

The Chief Executive Bay of Plenty Regional Council P O Box 364 Whakatane 3158 E Mail: rules@boprc.govt.nz
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**Statement of Evidence - Plan change 10,
Bay of Plenty Regional Water Plan,
Lake Rotorua Nutrient Management.**

Submitter Name

P F Olsen Ltd
Tuesday, 5 April 2016

Address for Service

The Environment Manager
PF Olsen Ltd
P.O.Box 1127
Rotorua

Phone

07 9217206

021 355631

Contact person

Kit Richards

kit.richards@pfolsen.com

Qualifications and Experience

My full name is Christopher Read Richards

My qualifications are B.For Sci, NZCF. I am a registered forestry consultant and a Fellow of the NZ Institute of Forestry. I have 34 years' experience in forestry and land management issues. I am currently Environment Manager for PF Olsen Ltd with responsibility for the Company's environmental performance over 140,000ha and 4 million tonnes of harvesting distributed nationwide within every region of New Zealand.

I am presently a member of the Bay of Plenty Regional Council's Water Advisory Board, and was the industry representative on the 'BoP Land Use Futures' collaborative group, the first group established to try to develop common and recommendations for dealing with Lake Rotorua water quality.

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Summary

- It is accepted that, given the magnitude of change required from conventional farming models, a transitional period is justified. Since BoP Council's Rule 11 came into force, giving notice of the impending certainty that the issue of lake water quality would have to be addressed, the pastoral sector will by the end point of Plan Change 10, have had in excess of 20 years to adjust to requirements to substantially internalise their own nitrogen footprint. We believe 20 years is sufficient given the depreciation rates that would apply to current (especially dairy sector) infrastructure and the rates of technological change.

Evaluation approach

- We believe there are fundamental flaws in the approach taken to evaluate the economic impacts of proposed rule changes. In particular the approaches have been designed around demonstrating added cost and potential disadvantage to the pastoral sector operating under current models without addressing fundamental questions of sustainability and transparency and net worth to the wider community
- If ultimately a sector is unable to operate permanently without a nitrogen cross subsidy from other land based sectors then that sector is fundamentally unsuitable as an activity in that environment.

Grandparenting

- PF Olsen Ltd reiterates its, and it believes other forest owner's, previously well flagged and implacable opposition to the grandparenting of other land user's pollution rights. As proposed, by its very nature grandparenting represents a **subsidy in perpetuity** for those parties whose land based endeavours are creating the most pollution. It is in fact the granting of a "Property Right" over other parties land, parties who fundamentally have almost nothing to do with the problem.
- Permanent grandparenting as proposed is a perverse signal as it rewards polluters and penalises those who don't. Existing forest owners will be locked into a nutrient discharge regime that represents the lowest possible natural discharge level of 3 Kg/ha/yr in perpetuity . This regime would represent a direct tax on current forest growers because their land values will decline as a result of the restraint to baseline emissions.
- A grandparenting regime is poor economic stewardship and it prevent landuse flexibility establishing the best sustainable land use for a given land class over time.
- Permanent Grandparenting is at odds with the fourth report of the Land and Water Forum which recognises the need to move toward natural capital approaches to land management.

Averaging / Natural Capital

- We contend that, beyond 2032, N discharge totals from pastoral sources must be less than the targets set in the notified plan change with the surplus being allocated back to those currently under commercial forest cover.
- Ultimately we believe that an averaged or better still, 'Natural Capital' approach must be the goal of regulators if a truly sustainable and resilient land use pattern is to be established.

- As a minimum, by our calculations based on Overseer 6.2, a further 2 Kg reduction across the pastoral sector would enable the existing plantation growing industry to achieve a discharge allocation of around 6 kg/ha/yr which would then be close to much of the drystock pastoral sector. With dairying and dairy support well above that level it would seem appropriate that they bear the greater share of that reallocation. We note however that under Overseer 6.3 the calculated leaching from pastoral farming and their consequential allocations approximately double while forestry allocations remain the same dramatically expanding the 'pollution gap' between forestry and other landuses.

Other Considerations

- The reallocation to forestry should be useable i.e they can increase their nitrogen discharge up to the limit (change of land use or forestry regime) and or tradeable in exchange for a nitrogen amelioration service.
- It is accepted that new forests planted using public monies and established with the express purpose of Nitrogen mitigation should not receive an added allocation.
- Farmers should have the flexibility to offset their excess nitrogen footprint within the catchment.

Scope of Evidence

1. Evidence presented aims to elaborate and clarify the key points made in the submission of PF Olsen Ltd. In particular I wish to emphasise the fundamental issues of principle outlined in that submission that allude to the precedent setting nature of the proposed plan change 10 in terms of its architecture and process and the much wider implications it potentially reinforces for low impact or more benign land uses throughout the Country.
2. In particular I will focus on:
 - a) Elements of concern regarding the collaborative process followed.
 - b) Fundamental and critical failures in transparency in the economic justifications for the decisions made.
 - c) The relationship between adjusted Policy decision criteria and the decisions finally made.
 - d) The fundamental flaws in the allocative provisions in terms of goals to achieve improved water quality, landuse change drivers, and the wider societal environment in which land use change must be considered.
3. I have also been asked to represent the submission of Hancock Forest Management NZ Ltd (HNFM), a large forest management entity with interests within the Rotorua Lake Catchment.

PF Olsen Ltd

4. PF Olsen Ltd is a forestry services provider. We own no forests, but manage the forests of private landowners across a full spectrum of scales from very small farm foresters (including in the Rotorua Catchment) to large (international) institutional investors, also represented in the Rotorua Catchment. PF Olsen operates to a similar formula throughout New Zealand. In total, we are the 3rd largest in NZ in terms of forests under management. Hancock are largest at 206,000ha in New Zealand.
5. PF Olsen manage a forest area of approx 1000ha within the Rotorua catchment 2.6% of the catchment and 11% of the current forest estate. Between Hancock Forest Management and Timberlands Limited the three entities combined manage 63% of the existing plantation forests in the Rotorua catchment.

Concerns about Consultative Process

6. Early in the phases of the introduction of Rule 11, the Bay of Plenty Regional Council set up a stakeholder collaborative group to consider evidence and provide advice on pathways to achieve improvements in water quality in Lake Rotorua. The group was formed under the banner of 'The Land Use Futures Group' with much of the work done between early 2008 and late 2010. I filled the role of the forest industry representative on that group.

7. The Group included representatives from dairying, drystock, Federated farmers and others as well as myself representing forest growing interests.
8. Regular meetings and deliberations were held for a number of years over which time the science around nutrient inputs, farm systems, and even allocation systems including N-trading were discussed and the beginnings of solution pathway evolved.
9. The work of this group more or less came to an end at the time of the untimely death of the then Chair. Nevertheless I have four very clear recollections of the progressions of the workings of the group:
 - a. Substantive proportion of the time involved ultimately reduced to the critical recognition and acceptance by the pastoral sectors that the underlying causes, excess nutrients, were a pastoral issue and acceptance of that fact.
 - b. Recognition by the pastoral sector that change was needed and the change was theirs to make.
 - c. At least tacit acceptance of the case put on behalf of forestry interests that while, as commercial entities, the forest industry accepted targets for nutrient reduction were likely to be difficult for farmers and therefore a transition period and temporary grandparenting over that period was palatable, the final point of any allocation system must include a greater than baseline allocation to existing forests and un(der) developed (usually Maori) land. This was required to ensure equity and prevent perverse incentives and outcomes whereby one of the very activities that had a capacity to assist in nutrient reductions would be deterred from investment, effectively precipitating a need for further ratepayer / taxpayer subsidies to achieve any change.
 - d. The legacy issues of history that contributed to much of the underlying nutrient loads were being addressed by substantial taxpayer and ratepayer contributions to the lakes clean-up. Future loads arising from pastoral activities that were above a nominal carrying capacity for the soils on which the activity took place were by default agricultures issue to solve.
10. With the dissolution of the Landuse Futures group, my close involvement ended and to the extent that lines of work would continue with a new group subsequently becoming the Stakeholder Advisory Group (STAG), I was comfortable that good foundations had been laid for the future including the interests of forest growers.
11. I was aware that C Maunder of Timberlands was to assist with cover for future industry involvement but had no further close involvement until 2015. In late 2015, partly through involvement in the Waikato River Wai-Ora process, I became aware that economic evaluations being used to assist the STAG group in making decisions about Nutrient Discharge Allowances (NDA's) may be similar to those used in the Wai-Ora process. At that time, in so far as, information was available, I had challenged elements of those evaluations and was concerned that the same issues might be being promulgated.

13. I became very concerned that the industry representation or cognisance of its representation, for various reasons appeared minimal and that the debate on allocation appeared to be regressing to levels that had been surpassed at the time of the Land Use Futures Group.
14. At that point I personally sought clarity on how the representation of the forest growing industry was being managed and subsequently more than once, requested that the managers of the STAG process organise a specific meeting with an already (loosely formed but recognised) "Forest Industry Liaison Group" (Appendix 1) tasked with meeting occasionally as and when required to ensure communication between industry over important matters affecting industry or of concern to Council.

It was noted at that a one off detailed presentation to this group would result in very rapid, efficient and probably reasonably aligned feedback on any matters of concern in these analyses.

15. Despite these requests, no meeting was ever convened. Instead:
 - a. A powerpoint summary of the proposed allocations rationale was forwarded, though this did not provide any significant underlying detail.
 - b. The industry was provided an opportunity to present to the STAG group. This was duly done in Sept 2015 (Appendix 2) though by that time it appeared the decisions on allocation method had already been made.
16. A second invitation, shortly after (for reasons not entirely clear), to re-present was again taken up. Again the decisions appeared already made with questioning focussed on how the policy criteria required consideration of past investment, the need to avoid windfall gains etc.
17. These steps as outlined above, and also in the knowledge that Timberlands representative on STAG was concerned about the make-up and processes related to that group, underpin my concerns that the consultative process was flawed.

Economic evaluations - critical failures in transparency

18. The general concerns raised about the economic evaluation methodology related to the Wai-Ora process were outlined in an email and the responses similarly received. These are contained in Appendix 3 and may provide some useful background insight. My concerns remain similar given the apparent use of similar strategies in the Rotorua Lakes evaluations.
19. In particular there has been in my opinion a serious oversight that has, as a consequence, failed to clearly provide the foundation required to inform future decisions aimed at steering landuse toward a long term socially, economically and environmentally sustainable landuse matrix.
20. Economic fundamentals: Farm Surplus vs Discounted Cashflow. The issue of concerns over the approach to evaluating the economic impacts has been raised as it is a crucial component underpinning not only the effects of decisions, but also the transparency required to ensure the wider public can truly understand the trade-offs that might subsequently follow. Modelling employed is based upon the impacts of change upon the cashflow of incumbent farms. It does not however, clearly illustrate the true economic returns and the sustainability of the activities under scrutiny.

21. In simple, terms, the economic modelling appears to be based on an approach that sought to quantify the impacts of cost and production changes brought about by implementation of different farm nutrient amelioration strategies. Of itself this is not a problem as it is a useful tools to establish relative cashflow impacts of different on-farm strategies. However, as the primary evaluation tool used in the Plan Change 10 process it has been used to estimate the costs to farmers of rule compliance (relative to the status quo operation), useful for indicating change impacts upon farmers cashflow but much less meaningful in terms of illustrating fundamental sustainability.
22. Unlike economic farm surplus, discounted cashflow is a methodology that incorporates all costs and revenue streams into the future, discounting those future costs (including land) and revenues at an interest rate that represents an appropriate risk return on the capital employed. From any particular analysis, if the final result, (the Net Present Value NPV) is a positive sum $\geq \$0$ then the enterprise is providing an appropriate or greater return on capital invested including land. If the result is less than $\$0$ at the interest rate, then the activity is fundamentally uneconomic. This is a methodology routinely used in forestry but not in agricultural evaluations, though it could be.
23. A variation of this methodology applicable to both forestry and agriculture is to determine "Land Expectation Value" (LEV). Under this approach all elements are the same except the cost of land is left out. The final result, assuming a value greater than $\$0$ is the estimated value an informed purchaser seeking to make the appropriate return on capital could pay for the land when undertaking that enterprise.
24. It is our contention that a failure to include discounted cashflow approaches into the evaluations has prevented clear discussions around two critical components as listed below:

- a. Is dairying a fundamentally sustainable activity within the Rotorua Lake catchment?

A LEV analysis of farm models under different mitigation strategies would provide a clear insight into this question. If for instance the LEV's were consistently negative for given levels of amelioration cost, i.e income receipts were consistently unable to cover costs, then those activities at that level of nutrient amelioration were therefore unsustainable, economically, environmentally (if the level of amelioration was insufficient to meet the required targets) and ultimately socially if the wealth and incomes of others were required to cross subsidise the particular activities. These are very fundamental questions that the public has every right to know and understand before any decisions are made about what and how allocations, if any are to be made. This most important question appears never to have been addressed.

- b. The second aspect is linked to the first. If under an LEV analysis, dairying models under various nutrient amelioration strategies are yielding positive returns then fundamentally dairying can be undertaken **provided that the price paid for the land as indicated by the residual value is not exceeded**. This is in fact the likely outcome. The dairy industry and the dairy export markets are not threatened by the requirement to meet tighter nutrient emissions controls. What is under pressure are costs. However, capital and operating costs may also be able to be afforded in a cashflow sense. The problem arises with the value attached to land and particularly the cost of debt associated with the land or the cost of debt leveraged against the value of land in order to undertake more intensive (and

higher nutrient leaching) activity. Doole himself alluded to this fact, noting that under some scenarios modelled some farmers would not survive but that did not preclude the continued operations of the activity if newcomers purchased at the correct price that enabled them to adjust farm systems of invest in new amelioration technologies.

25. It is well recognised that in many farm enterprises in NZ, the return to capital employed of the enterprises is poor. Farmers have been prepared to accept such poor returns, instead capitalising surpluses to land value which is ultimately sold on tax free. This situation is not necessarily the fault of individual farmers but with cashflow surpluses relatively weak it is a structural issue within the sector that leaves them vulnerable to sudden cost impositions and or revenue volatility. It also raises important questions that have not been addressed by the STAG process, namely:
 - a. If it is land value that is at risk, rather than the business of farming, and particularly dairy farming - How much responsibility/ obligation does wider society or other land users have to support the tax free capital gain tied up in land?
 - b. If particular farm entities are likely to be severely stressed because they carry high debt through purchasing farmland at high prices, what is the responsibility of wider society and land users to protect those businesses? Did we, collectively as a country, offer similar concessions to businesses forced to invest heavily in new industrial clean air discharge technologies?
 - c. If farm debt is a major factor that predetermines survivability, what is the value of that debt – how much responsibility should society in general have vs the lending institutions, particularly if significant debt was incurred over the last decade on farm expansion and intensification rather than environmental amelioration? Responsible due diligence should have clearly identified that borrowings for intensification, if in fact any such occurred since 2004, was an unwise strategy.
26. Given the vulnerability of farming as an investment portfolio, (i.e, employment, total equity, total income source, total savings) all tied up in the one venture and one sector, could 'exit with dignity' be a faster, cheaper and more certain option to consider?.
27. In our view none of these very important options have been evaluated nor considered, yet given the implications of the current approach involving as it does, public money, extended timetables and uneven allocations, we contend that all affected parties have every right to have clear answers to these questions before decisions on allocation can even begin.

Councils Policy guidance framework

28. We are aware of more detailed submissions in respect of the issue of the correlation between Bay of Plenty RPS Policy criteria and the amended criteria used to justify the STAG allocation decision model. Those criteria are tabulated below.

RPS Policy WL 5B principles and considerations	PC10 sector ave allocation
(a) Equity/Fairness, including intergenerational equity;	X
(b) Extent of the immediate impact;	✓
(c) Public and private benefits and costs;	X
(d) Iwi land ownership and its status including any Crown obligation;	X
(e) Cultural values;	X
(f) Resource use efficiency;	X
(g) Existing land use;	✓
(h) Existing on farm capital investment; and	✓
(i) Ease of transfer of the allocation.	X
	3/9

29. We concur with other submissions on this matter that the match between the final allocation decision model and the criteria is poor.
30. In particular, we relate to the presentations made by the industry to the STAG group where questioning was focussed on criteria WL5B - g & h. In terms of (g) the fact that a land use may be existing should not be a strong influence for allocation decision unless the activity has been already clearly demonstrated to be fundamentally sustainable in its own right. As discussed in para's 26 – 27 this has not been established.
31. In respect of (h) we draw attention to the fact that it is questionable if recent capital investment that was not directly related to meeting reduced nutrient emissions should be a criteria for allocation decisions. Firstly;
- a. Such capital investment, if not made for amelioration purposes and if made since around 2005 was probably an unwise business decision given the clear indications that regulation was coming and the ensuing veracity of the debate.
 - b. Capital investment in on farm machinery and technology is likely to be heavily depreciated unless made in the last 5 years. Given the rate of change in dairy technologies this aspect needs to be discounted heavily in the decision making process especially if made for intensification rather than amelioration purposes.
 - c. Farm land that was purchased within the last 10-12 years should already have been reflecting the due diligence caveat that debate and rules on nutrient emissions were clearly in train. Gains in land value, if any, since that time are unrealised while debt leveraged against land values unless for amelioration purposes is strictly business risk.

Allocative Mechanism

33. While fully supportive of the objective to achieve a much improved level of water quality in the lake catchment, and while fully sympathetic to the realities that there must be a transition period to achieve the required changes to farm management practices, PF Olsen, representing its forest owning clients strongly rejects the principle that land based operations that contribute to nitrogen emissions should in the long term be entitled to a grandparented “right to pollute in perpetuity”.
34. The current allocative approach effectively rewards those activities that pollute (right up to the highest allowable levels) and penalises those who don’t.
35. Grandparenting, without termination represents a cross subsidy in perpetuity. We reject this as outrageous. Pastoral farming and especially dairying under the current model is faced with significant challenges beyond the farm gate as well as within. The development of artificial milk and meat in industrial processes overseas Appendix 4 is occurring because those investing in these technologies are recognising the urgent need to produce food with a lower environmental footprint. Westland Dairy products on the West Coast is already under customer pressure to develop alternative energy sources for the coal that’s used in manufacturing milk powder, and the possibilities for a future where water is no longer free is a cloud in the horizon on farm as well as nitrogen and carbon emissions. In short the sector is going to have to adapt and change rapidly over the next 10-20 years.
36. Given substantial change pressures are building, it is our view that it is imperative that current farm practices evolve and fast. Protecting the current incumbents will not serve that purpose and is misplaced ‘good intent’:
 - a. Existing farms under existing models will either change or fail in in the relatively near future OR
 - b. They may adapt with new technologies to new systems or may transfer to other activities that nevertheless rely on a higher than average nitrogen emissions. Under this scenario, those with such land – with a high N allocation, effectively a granted property right, may find the scarcity value of land with that allocation holds or increases it’s value or such NDA’s are able to be traded – a financial value to the polluter granted by way of a property right in perpetuity over other parties land and non-polluting land use.
37. That such scenarios will unfold need only be observed in respect of water rights where those parties with land accompanying a Right, achieve far higher land values than those without. In other words, the free allocation of water becomes a property right with an often substantial financial value that benefits the holder.
38. We reject the notion of “windfall gains” often expressed by those supporting “grandparenting” as a reason not to advance toward an averaged or ‘natural capital’ allocation base.

40. Around the world markets evolve, new markets arise and old markets fade or collapse. The recognition of “N” as a problem globally, just as CO₂ has been, and the fact that some activities can provide beneficial services (ecosystem services), while other activities ‘consume’ those services has encouraged the attribution of values for the exchange of consumption and amelioration services around those factors. Put simply the evolution of new markets.
41. The so called ‘windfall’ reflects that some activities can provide a service not previously needed while some activities consume a service not previously required and a value of exchange of service develops around that opportunity. This is just natural development of new markets.
42. It is pertinent to note that the ‘windfall’ is only crystallised provided the service is provided – including the costs and opportunity costs of provision. Case in point has been the rocky path of the NZ emissions trading scheme whereby after governmental recognition of the urgent need for provision of a service and a rapid response by the forest industry to the provision of the service, those services were rapidly withdrawn as attempts to protect polluters led to costs of provision exceeding the benefits of provision and an almost immediate cessation of planting.
43. An allocation system involving grandparenting in perpetuity also has the nationally perverse outcome of creating structural biases in investment in any activity that can contribute toward a reduction in pollution. New entrants or activities including forestry that could substantially reduce emissions are in fact unlikely to occur because of the risks of future socialisation of benefits if global catchment wide NDA targets (Rotorua or elsewhere) are not met (eg new revisions in Overseer) and further regulation is required. Or those with higher NDA’s may only ever work to the minimum NDA required for their activity even if they could improve further, in order to protect the inherent property right and value of the high NDA and avoid costs of outperforming. This highlights the need for trading /offsetting options to be included.

Allocations

44. A cursory look at the allocation models generated from Overseer 6.2 saw an endpoint allocation objective as shown below:

2032			
	Ha end	Kg/N/ha	Kg N
Dairy	4016	30	120480
D support	358	14	5012
Sheep/B	9231	9	83079
Gorse conversion	500	3	1500
Farm conversion	5000	3	15000
Original plantatioi	8946	3	26838
Native Forest	10269	3	30807
	38320		282716

45. By our calculations reallocating NDAs to existing forestry at least to an interim level of 6kg/ha/yr, might involve in the order of a further 2kg/ha/yr from all pastoral agriculture though this realistically should be shared more reasonably on the basis of the magnitude of the NDA and might add around a further 13% to the reductions already required of the pastoral sector.
46. It is notable under an approximate reallocation based on Overseer 6.3, that the NDA's for the pastoral sector and dairy in particular have risen substantially while forestry appear likely to remain the same. On this basis, closing the gap would require a much larger reallocation.
47. However, under both scenarios total reduction in nitrogen expected from, for example the dairy sector, equates to around 35-44%. While these sound severe reduction hurdles there seems to be at least some commentary from within the dairy sector that in some cases, such reductions are already achievable, especially from very high leaching levels.
48. Ultimately the variations observed call into question the reliability of the calculated NDA's.
49. In our view there STAG process has not been subject to enough 'out of sector' scrutiny to be certain that the proposed allocations are appropriate or justified by the total societal contributions of the sectors benefiting from the high allocations. Until such a case is properly made we believe an averaged or 'natural capital approach' must be the end point sought after adjustment, or else pollution pricing mechanisms in conjunction with target reduction monitoring need to replace the allocation method.

Summary

It is accepted that, given the magnitude of change required from conventional farming models, a transitional period is justified. Since BoP Council's rule 11 came into force, giving notice of the impending certainty that the issue of lake water quality would have to be addressed, the pastoral sector will have had in excess of 20 years to adjust to requirements to substantially internalise their own nitrogen footprint. We believe 20 years is sufficient given the depreciation rates that would apply to current (especially dairy sector) infrastructure and the rates of technological change.

We believe there are fundamental flaws in the approach taken to evaluate the economic impacts of proposed rule changes. In particular the approaches have been designed around demonstrating added cost and potential disadvantage to the pastoral sector operating under current models without addressing fundamental questions of sustainability and transparency and net worth to the wider community

If ultimately a sector is unable to operate permanently without a Nitrogen cross subsidy from other land based sectors then that sector is fundamentally unsuitable as an activity in that environment.

PF Olsen Ltd reiterates its and it believes other forest owner's previous well flagged and implacable opposition to the grandparenting of other land user's pollution rights. As proposed, by its very nature grandparenting represents a **subsidy in perpetuity** for those parties whose land based endeavours are creating the most pollution. It is in fact the granting of a "Property Right" over other parties land, parties who fundamentally have almost nothing to do with the problem.

Permanent grandparenting as proposed is a perverse signal as it rewards polluters and penalises those who don't. Existing forest owners will be locked into a nutrient discharge regime that represents the lowest possible natural discharge level of 3 Kg/ha/yr in perpetuity . This regime would represent a direct tax on current forest growers because their land values will decline as a result of the restraint to baseline emissions.

A grandparenting regime is poor economic stewardship and it prevent landuse flexibility establishing the best sustainable land use for a given land class over time.

Permanent Grandparenting is at odds with the fourth report of the Land and Water Forum which recognises the need to move toward natural capital approaches to land management.

We contend that, beyond 2032, N discharge totals from pastoral sources must be less than the targets set in the notified plan change with the surplus being allocated back to those currently under commercial forest cover.

Ultimately we believe that an averaged or better still, 'Natural Capital' approach must be the goal of regulators if a truly sustainable and resilient land use pattern is to be established.

As a minimum, by our calculations based on overseer 6.2, a further 2 Kg reduction across the pastoral sector would enable the existing plantation growing industry to achieve a discharge allocation of around 6 kg/ha/yr which would then be close to much of the drystock pastoral sector. With dairying and dairy support well above that level it would seem appropriate that they bear the greater share of that reallocation. We note however that under Overseer 6.3 the calculated leaching from pastoral farming and their consequential allocations approximately double while forestry allocations remain the same dramatically expanding the 'pollution gap' between forestry and other landuses.

The reallocation to forestry should be useable i.e they can increase their nitrogen discharge up to the limit (change of land use or forestry regime) and or tradeable in exchange for a nitrogen amelioration service.

It is accepted that new forest planted using public monies and established with the express purpose of Nitrogen mitigation should not receive an added allocation.

Farmers should be able to offset their excess nitrogen footprint within the catchment.

Appendix 1

Sent 10th March 2015 – the second request

Gloria,

Talking to Colin, I was just wondering if there had been given any further thought to my idea of undertaking an update to forestry interests via BoPRC Forestry Liaison committee on the status of play, and especially the basis of the recent economic evaluation, the powerpoint of which is a bit too cryptic on its own without further explanation. This I would view as a pretty critical piece of work and believe I would not be alone wanting a better understanding of its inner workings and assumptions if it is being used as a basis to inform land use policy in the region.

Kit Richards | Environment Manager | PF Olsen Limited

PO Box 1127 | Rotorua 3040, New Zealand | 📞 +64 7 921 7206 | +64 21 355 631 cell | ✉ kit.richards@pfolsen.com | www.pfolsen.com

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Appendix 2

A Forestry Perspective

Water Quality
Setting Precedents or Solving Problems

Issues – why we are concerned



Appeal of
ecotourism
disruption



Public
/Private
benefit



Wildlife impacts
/ or market
signals



Resilience
&
Flexibility

Public /Private Benefit

Public
/Private
Benefit

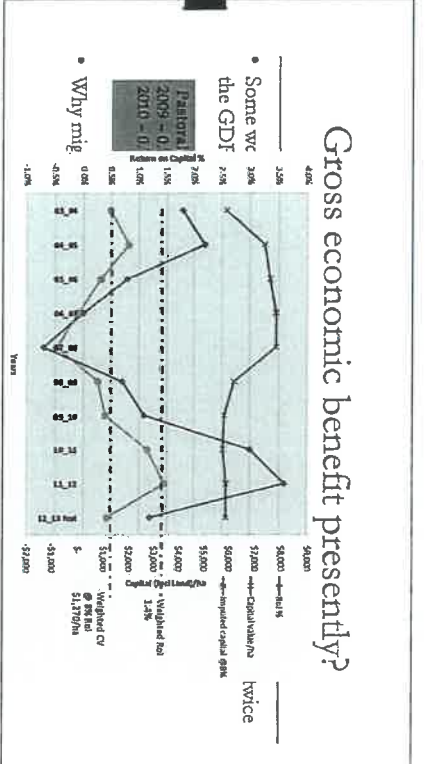
- The local economic modelling has been done –
At catchment level and NZ level total ongoing added value less in achieving N levels is not a high cost.
- Much lower than changing the NZ flag (i.e. the public cost of improvement relatively low even with externalities excluded and taxpayers/ rate payer inputs discounted as share of legacy issue).
- What is the public and national benefit from economic activity in NZ? = High returns to capital employed at low and sustainable environmental footprint.
- high returns = high business viability, investment, resilience, high wages, social licence

Gross economic benefit presently?

Some we know the GDI

Parliamentary Commissioner for the Environment
2009 – 01
2010 – 01

Why not?



Wounded cv @ 8% and \$1.270/m



Private Benefit

- SO ... if returns to capital (thus capital efficiency in NZ farming are often low... Why has there been such a massive investment in dairy and dairy conversion...."
- Land value appreciation and tax free capital gains.
- Much recent commentary that agricultural sector returns to capital are low. (see next slide)
- Land value is significantly misaligned with that landuse's capacity to generate efficient and high returns to capital – NZ economic benefit.
- Land value has been consistently well aligned to the purpose of private benefit.

Private benefit

- Doole et al - "Overall, the assessment indicates that the estimated costs to the public of providing private benefits at least to public or to collect land use returns to agricultural land are significantly lower than the estimated benefits to the public from the land for open space. The net benefits are positive and significant. The benefits are likely to be larger on the returns on capital would return to private benefits of an efficient economy delivering maximum regional & NZ inc benefit through better planning." "The catchment scale as some farms that go bankrupt are likely to be cheaper or the returns on capital would return to private benefits of an efficient economy delivering maximum regional & NZ inc benefit through better planning." "On average, rising scenarios not likely to result in negative synergy....."

The Commentators

- Bernard Hickey
- Gareth Morgan.
- Brian Fallov
- Alison Dews
- Average Dairy 4.6% ROI @ \$6.10/kg
- -2.3% @ \$4.5/kg
- Consistent messages and warnings!



The other side of the coin

- The hard question: What is the key objective... creating an efficient economy delivering maximum regional & NZ inc benefit... through better planning." "On average, rising scenarios not likely to result in negative synergy....."

The MINDMAP

Sustainability

Resilience & Feasibility

- Much modelling based around current farm models and the impact of change upon the incumbent sector players. BUT ...
- What would a truly sustainable dairy model look like in the catchment i.e. it operates within its Natural Capital envelope. **Is it feasible?** That should be a bench mark.
- If it can't be achieved without policy support should it be there?
- If it can only be achieved by a higher NDA than it needs a service of N provision. If the cost of this service can't be supported why?
- Because the gross costs always exceed gross revenues? – should it be there - is it sustainable?
- Because land value would have to decline to reflect the true economic worth of that land – why should we support that?

Sustainability

Low profitability – (profitability) vulnerable

Our Concern – It is not that transparent at this point that the question has been clearly answered. What is the sustainable dairy model in the Rotorua lake ecosystem. All eggs, income, savings, equity and supported through this crisis... what happen in next –

The hard question: Is there a sustainable dairy model in the Rotorua lake ecosystem. What are the economic parameters and how do we get there?

Nothing is certain

Age of economic disruption

M.E. environment, 'T O model assumes structure e.g. what if dairy commodity prices drop in how to protect and preserve some scale back but the world is... Possible but what if we... Our Concern – The emphasis has been in how to protect and preserve some scale back but the world is... The hard question: Are we going to... why would we lock in the current in the face of a

Business competition

- Primary industries are fundamentally in competition for land
- They use land, plus other inputs (sustainability or unsustainability) and generate output internalised or externalised to earn cashflow for products sold.
- For forestry land cost is the single biggest item that regularizes compound interest over the full 28-32 years of rotation. @ <6-8% post tax real returns on capital forestry distances from NZ.
- EVERY RULE or POLICY that seeks to PROTECT LAND VALUE or to protect the competing land use from the real market signals whether directly from the single market or the market in environmental services is a CROSS SUBSIDY.
- If disincentivises natural investment in the alternative land use both specific to or external to the targeted area.
- Increases the cost of public incentives required to support the land use change if it remains the desired solution.

Summary - Yes we do gripel

- In recent years following bad experiences with landridding and debris flows on steep country forest companies are making conscious decisions to walk away from certain areas and at least two whole large forests as the costs of meeting environmental constraints have risen significantly. No compensation nor expectation thereof – that's just the reality of tightening environmental standards and public expectations.
- Some forests are in the wrong place – Tough!
- Some of the highest cost landridding or KOT on capital invested are forests.
- If the costs of N remediation are consistently higher than the current land use cannot be maintained without the support of a policy intervention to protect the landridders and especially its land value then surely the current model is unsustainable in that context and must change.
- The N problem is not new ... it has become high profile and very serious because it has not been addressed early.
- Its "N" now ... what happens if the rest of the world decides NZ's current stance on carbon is no longer tenable. Do we protect incumbents against limit as well while generalising the industry best positioned to help alleviate the issue?

Natural Capital – Recognised severe impacts on specific individuals

- Or Grandparent with eventual clawback to NC level
- Practice established during Land Use Futures group meetings.
 - Provides more time
 - Finally levels playing field.
 - Incentivises technical innovation.
 - Incentivises investment AND borrowing only for economic worth not capital gain. (an important signal to banking and & land valuation industries)
- Or are there other ways to help
- The individuals and families – are there better ways of providing assistance out. Purchase & retail land + direct financial assistance.
 - Yes it's a "subsidy" But it's...
 - One off
 - Transparent
 - Relatively fast
 - Make certain outcomes for some.
 - The market takes over afterwards.
 - Clear signals.

Natural Capital OR....

- Otherwise land use becomes inflexible – all advantage rests with those allocated / over allocated.
- Maori land disadvantaged.
- New land use and technologies can only be applied by some and option value retained while for others they become a permanent X subsidy and locked down.
- What happens if Forest N leaching → 3 – evidence of crown capture of volatilised N from proximity to intensive dairy regions.
- What happens to forestry economics if forestry productivity can be doubled (an industry target) and N would go to 5 or some other figure still below the natural capital level?

Appendix 3

Memo

File No: 41 52 92

Date: 16 February 2015

To: Technical Leaders Group, Healthy Rivers/Wai Ora project

From: Blair Keenan

Subject: **Response to questions about JV**

This memo provides a response to questions raised at CSG7 of the Healthy Rivers/Wai Ora Collaborative Stakeholders Group (CSG). It is understood that the questions were posed to the Technical Leaders Group. In this memo I provide answers to those questions, noting that Dr Graeme Doole from the TLG has reviewed those answers. In the following text, I have copied the questions raised in italics, and provided a response below each.

The questions relate largely to work that was carried out as part of an Economic Impact Joint Venture (hereafter referred to as the Joint Venture) study in which the Waikato Regional Council was involved I also note that the memorandum of understanding with other Joint Venture partners would suggest that this information should be shared with them before the response is provided. I can confirm that I have shared my responses with the Joint Venture partners.

- | |
|---|
| <p>1) <i>The report undertakes scenario evaluations based on NPS, NPS average and NPS ALL. Of those only NOF ALL seems likely to approximate the standards required by the vision and strategy of the co-management agreement. While the other scenarios may or may not have some benefit in the ensuing debate, it seems prudent that the report should be seeking to highlight the scenarios that most closely match the WQ targets (swimmable in all reaches) that are implied in the vision and strategy.</i></p> |
|---|

It is noted that the questions appear to relate to the pilot report *Evaluation of policies for water quality improvement in the Upper Waikato catchment*, by Graeme Doole (referred to hereafter as Doole (2013)). It is important to place this report in context. It was undertaken as part of a pilot phase for the Joint Venture. One of the objectives was to provide information to inform central government decision-making on the National Policy Statement for Freshwater Management. The scenarios chosen were driven by the information requirements of central government at that time.

It was clearly acknowledged that they had limited applicability in respect of the Healthy Rivers/Wai Ora process, where the Vision and Strategy prevails.

It was also not intended that the report be the final product of that part of the Joint Venture work. Rather, the intention was to produce (among other things) a catchment model that could be used as a tool to understand the implications of different scenarios for targets and limits. That is, it was intended to provide a tool which could be used by the Healthy Rivers/Wai Ora project to understand the implications of different scenarios chosen by the CSG. It is noted that the model that has been passed from the Joint Venture to the Technical Leaders Group is based on the same approach as that utilised in Doole (2013), but it is not the same model.

- 2) *The report does not seem to particularly clearly spell out the approach to opportunity cost and how this is going to be defined/ applied by the subsequent process. A number of scenarios seem to indicate that if certain water standards (in respect of N & P, coliforms or sediment) are to be met then there will be an opportunity cost (lost profit or economic activity)– expressed as lost production to the dairy industry and total economic loss to the regional economy. This does not appear to be an accurate reflection of the possibilities on the following basis:*
- a. *For any scenario IF a water quality standard is to be met when under current “business as usual” it cannot be met, then a cost will have to be incurred. It will either be incurred by the generators of the excess contaminants or if not borne by the emitters then by socialisation of the mitigatory costs to the wider participants in the regional economy. If borne by the wider public rather than fixed at source, the total costs are very likely to be higher though these costs incurred may not relate directly to a loss in economic activity since the mitigatory actions will generate economic activity and employment in their own right.*
 - b. *For some scenarios the case is implied that significant increases in dairy expansion could occur but for the ‘limitations’ created by a required standard. The report then seems to infer that the requirements to meet the standard imposes an opportunity cost to the dairy industry and possibly the regional economy. This may well be a view point, however the policy makers should not shy away from acknowledging the fact that if an activity cannot meet the required environmental standards (and in the cases in question, it could be on multiple fronts, N, P, Coliforms and sediment) then that activity under its current model is fundamentally unsustainable. There is not an opportunity cost – it is not a tenable option. To accept otherwise would be to accept the principle that any other heavy industries should be allowed to discharge contaminants because they will be more profitable and generate larger (production multiplied) cashflows.*

Part a of question 2 focuses on the question of how the costs of meeting targets and limits could be allocated. The object of the model in Doole (2013) is to provide an estimate of the sectoral costs of meeting targets and limits as measured by the change in aggregate profitability of land use. The allocation of costs – who actually pays them – was not considered. The incidence of costs is part of the detailed policy design process that was beyond the scope of Doole (2013). That is, the model estimates total costs; it does not say anything about who ultimately pays those costs.

Part b of question 2 infers from Doole (2013) that the requirements to meet the standard imposes an opportunity cost to the dairy sector (and '...possibly the regional economy'). The model in Doole (2013) is not limited to the dairy sector; it covers dairy, sheep and beef farming, and forestry land uses. That aside, it is correct that the model is designed to help understand the costs incurred in order to meet specified targets and limits. For example, policy decision-makers can set a constraint that must be met in terms of water quality targets, and the model will then work out what changes need to occur on the land to achieve that, selecting the least costly changes first, and continuing until that targets are met¹.

It is acknowledged that there are a number of constraints on the expansion of dairying in the upper Waikato. The model in Doole (2013) estimates the limits on conversion implied by targets and limits under certain scenarios (it is not intended to make judgements about whether this is a good or bad thing, only whether it is physically possible). It also attempts to take account of water availability (since the catchment is at or close to fully allocated), and the suitability of land.

The Doole (2013) report does not consider the wider impacts on the regional economy. The regional economic effects were planned to be estimated as part of a subsequent study under the Joint Venture, but resource (time and funding) constraints meant that this did not happen. Nevertheless, it is recognised that such information is important, and that it is needed to satisfy the requirements of section 32 of the Resource Management Act 1991 (for example, the need to be able to show the effects of proposals on economic growth and employment).

Part b of question 2 argues that '*...policy makers should not shy away from acknowledging the fact that if an activity cannot meet the required environmental standards...then that activity under its current model is fundamentally unsustainable.*' By providing estimates of the effects of limits on the profitability of different land uses, this is precisely the kind of information that the model in Doole (2013) is intended to provide. For example, it may show that it is not possible to meet certain targets and limits given current land uses and management practices. This does impose an opportunity cost, as though continued ('unsustainable') intensification is not in line with the limits evaluated under some scenarios, a change to the status quo necessarily imposes some costs on current operators as they are forced to change their current management.

- 3) Without more information it is not completely clear whether the modelling clearly differentiates between the likely effects of meeting target standards on individual farm level incomes as against regional grossed up product revenues. If the desired standards in water quality simply cannot be despite significant investment in mitigatory farm systems because the outright cost of those systems exceeds the revenue for milk solids, then inevitably there will be implications for regional economic cashflow from the pastoral sector. While not a desired outcome, this would as noted above, be a signal that the current model is fundamentally flawed in terms of its long term sustainability. However it is not clear from my reading of the report whether this is the case. The markets for dairy products and the international prices they obtain are not impacted in any way by any proposed water quality standards. Only the costs of production. The report notes that many farms would for instance need feed pads and herd homes implying that few have

¹ Policy decision-makers can also use it the other way around: by specifying land use/management scenarios, it can provide information about diffuse discharges that affect water quality.

them at present. There seems to be a suggestion that they could not economically be incorporated into the farming model. What is not clear though is whether this is because the value of the land + the value of the new technologies along with levels of business debt meant the average farm is unviable or whether it is simply the costs of the new technologies plus the debt servicing requirements on those exceeds the milk income at any level.

- a. If it is the latter then clearly the industry cannot be competitive in producing food at an environmentally acceptable level. That would be a matter of public and regional economic interest and concern implying that change in the role of the sector in the regional economy is inevitable and will have consequence.
- b. If it is the latter however, the implication is that land values are too high and are going to have to adjust. That is not a matter of public policy concern to the same extent. It is the consequence of private business decisions and the level of equity /debt held by individual farmer operations. While adjustments may be painful time will be the most important tool of adjustment. The fact that adjustment may well be harsh in some circumstances will in part be due to the willingness of many in the farming community to carry high debt over poor returns on capital invested on the basis that the profit will come from tax free capital gain. That is a business decision and a risk they took. Likewise much of the recent intensification has been in the face of the rising debate on water quality. If risks have been taken to maximise private profit at the expense of externalised environmental costs, it could be suggested that the Wai-Ora process should not be unduly wed to bailing out those who took the risk – the actual totality of dairy production and regional economic contribution will continue as before, it's just the underlying cost and ownership structures that will change. This issue needs to be made very transparent; is the economic farm surplus based on static current land values or not?

The model in Doole (2013) takes a 'bottom-up' approach, modelling farm level profitability, and aggregating this across the catchment. The idea is that if meeting a particular target requires reductions in discharges, mitigations are added until the target is met. It is not intended to suggest mitigations cannot realistically be incorporated into farm systems; rather, the model shows what mitigations are required to meet targets, and how much additional cost is incurred as a result.

Question 3 identifies a limitation of the model in Doole (2013): it measures 'profitability' by estimating the effective farm surplus per hectare. This is because it was considered to be the measure that was both available and most comparable across different land uses. Data on debt levels was not generally available (apart from for the dairy sector), so limited conclusions were possible about the implications for farm viability. Similarly, the measure of changes in profitability is in absolute dollar terms, and is independent of land values. It is acknowledged that these are important questions that could be the subject of further studies.

It is noted that revenues are also an important element of profitability, and that, while production quantities are estimated, prices are exogenous to this model (that is, they are assumed on the basis of historical averages).

It is agreed that policy issues such as the potential payments for environmental services (and the design of such a framework) will be important considerations. They have not been analysed by the Doole (2013) report, although the model could potentially be a tool that could assist in such analysis.

6) *A final issue outside the scope of the report but nevertheless ultimately important for the communities decision making is that the report deals only with the financial costs and benefits relative to the dairy sector. There are a number of other costs and benefits that appreciate or depreciate according to the balance of land uses. Carbon currently unaccounted by agriculture is nevertheless a contingent liability long term to NZ's pastoral sector. Biodiversity for instance will unlikely be enhanced under intensive dairy regimes. The Technical Group will need to find ways to acknowledge some of these other elements.*

Question 6 identifies that there are a wide range of costs and benefits beyond those reflected in the catchment modelling work in Doole (2013)². It is agreed that these broader effects are relevant, and should also be included into decision-makers' considerations. For this reason, the catchment modelling work in Doole (2013) report was only one of the studies carried out as part of the Joint Venture. However, it is acknowledged that, given that some of the other studies (for example, into non-market values of water quality, and cultural values of Waikato and Waipa River iwi) were not completed and available at that time, it might have appeared that the catchment model was the only output of the Joint Venture.

The question also notes the focus in Doole (2013) on the financial implications for the dairy sector. Again, this is more a reflection of the more detailed information available for that sector. The analysis underlying the report included the financial implications for other land uses too (e.g. sheep and beef, bull beef, dairy support, and forestry), but these were only reported in aggregate form (in the row titled 'Surplus' in tables 4-7). Given this, and the inclusion of the 'Dairy stats' sections in these tables, the impression that there was a greater focus on the dairy sector is understandable.

² It is noted that the report does not *only* cover the dairy sector; it covers the financial implications for land use in the upper Waikato – including the dairy sector, but also to sheep and beef and forestry land uses.

- 4) Through most of the scenarios the evaluation reports impacts of land use responses in relation to employment or loss there-of solely in relation to the dairy industry. It does not report losses or gains in respect of forestry which will be partially offsetting. The picture is thus distorted and needs correction or deletion. Related to this, the report does not follow downstream to further levels of processing. This is understandable given the complexities, however given that a massive local industry (Pulp and Paper) in the Waikato region is already under threat from insecurity of fibre supply following recent farm conversion and its economies of scale requirements are very sensitive to total area forested, the deficiencies and loss of other industry regional export earnings and jobs need to be either fully accounted in a properly constructed balance sheet OR – openly and transparently acknowledged as a deficiency in the report that currently could lead to misleading conclusions about the real wider gains and losses are to the region.

It was not intended for the focus of the report to be on the dairy sector. Tables 4-7 contain results for land use and production for the dairy, sheep and beef and forestry sectors. The additional reporting in the 'Dairy stats' section of those tables, and the dairy-specific focus of tables 10-12 *does* give the report an increased focus on the dairy sector, although this largely reflects the additional data that was available for that sector.

The upstream and downstream effects of changes to the land use profitability are outside the scope of the model in Doole (2013). As noted above, it was intended that this would be the subject of another study into the wider regional impacts, and it is understood that the Technical Leaders' Group is in the process of commissioning work that will do this. The point about the sensitivity of the pulp and paper industry in the region to the total forested area is an important point, which should be explicitly addressed in this piece of work (or, if not there, would appear to be of sufficient importance to warrant an additional work on its own).

- 5) Again without knowing more about the construct of the models it is not clear how land values are accommodated within the modelled scenarios. Those where significant afforestation is predicted as required to meet water quality standards would only achieve that level if there was a significant reduction in land values (correctly recognising the low real values attainable under the farming model while meeting normally expected rates of return on capital). Without such adjustments or the direct payment for environmental services, such afforestation is very unlikely to occur. If the payment for environmental services is a payment from emitter to avoider (i.e. trading) that would be a valid system. If however the payment for the environmental service provision was a payment by society, that would be a subsidy to protect the capital values and personal profitability of the emitters – This is a very important issue and full transparency is required from the Technical Group.

As noted above, land use values are not incorporated into the model in Doole (2013), although they could be theoretically inferred by the relative changes in discounted effective farm surpluses. However, it is agreed that land values may be distorted by other factors (for example the tax system, externalities related to different land uses, etc).

Appendix 4

<http://www.qfi.org/a-perfect-day-to-disrupt-dairy>

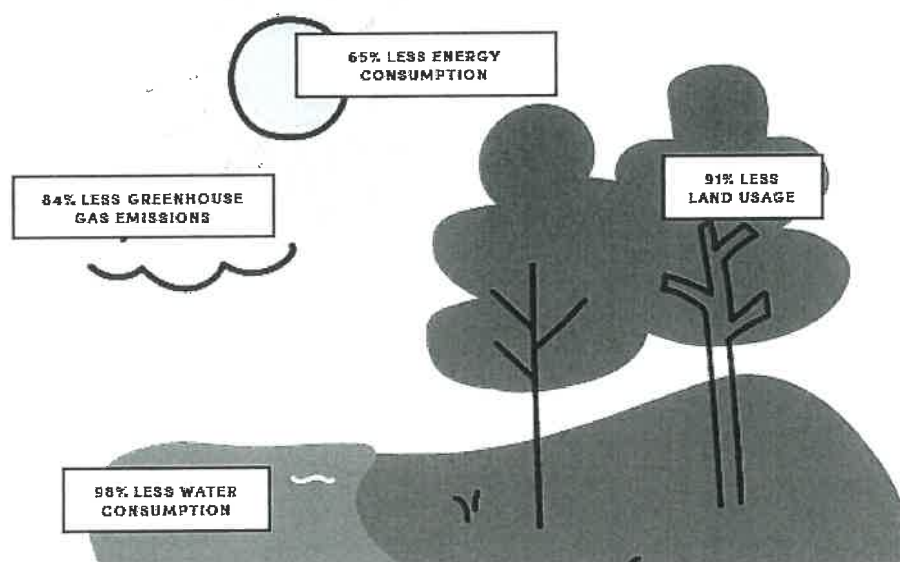
Since the summer of 2014, founders Ryan Pandya and Perumal Gandhi have been hard at work perfecting their process and building a company with the **potential to change the landscape of dairy forever**. Perfect Day is a milk created with real milk proteins, but without the involvement of a single cow. By using centuries-old fermentation techniques, the team has created milk without chemicals, hormones, and lactose, but with the exact same flavor.



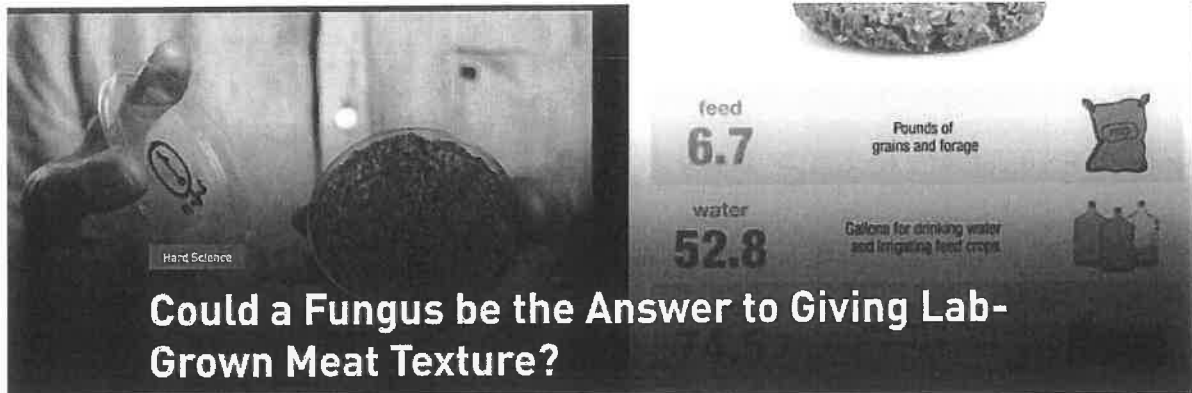
A Smaller Hoofprint

We worked with a team of conservation biologists to understand the environmental impact of our process.

Here are some early (but exciting) numbers.



<https://futurism.com/tackling-challenge-texture-lab-grown-meat/>



1. IN BRIEF

One of the biggest challenges of creating lab-grown meat is getting the right texture. Quinn Fucile believes using a modified fungi in the growth process could be the answer.

Meat production is one of the most resource-intensive areas in food production. As the human population grows, demand for meat continues to increase, as does its burden on the environment.

To make a quarter-pound hamburger, for instance, it takes 6.7 pounds of grain to feed the cattle, 52.8 gallons of water for drinking and irrigating feed crops, 74.5 sq. ft. of land for grazing and growing, and 1,036 btus of fossil fuel energy for feed production and transport.

It's clear that a new feasible and sustainable strategy is needed.