



Critical Pathways Programme

Lincoln Agritech is leading the Critical Pathways Programme (CPP). This research aims to investigate the shallow and short pathways often operating at sub-catchment scale (10s of km²) and represent these pathways in water flow and contaminant transfer models.

Two intensively farmed North Island catchments with contrasting hydrological and biogeochemical conditions were chosen as study catchments - the Waitapu Stream catchment on the Central Plateau and the Piako River headwater catchment in Hauraki.

The programme is introducing significant innovations in hydrogeophysical data acquisition, 'big data' analysis and water flow and contaminant transport modelling.

The team will deliver a range of methods and tools: new geophysical measurements; continuous real-time stream flow and nitrate monitoring set-ups; models that realistically describe water flows and nitrate transport and attenuation at sub-catchment scale; and cost/benefit analysis of mitigation measures.

Improved understanding of the local nitrate transport and attenuation processes will allow farmers, stakeholder groups and regulators to make more effective and efficient decisions on land management, mitigation measures and policy. The fine-grained understanding enabled by our research will underpin the successful implementation of the National Policy Statement for Freshwater Management.

The programme is funded by the Ministry of Business, Innovation and Employment (MBIE). The research team includes experts from GNS, Manaaki Whenua - Landcare Research, LaWR Land and Water Research, Lincoln University, AgFirst, and IK & Associates; and international collaborators from Aarhus University (Denmark), the Geological Survey of Denmark and Greenland (GEUS), and the Technische Universität Dresden (Germany). Waikato Regional Council, DairyNZ, and the iwi holding mana whenua over our catchments (Ngāti Tahu - Ngāti Whaoa, Ngāti Hauā), additionally support this research.