Peer Review of 'Essential Freshwater Regulations - Industry Impact Analysis'

No.	Comment - Infometrics	Sapere Response
1	Are the two profit measures conceptually the same? That is, is operating profit less interest and rent, the same as farm profit before tax?	The two profit measures for the sectors used in the analysis are designed to be as comparable as possible - while we had to make some assumptions to derive estimates of interest and rent for the Dairy sector, adding them to the operating profit less interest and rent makes it a (derived) equivalent of farm profit before tax.
2	Point 5 below Figure 2.2, is the average per hectare across farm types within REC?	The per hectare averages at this point of the methodlogy are derived at a regional level from summing the values for all the RECs in a region.
3	Sapere estimate an NPV cost for the NPS of $8.0b (for Scenario 1). This is in marked contrast to the cost estimated by Resource Economics of $5.9b. For the EFW package Sapere estimate a marginal cost of $1.8b, compared to Resource Economics figure of $2.3b, so perhaps these two estimates are within error margins. More interestingly though, the direction of difference is reversed.	One of the key distinctions between our model and Resource Economics' model is the presence of land use change in the Resource Economics model, which is able to achieve reductions at a lower cost than the alternative in our model (M3 bundle). While we cannot comment for sure on the reason for the direction of the difference being reversed, it could be possibly due that we aggregate and calculate regional averages at a different point compared to Resource Economics, which in turn has flow-on effects for mitigation effectiveness and load reduction.
4	With regard to Scenario 1 it is possible that the higher costs estimated by Sapere are because they do not consider land use change (unless it converts to wetlands), which means that more costly on-farm mitigation is required. Does that implicitly make the EFW package a smaller marginal challenge?	Correct - as touched on in comment 3, this is our assumption as well
5	In that connection, some mitigation actions in some regions have negative costs. Aside from the question of why these actions aren't currently being pursued, what are the incremental costs for EFW if these negative costs are excluded?	Negative costs to farmers tends to only occur as a result of applying the mitigation of achieving Optimal Olsen P to specific sectors and regions, wherein the maintenance level of phosphate fertiliser required to maintain Optimal Olsen P is lower than the current level. However, this cost saving represents a point wherein Optimal Olsen P has been realised at a regional level, and there may be barriers or costs in terms to realising region-wide adoption that have not been included in our cost estimates. To some extent, part of this is also a limitation in our approach which currently applies all mitigations at time 0 - in practice, there would likely be a time delay in the realisation of the benefits, which our modelling has not captured. We have not modelled a scenario where the negative costs are excluded, as they are attached to a specific mitigation (Achieving Optimal Olsen P) - given the EFW targets for P cannot be realised even with this mitigation, it is likely that removing it would result in a significant cost increase with a lower level of P load reduction.
6	Scenario 4 is a true scenario in that it represents a different policy objective. Scenario 3 is really a sensitivity test on Scenario 1, but the status of Scenario 2 is unclear. Is it a pure sensitivity test on Scenario 1, or does it reflect not just uncertainty about the effectiveness and cost of mitigation measures, but also a wider uncertainty about the nature of the Business as Usual (BAU) scenario? Some additional discussion would be useful.	The intention of Scenario 2 was to consider a situation where some of the more basic mitigations associated with the M1 bundle (fencing, optimising stocking rates, effluent management) had already been implemented. To some extent, it is a valid point that the BAU scenario is unclear and Scenario 2, beyond being a test of sensitivity for M1 (typically the most cost-effective N mitigation), it attempts to provide analysis for a situation with a different BAU, if it turns out that many of these mitigations have already been applied.

7	Indeed what is the implicit BAU out to 2050?	The BAU case is assumed to be a scenario where none of the mitigations are applied and load reductions continue at their current levels. There is no temporal element that captures changes in technology or increases/decreases in baseloads, as we did not have a basis for (nor were we asked to) determining how these would evolve through to 2050.
8	Unfortunately there is no indication of the variance around the means or whether nonlinearities could bias in the results in one direction or another. This is perhaps an area for further work if the Ministry wishes to place some boundaries around the cost estimates.	We will add this as an inclusion into the discussion of limitations

No.	Comment - Sense Partners	Sapere Response
1	Several results indicate (we think) farmers would have negative costs from implementing mitigation measures. This raises the question as to why they aren't taking these steps already, and whether they should be included as costs related to the regulations.	Negative costs to farmers tends to only occur as a result of applying the mitigation of achieving Optimal Olsen P to specific sectors and regions, wherein the maintenance level of phosphate fertiliser required to maintain Optimal Olsen P is lower than the current level. However, this cost saving represents a point wherein Optimal Olsen P has been realised at a regional level, and there may be barriers or costs in terms to realising region-wide adoption that have not been included in our cost estimates. To some extent, part of this is also a limitation in our approach which currently applies all mitigations at time 0 - in practice, there would likely be a time delay in the realisation of the benefits, which our modelling has not captured.
	Is the approach credible and reasonable given the available information and timeframe constraints?	
2	There is no discussion of counterfactual growth in pastoral land use or intensity of land use over the period to 2050. Is the assumption that current land use patterns persist for the next 30 years? If so, some commentary on how realistic that assumption is would have been helpful.	The assumption is that land use patterns persist over the next 30 years - we concede that is a limitation in our model and have added expanded commentary of the limitations of the analysis.
3	A paragraph on the choice of the 3% discount rate would be useful…Sensitivity analysis around the discount rate would also be helpful	The 3% discount rate (and the absence of sensitivity testing with respect to the discount rate) was chosen at the advice of MfE - sensitivity of discount rates was considered, but once the scenarios for sensitivity testing were defined, they were ultimately not included.
4	The following statement (s3.8 p.29) would benefit from greater clarification and justification: “land use change would likely be viewed as a final mitigation used by farmers failing the viability of incorporating other mitigations”. It seems to us that the costs of mitigation could be overstated if low profitability farms instead changed land use and delivered large load reductions.	This is a valid point and we have updated the wording to reflect that the absence of land use change reflects our uncertainty around the potential mitigations that could be applied to reduce mitigations, but which were not captured in our mitigation set. As our model did not provide any means by which to determine what land use change farmers would undertake, we chose not to include it as a mitigation.
5	The report would benefit from a discussion on the risks associated with using averages around the cost and effectiveness of mitigation. We appreciate the alternative approach of using distributions of costs was likely unrealistic in the time and resources available. But the report should at least flag that the analysis is highly simplified and ignores potentially important relationships (covariances) between mitigation costs, land typology, profitability, and pollutant loads.	This has been noted and touched on in an expanded commentary of the limitations of the analysis.

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6	Some discussion about the extent to which mitigations have increasing/decreasing/constant returns to scale would also be useful, along with commentary on whether the effectiveness of mitigation depends on existing practice (e.g. use of supplementary feed, which might be reduced as a mitigation) and whether existing practices correlate with lower or higher profitability.	This has been noted and touched on in an expanded commentary of the limitations of the analysis.
7	As we discussed in our review of Resource Economics' cost report it would at least be good to know what sort of averages are used for the average mitigation cost and mitigation effectiveness numbers. Are they weighted averages? What are the weighted by?	The costs for the modelling were provided by MfE based on work from Perrin Ag commissioned by the Ministry. We have made reference to this report and included some commentary on the range of averages.
8	The analysis assumes capital costs are incurred up front in the first "period" of the policy (p.19, is this the first "year"?) Some discussion about whether that is reasonable would be useful, given policies will be phased and costs incurred incrementally. The same could be said of operating costs which are likely to be phased in. Again, alternative costing approaches may not have been feasible in the timeframe and with the input data available, but the likely implications on the results of the assumed approach should be flagged.	This has been noted and touched on in an expanded commentary of the limitations of the analysis.