proposals (paper 1 of 3)	18(d)
22	18-Apr-19	2019-B-05475 Seeking agreement to national direction proposals (paper 2 of 3)	18(d)
23	18-Apr-19	2019-B-05440 Seeking agreement to National direction for Rural Land use	18(d)
24	9-May-19	2019-B-05576 Recommendations on Outstanding Policy Options for National Direction on Rural Land Use	18(d)
25	10-Jun-19	2019-B-05684 Consent requirements in the rural package	18(d)
26	21-Jun-19	2019-B-05719 Maori values and measures of freshwater health: Seeking agreement to consult on options	18(d)
27	8-Jul-19	2019-B-05769 Draft cabinet materials for ministerial and cross-party consultation	18(d)
28	22-Jul-19	2019-B-05813 Updated draft cabinet package	18(d)

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IMPACT OF PROPOSED CHANGES ON COUNCILS

NPS

Councils will be required to look at their current plan and the new NPS and analyse what needs to be updated. This will vary by council. At a minimum they will need to do a combined plan and regional policy statement (RPS) change, for example to express long-term vision for water in their RPS. This work will need to be completed so they can notify the plan change by the end of 2023 as the new NPS works with the new plan making process under the RMA which requires plan changes to be notified by the end of 2023.

There are beefed up requirement to engage with Tangata Whenua on values and interests, this will mean many councils will need to increase engagement from current levels.

There's a handful of new attributes to take through the National Objectives Framework process, for example setting limits and establishing an action plan, by 2023 councils will need to notify these.

Budget 2019 included implementation support for councils. This could be tailored to what specific councils need to complete the above steps. This may include technical and scientific input, expertise in planning or finding out about best practice (learning from other councils).

There are increased monitoring requirements which need to be implemented by councils over time. This is likely to cost the most for the requirements to monitor dissolved oxygen, fish and submerged plants, (the current NPS already requires monitoring of indigenous flora and fauna but the new-NPS specifies attributes and methodologies for doing this which will be more costly for all councils).

Councils will need to build new components into their five-yearly reports (reports they already produce). They can start this anytime but would need to include the new components in five-yearly reports published from 2025.

Enhanced clarity to requirements for council staff mean there is less uncertainty in how to implement the NPS to improve freshwater ecosystem health.

S360

Change to telemetry requirements. This impacts councils as it means there's more and better quality data that can be used for plan changes, assessing cumulative effects, allocation and flow decisions, and compliance, monitoring and enforcement.

It will save councils time on dealing with poor quality monitoring data and following up checking manual data submissions.

To do this councils may need to upgrade their systems to cope with the increased amount of data (many councils are already working to improve their systems but the quantity of the data they need to deal with will increase).

Process any exemptions to the s360 regulations for stock exclusion that people apply for (consultation is asking for suggestions of criteria for exemptions).

Councils will need monitor compliance with the regulations.

NES

Stronger compliance burden on councils to find non-compliant drains and require the land owners to either fence or apply for a consent.

Increased cost of processing of consents by councils for a number of activities eg earth disturbance, drainage, vegetation destruction for wetlands where land owners want to alter wetland ecosystems. Also for intensification, nitrogen cap, winter grazing of forage crops in areas that are above

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thresholds defined in the policy, stock-holding areas and feedlots. Where land owners wish to undertake an activity that will now be restricted councils will need to process consents and undertake monitoring and compliance. Where land owners wish to undertake a discretionary activity councils will need to process consents and undertake monitoring and compliance but this would be cost recovered. Noting councils set their own policies for consent costs.

Increased number of consents to process, for example for winter grazing of forage crops in areas that are above thresholds defined in the policy.

Administering Fresh Water – Farm plans, including certifying suitably qualified and experienced person(s) for preparing and auditing of farm plans.

Specifically for district and city councils

Under the proposal 'Direction for territorial authorities' district and city councils have a greater role in influencing the effects of urban development on freshwater ecosystem health. This can be achieved as part of high quality urban design. It's more efficient for this to be dealt with in district plans than for an extra set of rules to be developed by regional councils.

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ESTIMATES OF COSTS

Dairy sector spend on stock exclusion

Dairy companies reported 8128 farms with 24,722km of stock exclusion for the 2016/2017 season; this equated to fencing of 97.5% of the waterways for which data was collected.

This could be a total fencing cost alone of at least \$247 million. Based on 24,722,000 metres of stream x 2 (sides of the stream) x \$5 per linear metre (for two-stand electric, the lowest cost option).

24 percent of dairy farm covered by the Accord also had riparian management plans (for setbacks and planting). If these farms had an average setback of 3 metres, then the additional opportunity cost of land would be around \$48 million. Opportunity cost of land is included in the \$600 million estimate we made for stock exclusion and riparian setback policy proposals.

In round terms, we estimate that the total cost of stock exclusion by the dairy sector to date is at least \$300 million. This is likely to be a significant under estimate, since we have assumed the cheapest fencing option was used in all cases. Fencing with an 8-wire permanent fence is roughly 2.5 time the cost of electric.

Further information on magnitude from industry websites:

Hort NZ (2019 annual report):

NZ consumption is \$2.24B, export value is \$3.6B

Beef and Lamb (2018 annual report):

NZ consumption is \$2.9B, export value is \$7.5B (includes wool)

Dairy NZ (from 2017/2018 annual report):

NZ consumption: [figures not available]. GDP contribution \$7.8b. Exports: \$13.4b

These are per annum figures. The stock exclusion proposals are spread out over 5 years, so an average of \$120 million per year (\$600 million over 5 years). This costs fall largely across sheep and beef and dairy sectors which total \$20.9 B in exports a year. Compared to this the stock exclusion costs are 0.6% of export earnings.

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COMMENTARY ON EXTENT TO WHICH RIPARIAN PLANTING CAN BE USED TO OBTAIN CREDITS UNDER KYOTO PROTOCOL

MPI was preparing a briefing on riparian planting for Minister O'Connor looking at how mitigation from on-farm vegetation could be recognised. We are trying to find out if this briefing was completed and will ask for it to be forwarded to Minister Parker if it was.

Summary

Mitigation from on-farm vegetation would not count towards international targets

Carbon removals from non-forestry farm vegetation such as riparian strips are **not currently recognised** in our international accounting. This means any mitigation benefits from increasing carbon removals through a new policy measure would not count towards meeting New Zealand's international targets.

This is not an insurmountable barrier. However, the implications of extending our international settings to new vegetation classes are complex and likely to be costly.

It is important to note that any change in accounting may need to consider both gains and losses in the elected vegetation types. Some regional councils (e.g. Taranaki) and sector bodies (Dairy NZ) have developed policies to encourage riparian and erosion control plantings resulting in an increase in vegetation. New Zealand has also experienced recent intensification in its agriculture sector, resulting in the clearance of shelter belts, trees and riparian plantings for the establishment of irrigators on some farm types. Changes may also affect the periodic clearance of scrub common on sheep and beef farms in some regions.

Adopting lower parameters of the definition of forest land is not a viable option

New Zealand could, in theory, adopt lower parameters of the definition of forest land in international accounting¹. This would allow the carbon removals from smaller areas of land with a wider range of vegetation types to be counted towards international targets. However, this would reduce the area of land that was considered non-forest land in 1990, and historic assessments of pre-1990 forest and post-1989 forest would need to be revisited. Some post-1989 forests would be considered pre-1990 forests under an extended definition. This change would have implications on our first commitment period and 2020 targets with significantly less forest eligible to contribute to these targets. Those forests would no longer be eligible for earning credits in the ETS and we would be liable for emissions from clearance of scrub, gorse and broom in our international targets. This is not a viable option.

Electing to account for revegetation activities for international targets would be a substantive piece of work

An alternative to changing the forest definition would be for New Zealand to elect to account for revegetation activities in our international accounting. However, substantively more sub-forest vegetation has been cleared than established since 1990. The viability of this would need further investigation, including whether this could be rolled out on a project basis, ie. accounting only for gains.

¹ The parameters of the international forest definition are a minimum land area of 0.05-1.0 hectares, tree crown cover of more than 10-30 per cent and trees with potential to reach a minimum height of 2-5 metres at maturity in situ. New Zealand elected to use the upper limits of the international forest definition. This decision ensured as much land as possible was eligible for establishing post-1989 forests, to maximise the benefits of the international accounting rules for New Zealand. The decision reflected the affordability and accuracy of measuring smaller-scale changes in land-use and vegetation at that time.

This would be a substantive piece of work that would be unlikely to align with developing a policy incentive for farmers that can be implemented in the immediate term.

MfE recommends taking an ecosystem benefits approach to any new scheme

MfE and MPI agree that a standalone grant scheme could be a simple way to incentivise riparian planting on farms. A scheme is likely to require a budget appropriation.

MfE would recommend taking an ecosystem benefits approach to such a scheme that does not specifically favour carbon storage over other benefits.

An example of other benefits is that streamside seeps (the wet areas seeping into the stream) can also provide denitrification zones.

Linkage to the work of the Interim Climate Change Committee

The Government has agreed to the Interim Climate Change Committee's recommendation to investigate counting carbon sequestration by trees and vegetation on farms. The actions recommended by the ICCC will be included in a joint action plan with the sector and iwi/Māori, as either a) supporting measures for processor-level emissions pricing in the NZ ETS or b) part of the formal agreement with the sector to reduce emissions and support the transition to farm-level pricing.

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Alix Raine

From: Katherine Meerman <Katherine.Meerman@mfe.govt.nz>
Sent: Tuesday, 10 September 2019 12:20 PM
To: Hayden Johnston (Parliament)
Cc: Peter Nelson
Subject: PQ answers

Hi Hayden – here you go. Happy to discuss or come over as needed.

Does he stand by his statement in regards to the Government's proposed new water policy, that it will cost "1 to 2 percent of gross revenue, in my estimation" and if so, has he seen any economic analysis that confirms or rejects this estimate?

- The 1-2% figure is based on a descriptive case study of how indication of how the proposals may impact a typical farmer. The figure does not provide an average cost for all of the proposals.
- There will be farmers who are impacted less than this, and there will be farmers that are impacted more. In some parts of the country, there will be additional costs on top of this as regional councils implement the proposed, strengthened, nitrogen, swimming and sediment bottom lines.
- To date we have done analysis on specific components of the package (as set out in the RIS) and used information about typical farms to assess the impact of the package as a whole. The discussion document clearly states that more work is needed and we are doing this before final decisions are made and we are using consultation to test the impacts of proposals.
- The discussion document clearly states that further work is required to identify the impacts of the new nitrogen bottom line proposed by the STAG and that "Final decisions will not be taken until further analysis has been done."

If the follow-up question adds up numbers in the RIS to produce their own estimate

- The estimates of the costs and benefits contained within the RIS are not necessarily additive. There will be some cross-over of these impacts. We intend to provide a fuller outline of the overall costs of the package at the farm-level before final decisions are made. There are several examples of this, for instance the costs and benefits of the *stock exclusion* and *E. Coli* are not additive. This is because the fencing costs can meet both requirements.

If the follow-up appears to extrapolate from regional specific data to create a country-wide estimate

- Due to the significantly different land types, climate, conditions and agricultural practices you cannot extrapolate results from one situation to national picture.

If the follow-up uses costings from the MRB Report which was one commissioned report in the RIS (*Impact of possible environmental policy interventions on case study farms*)

The MRB report was prepared to consider a range of policy options to support the RIS. These policy options do not reflect the preferred policy package proposed by the Government. They can, therefore, not be used as a method of estimating the overall costs of *Essential Freshwater*.

If the follow-up uses costings from the LGNZ Report

- As per discussion with Peter.

Katherine Meerman – Director, Water

Ministry for the Environment – Manatū Mō Te Taiao

Email: katherine.meerman@mfe.govt.nz / Cell: 022 493 0017 / Website: www.mfe.govt.nz

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Alix Raine

From: Justin Strang <Justin.Strang@mfe.govt.nz>
Sent: Tuesday, 10 September 2019 5:43 PM
To: Vicki Addison; Rereata Hardman-Miller (Parliament); Oliver Sangster
Cc: Chyi Sim; Natalie Pike; Alison Newbald; Ministerials; Danijela Tavich
Subject: RE: Draft LEG paper and Bill for Ministerial consultation - Proposed Resource Management Amendment Bill

Looks good team – we will hold fire on meeting from within baselines until we have determined the cost of the secretariat.

From: Vicki Addison <Vicki.Addison@mfe.govt.nz>
Sent: Tuesday, 10 September 2019 3:48 PM
To: Rereata Hardman-Miller (Parliament) <Rereata.Hardman-Miller@parliament.govt.nz>; Oliver Sangster <Oliver.Sangster@mfe.govt.nz>; Justin Strang <Justin.Strang@mfe.govt.nz>
Cc: Chyi Sim <Chyi.Sim@mfe.govt.nz>; Natalie Pike <Natalie.Pike@mfe.govt.nz>; Alison Newbald <Alison.Newbald@mfe.govt.nz>; Ministerials <ministerials@mfe.govt.nz>; Danijela Tavich <Danijela.Tavich@parliament.govt.nz>
Subject: RE: Draft LEG paper and Bill for Ministerial consultation - Proposed Resource Management Amendment Bill

Hi Rere – replies in yellow – I leave point 6. To Chyi/Ollie

vicks

From: Rereata Hardman-Miller <Rereata.Hardman-Miller@parliament.govt.nz>
Sent: Tuesday, 10 September 2019 3:08 PM
To: Oliver Sangster <Oliver.Sangster@mfe.govt.nz>; Vicki Addison <Vicki.Addison@mfe.govt.nz>; Justin Strang <Justin.Strang@mfe.govt.nz>
Cc: Chyi Sim <Chyi.Sim@mfe.govt.nz>; Natalie Pike <Natalie.Pike@mfe.govt.nz>; Alison Newbald <Alison.Newbald@mfe.govt.nz>; Ministerials <ministerials@mfe.govt.nz>; Danijela Tavich <Danijela.Tavich@parliament.govt.nz>
Subject: RE: Draft LEG paper and Bill for Ministerial consultation - Proposed Resource Management Amendment Bill

Thanks Oli!

We have received questions below for clarification. The majority is commentary that I think we can note, but for the questions in red text can urgent responses please be provided? *Let me know when this can be provided by.*

1. Freshwater planning documents must be publically notified; Para 10 - 11
 - The lack of discretion available for large or small applications is flagged. Note the ability to convene small panel sizes below.
 - Who will bear the cost of public notification and hearings for each applications? Regional Councils will bear the costs for public notification and hearings as they do currently. It is expected that overall there will be costs savings from reduced appeals to the Environment Court.
2. Enabling secretariat support by the Environmental Protection Authority; Para 14 - 15
 - Does the Ministry for the Environment or the Environmental Protection Agency have the resources to cover this expansion of service? Yes.
 - Will the costs of secretariat service be met in existing baseline funding or will additional funding be extended? The costs of providing the secretariat are expected to be met within current baselines.

3

3. Allowing for smaller hearing panel sizes; Para 16 - 18

- The Minister noted that this will reduce costs but would like to know **what the criteria are for dropping down to a panel of 3 members?** "Large catchments with multiple communities would not be happy with this". The rationale is to provide a smaller panel for smaller plan changes (eg small catchment scale plan changes) and enable a panel to be convened that is commensurate with the size of the plan change. There is no criteria as such, it is at the full discretion of the Chief Freshwater Commissioner, who will be a current or retired Environment Court Judge, to convene a smaller panel.
- Overall the ability to hold smaller panels "sounds fine, but **do locals get a right of appeal if they disagree?**" The right of judicial review would apply on the decision to convene a smaller panel.

4. Variations to freshwater planning documents; Para 22 - 23

- Para 23: the ability of the Chief Freshwater Commissioner to accept or reject variations in the freshwater planning process "might prove controversial".

5. Proposed Bill and aspects of the Bill that may be contentious; Para 31.4

- i. Regional council planning practitioners generally support but noted that the time frames to implement may be challenging to meet.
 - "there will be skills shortages with competition for skilled people in this space. Large councils will get the best and small councils will struggle to compete. We have to be open at the Select Committee stage to lengthen the time frames.

6. Impact Analysis; Para 32

- i. The Bill restricts the ability to recommend or impose financial contribution conditions on any notices of requirement lodged by the Minister of Education,
 - **We feel that this should "apply to all Government Ministries and Defence", not just Education.**

7. We note the Commencement, Transition and Savings provisions clause in Para 28, defined in Appendix 2 which set out the proposed actions.

Any questions please give me a call.

Cheers

Rereata

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[Redacted]

[Redacted]

Remaining document out of scope



[Redacted]

Rei

Alix Raine

From: Peter Nelson <Peter.Nelson@mfe.govt.nz>
Sent: Wednesday, 11 September 2019 9:50 AM
To: Hayden Johnston (Parliament)
Cc: Ministerials; Katherine Meerman
Subject: RE: LGNZ report messages

Kia ora Hayden

I just re-read that first paragraph, and I'd like to make it a bit clearer:

It's great that LGNZ are providing more information to help the discussion on the Essential Freshwater package. Our general impression is that the Waikato/Waipā modelling is of reasonable quality, especially in the time available. It's important to note that some of the other modelling contained in the LGNZ report doesn't relate to the final proposals included in the discussion document. Also the statements about the cost-effectiveness of the nitrogen policy only consider its impact on MCI. The policy was brought in to address the impact on many ecosystem components (fish, periphyton, macroinvertebrates and ecosystem metabolism).

Peter Nelson – Principal Analyst, Water Directorate

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From: Peter Nelson
Sent: Wednesday, 11 September 2019 9:43 AM
To: Hayden Johnston (Parliament) <Hayden.Johnston@parliament.govt.nz>
Cc: Ministerials <ministerials@mfe.govt.nz>; Katherine Meerman <Katherine.Meerman@mfe.govt.nz>
Subject: LGNZ report messages

Kia ora Hayden

It's great that LGNZ are providing more information to help the discussion on the Essential Freshwater package. Our general impression is that the Waikato/Waipā modelling is of reasonable quality, especially in the time available. It's important to note that for some of the modelling it doesn't relate to the final proposals included in the discussion document. Also the statements about the cost-effectiveness of the nitrogen policy only consider its impact on MCI. The policy was brought in to address the impact on many ecosystem components (fish, periphyton, macroinvertebrates and ecosystem metabolism).

Modelling the impacts is a challenging exercise which can help people to understand the likely impacts of new policies, however it is important to understand some of the of the potential limitations with the modelling. Specifically on the Waikato/Waipā the LGNZ modelling is likely to overstate the impacts of the proposals because:

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- **The estimate of costs includes a considerable amount for mitigation strategies that would be required under plan change one anyway.** Mitigation strategies include, for example, additional stream fencing, effluent management, erosion control and 'edge of field' mitigations.
- Unfortunately it is not possible for us to simply subtract the impacts of plan change one from the LGNZ modelling. While the Waikato-Waipā modelling used the same baseline as the Healthy Rivers/Wai Ora technical work did, the modelling of the changes under plan change one cannot be directly compared to this modelling as it took a different approach and the costs were only counted for the 10 year life of the plan (The modeller has advised that to some extent not including the PC1 impacts "was a practical decision, since we were working to very tight timeframes, and using a pre-existing baseline was easier... [but also because] it illustrates the changes that might be needed on the ground from this point on").
- The models only consider some of the existing mitigation options that would be used to meet the new proposed requirements (this is noted within the report). **Lower cost options for mitigation may exist that have not been used.**
- **The modelling assumes an immediate change in land-use,** it does not consider the time that councils are expected to take to introduce the policies. Phasing-in of policies are an important part of the design of the Essential Freshwater package and help to manage the impacts by spreading the cost of implementation over time
- The report is an optimisation model, it does not mean that land use change will be required, it is stating that on the information available within the model, this would be the most profitable route. **Farmers can and do make decisions on land use based on a range of factors, not just what is most profitable.**
- Part of the reason **the Waikato-Waipā was chosen to be modelled because it is one of the 13% of catchments affected by this policy.** The impacts of this policy on this catchment cannot be extrapolated out to the whole country.

Cheers
Peter

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Cyber Security Warning – External E-Mail CAUTION: Please ensure you take **EXTRA CARE** when opening any links or attachments.

Dear Damien and David

I note the tensions in Canterbury today are at an all-time high with respect to the Freshwater Reforms.

I just wanted to reiterate that we have some good modelling work on how our farms at Eyrewell, and Ashburton might respond to the reforms.

We have recently formed a working group with Synlait, Craigmore Sustainables and ourselves to work out what the next steps are in creating a transition plan in order to showcase what can be done.

We are about to commission some farm system and economic modelling to see if we can get to a 60% and 80% reduction in N leach on our Canterbury farms.

The original work is attached.

Our farm at Eyrewell is already implementing the first steps of changes and is now only leaching 53 kg N per ha (on average), which equates to around 20 mg (on average) per L from the root zone.

We know we are going to have to go a lot further, and are focussed on working out how we do that.

Martin Workman was provided with this information around 6 months ago, however I am uncertain why it has not been used by MFE.

It may be useful to include it in the communications somehow, to help alleviate the fear being expressed by farmers in the public meetings.

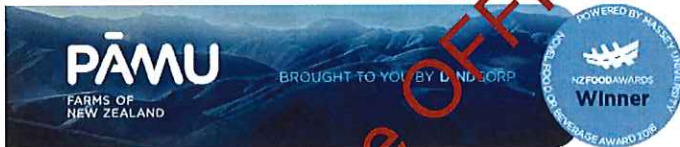
Kind Regards Alison.

Nitrogen summary

	TOTAL LOSS (KG)	LOSS PER HA (KG/HA)	N IN DRAINAGE (PPM)	N ADDED (KG/HA)	N SURPLUS (KG/HA)
DRYLAND	979	23	11	91	97
EFFLUENT	2518	25	9	166	196
LUCERNE IRR EFF (PKD 5)	626	86	30	66	271
LUCERNE IRR NON EFF (PKD 29 & 30)	1147	71	26	0	232
NON EFFLUENT - PIVOT	6797	31	12	180	189
SOLID SET - NON EFF	676	43	12	180	197
FODDER BEET IRR (PKD 32 NO OATS)	1018	150	47	136	34
FODDER BEET SOLID SET	244	122	22	136	38
FODDER BEET TO OATS IRR EFF (PKDS 3 & 31)	1288	126	40	158	27
FODDER BEET IRR NON EFF (PKD 46)	1018	130	43	136	30

ALISON DEWES
Head of Environment

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Nitrogen summary

	TOTAL LOSS (KG)	LOSS PER HA (KG/HA)	N IN DRAINAGE (PPM)	N ADDED (KG/HA)	N
DRYLAND	979	23	11	91	
EFFLUENT	2518	25	9	166	
LUCERNE IRR EFF (PKD 5)	626	86	30	66	
LUCERNE IRR NON EFF (PKD 29 & 30)	1147	71	26	0	
NON EFFLUENT - PIVOT	6797	31	12	180	
SOLID SET - NON EFF	676	43	12	180	
FODDER BEET IRR (PKD 32 NO OATS)	1018	150	47	136	
FODDER BEET SOLID SET	244	122	22	136	
FODDER BEET TO OATS IRR EFF (PKDS 3 & 31)	1288	126	40	158	
FODDER BEET IRR NON EFF (PKD 46)	1018	130	43	136	



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Alix Raine

From: Peter Nelson <Peter.Nelson@mfe.govt.nz>
Sent: Thursday, 12 September 2019 12:37 PM
To: Hayden Johnston (Parliament)
Cc: Katherine Meerman; Ministerials
Subject: FW: Oral PQ

Kia ora Hayden

The quote is taken out of context. The report states that if the target of the policy is only to address Macroinvertebrates then the cost-effectiveness would be questionable. The policy was brought in to address the impact on many ecosystem components, including fish, periphyton, macroinvertebrates and ecosystem metabolism.

(This point was raised with the author of the report who acknowledged this and advised: *"we amended the text on this to specifically mention those other things and so that it is more heavily caveated (to the extent that the DIN and DRP targets are derived from a statistical relationship between nutrients and the DSL the apparently low explanatory power of the independent variables...gives rise to important implications for policy. P19) The corollary of this is that these implications do not arise to the extent those targets are derived from something else."*) [I've checked with Blair Keenan and he's alright with me passing this comment on to you]

The change in land-use from this report is overstated because:

- Much of these costs are for mitigations already required under existing council requirements under plan change one
- The models don't consider potentially more cost-effective mitigation options that would be used to meet the new proposed requirements. The mitigation options possible in the modelling for drystock farming were particularly limited, focussing on planting high-slope areas and de-stocking.
- The report is an optimisation model, it does not mean that land use change will be required, farmers can and do make decisions on land-use based on a range of factors, not just what is most profitable.

Background info from STAG report:

<https://www.mfe.govt.nz/sites/default/files/media/Fresh%20water/freshwater-science-and-technical-advisory-group-report.pdf>

- The inclusion of both DIN and DRP attributes is recommended because both impact the structure and functioning of healthy ecosystems. Reducing DIN and DRP will contribute to improvements in ecosystem health by potentially reducing the prevalence of macrophytes, organic matter processing, conspicuous and non-conspicuous periphyton, changes in trophic structure and function, assimilation efficiency, and changes in fish and invertebrate communities.
- While there may not always be a direct link and well-defined mechanistic models between nutrients and components of a healthy ecosystem, ecosystems are dominated by indirect relationships and the framework for managing the health of fresh water must account for this.
- The proposed bottom-line for DIN is exactly the same as the current A-band for 99% species protection from nitrate-nitrogen toxicity and consistent with the recommendations of Camargo & Alonso (2006) who conducted a comprehensive, global literature review of effects of inorganic nitrogen pollution in rivers and suggested levels should be less than 0.5- 1 mg/L to prevent eutrophication and protect against toxicity.
- The bottom-line also represents the 99% species protection threshold for nitrate-nitrogen toxicity (current A band) – thereby providing a direct, mechanistic link that applies in all rivers alongside the other ecosystem health links, ensuring consistency across all river and stream environments with previously proposed attributes for nitrate.

Possible follow ups?

What's the impact on the whole country?

- Few catchments would require such reductions in nitrogen yield based on the Government's draft freshwater proposals. Modelling suggests that the reduction in nitrogen required across the country from these proposals is approximately 0.8% on top of the 31.8% required as a result of the 2014 NPS-FM requirements. This 0.8% is spread across the approximately 13% of New Zealand's land area which could be impacted by this policy.
- The Waikato-Waipā was chosen to be modelled because it is one of the 13% of catchments affected by this policy. The impacts of this policy on this catchment cannot be extrapolated out to the whole country.
- Only ~5% (27,000km) of the country are impacted by DIN proposals. The Waikato is an example of this because it may not support periphyton.
- Of the areas that need to reduce nitrogen loads, most have modest reductions. Only 1% (4,500km) of river segments nationally has indicative N load reductions beyond current NPS-FM of greater than 50%. Only 0.25% (1000km) of river segments nationally has indicative N load reductions beyond current NPS-FM of greater than 50%.

Is it acceptable to have a \$100 million impact on this catchment?

- The estimate of costs is inflated because it includes a considerable amount for mitigation strategies that would be required under plan change one anyway.
- The modelling assumes an immediate change in land-use, it does not consider the time that councils are expected to take to introduce the policies. Phasing-in of policies are an important part of the design of the Essential Freshwater package and help to manage the impacts by spreading the cost of implementation over time.

What about the impact on farmers?

- The report is an optimisation model, it does not mean that land use change will be required, it is stating that on the information available within the model, this would be the most profitable route. Farmers can and do make decisions on land use based on a range of factors, not just what is most profitable.
- The report states "the total profit estimated to be obtained from land use declines only by around \$7 million per year" across what is a very large catchment, from the gates of lake Taupo to Port Waikato and all the way to the headwaters of the Waipā.
- Phasing-in of policies are an important part of the design of the Essential Freshwater package and help to manage the impacts by spreading the cost of implementation over time.

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