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High-level Review of Essential Freshwater Economic Impact Reports: SAPERRE Modelling

Dear Nigel

This note relates to the modelling by Sapere as reported in *Essential Freshwater Regulations – Industry Impact Analysis: Methodology and findings report*, 6 May 2020 and an updated version dated 24 May.

I understand that the scope of my review should address the following questions:

- Is there a clear and logical approach to the modelling?
- Are the approaches credible and reasonable given the available information and timeframe constraints?
- Are the conclusions reasonable and consistent with the analysis undertaken?

Out of scope are:

- Modelling inputs such as the modelled load assumptions, or cost and effectiveness of mitigations.
- The assumptions made by consultants or MfE such as discounts rates, multifactor productivity etc.

The new version, which is much improved with regard to readability and clarity, has made some of my earlier questions superfluous. A few questions and comments remain:

1. Section 2.5: Are the two profit measures conceptually the same? That is, is operating profit less interest and rent, the same as farm profit before tax?
2. Point 5 below Figure 2.2, is the average per hectare across farm types within REC?
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.
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?
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?
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.
7. Indeed what is the implicit BAU out to 2050?
8. In general the methodology is comprehensible, and Sapere are entirely open about the limitations of using regional averages. 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.

Summary

With regard to the stated scope of this review I conclude that:

- The approach followed by Sapere is generally clearly described although it would assist comprehension if at each stage of the methodology (eg in Figure 2.2) the degree of disaggregation by the various dimensions (REC, physical attributes etc) was explicitly stated. The approach makes good use of the input data.
- If the brief was confined to analysing the use of on-farm mitigation measures for meeting the N and P targets, the report does that and the results follow logically and consistently. The relativities between regions and farm types is plausible. Appropriate caveats are noted.
- Is the analysis intended for comparison with a subset of the work by Resource Economics, in which case such a comparison would be most useful. I acknowledge this was not part of the assignment.
- If not, I'm unclear about its usefulness when Resource Economics has a more comprehensive approach that also allows for land use change, which emerged as the main adjustment mechanism.



I am happy to discuss any aspect of the above especially if I have misunderstood something.

Yours faithfully

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