

Title: **Managed Aquifer Recharge – Potential Impacts on the Regional Economy**

Section: Environmental & Regulatory Services

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Meeting Date: 22 March 2017

Legal Financial Significance = Medium

Report to ENVIRONMENTAL PLANNING & REGULATIONS Committee for noting

SUMMARY

The purpose of this report is to provide an update to the Environmental Planning & Regulations Committee on the Makauri Economic Project (MEP). Effective as of 12 December 2016, the MEP has had a change in direction in its deliverable outcomes from focusing on the impact of Managed Aquifer Recharge (MAR) to “on-farm” economic practices, to the impact of MAR on the economy of the entire Gisborne Region.

Extending the scope of the MEP provides for the evaluation of the regional impacts of MAR to understand how a change in current water management will impact employment, exports, and income within the Gisborne District.

This report provides an overview of:

- 1) the expected outcomes associated with the project extension;
- 2) how each outcome is expected to be delivered;
- 3) who is conducting the work;
- 4) a summary of the research completed so far; and
- 5) an updated project budget.

The project has a completion date of 30 May 2017 and is on target to achieve this deadline.

The decisions or matters in this report are considered to be of **Medium** significance in accordance with the Council's Significance and Engagement Policy.

RECOMMENDATIONS

That the Environmental Planning & Regulations Committee:

1. Notes the contents of this report.

Authorised by:



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Team Leader
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Lois Easton
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Keywords: Makauri Economic Project, update, Managed Aquifer Recharge

BACKGROUND

The Makauri Aquifer is one of Gisborne's most economically significant water resources and is identified as being in decline, and over-allocated by about 2/3 of actual use. Water levels in the Makauri Aquifer are thought to be declining by 2cm per year. It is considered that to balance abstraction of irrigated water with natural recharge, a reduction in irrigation volumes abstracted of 60-70% is required. In addition to a reduction in paper allocation, Managed Aquifer Recharge (MAR) is shortly to be trialled to facilitate aquifer recharge, thereby increasing water availability during the irrigation season in the Poverty Bay Flats. Consent has been granted for the MAR trial, Honours Well Drilling have been selected to drill the bore. Drilling is expected to begin in late March and be complete by mid-April 2017.

Economic analysis provides an understanding of the economic consequences of water availability in the Makauri Aquifer including cutting back on actual use, MAR, and surface storage options. Work has been undertaken by Trevor Lupton (Lewis Wright) and Graeme Doole (University of Waikato) to look at the economic implications of four management scenarios for the Makauri Aquifer:

- 1) maintaining status quo;
- 2) decreasing irrigation volumes by 30%;
- 3) decreasing irrigation volumes by and 60%; and
- 4) an increase in irrigation volume of 30%.

These provide an evaluation of what would occur with or without the use of MAR to reduce or prevent further decline in the Makauri Aquifer. It does not however evaluate the regional value of the different management scenarios, which would enable the consideration of the flow of money among various sectors and industrial groups in the economy.

INITIAL RESULTS

Investigation into the economic impact of MAR at the "farm gate" has already been conducted. For this analysis, crops have been assigned to four groups:

- Higher value permanent crops (HVP): dependent on irrigation e.g. kiwifruit and apples
- Higher value annual crops (HVA): dependent on irrigation e.g. salad leaf, lettuce, broccoli
- Lower value permanent crops (LVP): generally grown without irrigation e.g. oranges and grapes (although some growers may irrigate, but generally to a lesser extent than for HVP's)
- Lower value annual crops (LVA): generally grown without irrigation e.g. maize, see maize and sweet corn.

Summary of Analysis:

The table below provides a summary of the analysis conducted thus far, addressing the economic impact of the four scenarios "at the farm gate".

Table 1: Summary of Analysis.

Land Use Assumptions	Hectares									
	SQ	30% Increase	Hectares Change	% Change	30% Decrease	Hectares Change	% Change	60% Decrease	Hectares Change	% Change
1. Higher Value Permanent (Irrigated) (HVP)	160	300	140	88%	107	-53	-33%	107	-53	-33%
2. Higher Value Annual (Irrigated) (HVA)	797	956	159	20%	397	-400	-50%	0	-797	-100%
3. Lower Value Permanent (unirrigated) (LVP)	269	269	0	0%	287	18	7%	287	18	7%
4. Lower Value Annual (unirrigated) (LVA)	460	161	-299	-65%	895	435	95%	1,292	832	181%
	1,686	1,686	0		1,686	0		1,686	0	
Total Farm Gate Return	\$20,026,600	\$28,559,200			\$14,040,059			\$12,396,059		
Total Farm Gate Return Per Hectare	\$11,878	\$16,939			\$8,327			\$7,352		
% Change in Total Farm Gate Return		43%			-30%			-38%		

Reduction in Water Availability from Makauri Aquifer: Other impacts on the Gisborne Region:

- **Post-harvest processing: reduced throughput** – profitability and employment are not factored into these analyses
- **Increase in LVAs grown on the Poverty Bay Flat-** are likely to result in reduced areas of these crops grown in more out-lying parts of the region (Tolaga Bay-East Coast, Nuhaka and Wairoa). This is likely to result in these areas switching to pastoral land use with reduced farm gate return.
- **Reduced Farm Gate Return Effect on Asset Values-** reduced farm gate returns are likely to result in reduced land values on the Poverty Bay Flats and out-lying areas in the region.

DISCUSSION AND OPTIONS

Effective as of the 12 December 2016, agreement was reached with the Ministry for the Environment funders on a Deed of Variation to provide funding to “update the Gisborne Regional Economic Model to include a Makauri Aquifer Managed Aquifer Recharge scenario” with a completion date of 30 May 2017. The objective of this further work is to:

- 1) evaluate the regional impacts of the four different scenarios,
- 2) Understand how a change to current management will impact on employment, exports and income within the Poverty Bay Flats, the Gisborne District, and New Zealand as a whole.

The proposal links the data generated in the first stage of the project to an input-output (IO) model. Input-output models are the most widely-applied method for estimating the regional impacts of environmental policy in New Zealand, and internationally. Input-output models describe the complex interdependency between different sectors within an economy. This allows the consideration of numerous flow-on relationships arising from a change in economic activity.

In 2007, Council commissioned an input-output model from Market Economics – “The Gisborne Environment Economy Model”. Updating this model, will enable the interrelationships between different sectors in relation to the four MAR scenarios to be identified. (Market Economics is an independent economic consultancy firm based in Auckland who specialise in market and economic analysis and environmental and ecological research).

As part of the extension of the MEP scope to assess the impact of MAR at a regional scale, the Gisborne Environment Economy Model will be able to be updated by Council staff to reflect changes that have occurred over time. GDC, has engaged Market Economics to deliver eight quantifiable outcomes:

- 1) Review community linkages.
- 2) Estimate input-output coefficients using the established Market Economics approach, to ensure the input-output model is sound from both an empirical and practical perspective.
- 3) Estimate input-output co-efficient using the established Market Economics approach, to ensure the input-output model has a much-improved capacity to deal with supply-side constraints.
- 4) Generate change in gross regional product, employment, and international exports from the Gisborne District, the Poverty Bay Regional and the entire nation for the four scenarios that each represent different management options for the Makauri Aquifer.
- 5) Provide all data in accessible format in an Excel worksheet.
- 6) Present the output to Gisborne District Council in a workshop format
- 7) Present a training workshop to the Gisborne District Council based around how input-output models work, their advantages and disadvantages, and how to use the model developed by Market Economic.
- 8) Provide a concise, final report for the Makauri Economic Project, which focuses on describing the methodology and provides a discussion of the model output.

At the completion of the update to the Gisborne Environment Economy Model, three workshops will be held.

The first workshop will present the model, and facilitate the use of the model to Council staff so that the model can be used in business as usual. During this workshop, further breadth and depth regarding the potential outcomes of each management scenario will be identified. The second workshop will allow for the presentation and reviews of the analysis to Gisborne District Councillors and the project governance group. The third workshop will present the findings of the study to key stakeholders, with an invitation to all irrigators from the Makauri Aquifer, to enable water users to discuss the implications of each scenario with Council staff. Trevor Lupton, Graeme Doole and Garry McDonald (from Market Economics) will be available for the workshops.

ASSESSMENT OF SIGNIFICANCE

Criteria	This Report	The Process Overall
The effects on all or a large part of the Gisborne district	Low	Medium
The effects on individuals or specific communities	Low	Medium
The level or history of public interest in the matter or issue	Medium	Medium
Consistency with Council's current strategy and policy	High	Medium
Impacts on Council's delivery of its Financial Strategy and Long Term Plan.	Low	Low

The decisions or matters in this report are considered to be of **medium** significance in accordance with Council's Significance and Engagement Policy.

COMMUNITY ENGAGEMENT

This project will provide the community with robust information regarding the economic costs of MAR. Gisborne is a region where economic development and jobs are substantial issues and deprivation levels in some places are high. Understanding the economics of MAR by creating a freshwater planning environment whereby the economic value of the region's fertile soils can be realised, will have substantial benefits for wider social wellbeing in the region.

As part of the project delivery, three workshops will be held. One of these workshops will be specifically for irrigators and users of the Makauri Aquifer. This will allow the Makauri community to see how each scenario will impact upon them economically, both at the "farm gate" and the regional scale.

CONSIDERATIONS

Financial/Budget

The project is funded by MFE. The extension of the scope can be completed within the \$90,000 allocated to the project by MFE.

Legal

There are no legal implications of the change in scope to the Makauri Economic Project.

POLICY AND PLANNING IMPLICATIONS

The change in scope to the Makauri Economic Project to address the economic impact of MAR at a regional scale is consistent with the Council's policies and plans. MAR is one of eight Non-Regulatory Projects listed in the Proposed Gisborne Regional Freshwater Plan. The decline in water quantity in the Makauri Aquifer threatens the long term sustainability of the water resource. As part of the Waipaoa Catchment Plan, a target of reducing total annual allocation to 1,892,160m³ has been set for the Makauri Aquifer.

Understanding how this allocation may impact the region economically, will be fundamental when evaluating the MAR trial and the potential for operational MAR in the Gisborne Region.

RISKS

There are no major risks associated with the change in scope outlined in this report.

NEXT STEPS

Date	Action/Milestone	Comments
On Going	Continue with modelling. GDC to continue to engage with project team, and ensure that all data required to complete the project is provided.	
19 th & 20 th April 2017	Workshops to present the results of the updated Gisborne Environment Economy Model to GDC staff, governance group and key stakeholders.	
30 th May 2017	Project complete	The project is currently on track to achieve this deadline.