

Modelling horticulture in the Auckland Council's Fresh Water Management Tool.

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Auckland Council (Healthy Waters) is developing a water quality accounting framework, the Fresh Water Management Tool (FWMT). Designed to support fresh water management, the FWMT assesses present and alternative future water quality as well as feasible action strategies. The FWMT derives optimised action plans to improve water quality based on 50-year lifecycle costs and continuous effects of feasible interventions linked to critical sources of contaminants contributing to excessive degradation instream. Optimisation is through continuous, process modelling which allows detailed plans to be developed for any feasible water quality improvement target (e.g., action type, scale, location, treatment and cost).

The FWMT programme is decadal, underpinned by external review and continuous improvement. The FWMT Stage 1 has built the model's architecture, the next stage is improving key aspects including land use typology classification, footprint, mitigation and opportunity datasets including for horticulture land uses. The paper presents a partnership project between Healthy Waters, Horticulture NZ and leading growers designed to improve the data for horticulture land uses in the FWMT for better decision-making and improved water quality outcomes.

The paper covers the generation of new robust information on horticulture activity in the Auckland region including baseline profitability, baseline water quality impact (contaminant yield) and mitigations (50-year lifecycle cost, steady state yield and opportunity). Activities included commercial vegetable production and kiwifruit systems. Mitigations included both edge of field (e.g., wetlands) and practice-based options. The environmental footprint includes nitrogen, phosphorus and sediment loss estimates.

The partnership project defined five grower system typologies from multiyear commercial vegetable rotations and a kiwifruit orchard (inclusive of baseline management practice and farm infrastructure as well as biophysical characteristics). Nitrogen losses from vegetable production systems were modelled in APSIM and SPASMO for kiwifruit. Sediment and phosphorus losses for vegetable production systems were modelled in the Erosion Sediment Calculator. Sediment, phosphorus and copper losses were provided by the kiwifruit industry for orchards. Gross margins were developed for each crop in Excel based on a range of data sources including direct grower guidance.