

CURRICULUM VITAE

Name	Graham Macky
Nationality	New Zealand
Education	M.E., Civil Engineering, Canterbury B.E. (Hons), Civil Engineering, Canterbury
Specialist expertise	Civil Engineering: River engineering and numerical hydraulic modelling <ul style="list-style-type: none">• River flows and flooding• Sediment transport, deposition and erosion in rivers and estuaries• Stormwater management• Hydrology• Coastal wave environments
Courses attended	<ul style="list-style-type: none">• Summer School in River and Coastal Morphodynamics, IAHR (1991)• “Making Good Decisions”, a programme for the accreditation of Resource Management Act 1991 decision makers (2015 and 2017)

Employment record

Year	Firm	Position and responsibilities
From March 2017	Macky Fluvial Consulting Ltd	Director
From March 2017	Auckland University	Professional Teaching Fellow
2009 - 2017	DHI	Principal Engineer, Technical management and review of hydraulic modelling
2007 - 2009	Beca, Auckland	Modelling Team Leader Stormwater, Technical management and review of stormwater modelling
2002 - 2007	Auckland Regional Council, Auckland	Project Leader Stormwater Quantity, Conception and management of applied research projects; and policy advice
1999 - 2002	Harrison Grierson, Auckland	Senior Engineer Water Resources, Stormwater design and technical supervision of junior staff.
1989 - 1999	National Institute of Water & Atmospheric Research (NIWA), Christchurch	Scientist, Government funded research (river hydraulics, sediment transport, ocean wave climate) and consulting contracts
1987 - 1988	Water Resources Division, Ministry of Works & Development, Wellington	Planning Engineer, Water resources planning advice: Water Conservation Orders ad hoc advice to NWASCA
1982 - 1987	Central Laboratories, Ministry of Works & Development, Wellington	Engineer, Hydraulics investigations, especially physical hydraulic modelling, also ocean wave climate

Publications

Publications in Refereed Journals

- Macky, G.H., G.J. Latimer & R.K. Smith (1995). "Wave climate of the western Bay of Plenty, New Zealand, 1991-93", *New Zealand Journal of Marine and Freshwater Research*, Vol. 29: 311-327
- Macky, G.H. (1999). "Large flume experiments on the stable straight gravel bed channel". *Water Resources Research* 35(8): 2601–2603.
- Macky, G.H., A. I. McKerchar, A. K. Laing, G. S. Carter & A. M. Chater (2000): "Synthesis of extreme wave climate for the Canterbury Bight, New Zealand", *New Zealand Journal of Marine and Freshwater Research*, Vol. 34: 71–85.
- McKerchar, A.I.; Macky, G.H. (2001): "Comparison of a regional method for estimating design floods with two rainfall-based methods". *Journal of Hydrology (New Zealand)*, Vol. 40 (2) 129-138.

Publications in Refereed Conference Proceedings

- Macky, G.H. (1991). "Correlation between wind, waves and river bar changes at Wanganui". *Coastal Engineering – Climate for Change*. 10th Australasian Conference on Coastal and Ocean Engineering, Auckland, 2-6 December 1991. pp 283–288.
- Macky, G.H. (1999). "Classification of river mouths on gravel coastlines". *Proceedings, 1st IAHR Symposium, River, Coastal and Estuarine Morphodynamics*, Genova, Italy.
- Macky, G.H. (2003). "Effectiveness of Stormwater Treatment with Multiple Ponds". *NZWWA Stormwater Conference*, Auckland.
- Macky, G.H. (2005). "Towards a set of design storms for treatment of urban stormwater". *Combined conference of the Australian Chapter of the Association of Hydro-geologists and the New Zealand Hydrological Society*, Auckland.
- Macky, G.H. and Elliot, A.H. (2006) "Controlling stream channel erosion in urbanising Auckland streams: detention storage, roofwater tanks and other possibilities". *4th International Conference on Water Sensitive Urban Design*, Melbourne.
- Macky, G.H. (2011) "A form of the braiding-meandering threshold that accounts for light-weight sediments". *7th IAHR Symposium on River, Coastal and Estuarine Morphodynamics*, Tsinghua University, Beijing, pp439-448.

Published Reports

- Macky, G. (1995). "Investigation into changes in stream morphology at two mining sites near Reefton." *Department of Conservation Science Report*.
- Macky, G.H.; McKerchar, A.I. (1997). "Waterway design parameters." *Transfund New Zealand. Research Report No. 88*.

Significant Projects:

1. Resource Management and related science

Year	Project	Position and activities
2017	Resource consent hearing for proposed mining of alluvial gold Elect Mining Marlborough.	Independent Commissioner, sitting alone
2017	<i>CRC vs Dewhirst</i>	Expert witness on gravel river processes and defining the river bed Disputed-facts hearing in the Environment Court
2013 - 2014	Tauranga CC Rainfall Runoff study	Review of the suitability of available rainfall-runoff models for Tauranga catchments. Recommendations incorporated in the city council's Guidelines for Stormwater Modelling.
2008 - 2012	Taonui Basin water permit hearing	Expert witness and assistance to Horizons Regional Council Consents Department, at a hearing for increased floodwater diversion into Taonui Flood Basin.
2008	Expert evidence on Waimakariri gravel budgets and peer review of Waimakariri River bed level report	Presented numerical analysis and professional opinion at an Environment Canterbury hearing. Reviewed Environment Canterbury report.
2004 - 2007	Applied Research on the environmental impacts of stormwater, Auckland Regional Council	Project Manager of investigations into mitigating the environmental effects of stormwater – urban contaminants and increased peak runoff. Development of ARC's guidelines for stormwater treatment and for flow control to minimise channel erosion. <ul style="list-style-type: none"> • Overview of hydraulic modelling methods, and investigation of hydrological modelling methods. • Investigation of the performance of stormwater treatment ponds and rain gardens • Review of proprietary stormwater treatment devices. • Promoting the application of "best practice" hydraulic and hydrological modelling methods to catchment management plans and to planning decisions. • Assistance with policy development especially relating to flooding.

Year	Project	Position and activities
2002 - 2004	Technical and policy work at Auckland Regional Council	<ul style="list-style-type: none"> • Liaison with Territorial Authority engineers and with Infrastructure Auckland. • Contribution to development of ARC guidelines for stormwater treatment: • Resource consents: Technical assessment of effects of stormwater discharges.
2000	Erosion Potential of Mercer Stopbanks	Evidence to a resource consent hearing: site assessment and interpreting modelled velocity patterns to assess the risk of increased bank erosion.
2000	Pahurehure Inlet Tidal Gates	• Assessment of Environmental Effects of impounding a tidal inlet. Hydraulics and sedimentation study, also facilitating water quality and ecological studies.
1991	Whanganui River Minimum Flows Hearing	Analyses of ocean waves, tide levels and sedimentation at the Whanganui River mouth. Developed explanations of how these processes interact with flow abstractions from the upper Whanganui River. Given as evidence at a Regional Council hearing and in the Environment Court. Reported in a refereed journal.
1987 – 1988	Water Conservation Order applications	Advice to NWASCA on several Water Conservation Order applications, especially those for the Manganioteao River and Lake Ellesmere: <ul style="list-style-type: none"> • Technical and resource management advice to NWASCA subcommittees. • Assisting the subcommittees at public hearings • Preparation of draft Orders

2. Overseas secondments (review / guidance roles)

Year	Project	Position and activities
2013 - 2014	EVN Dambreak assistance, Vietnam	Foreign Consultant, Guidance and peer review for a Vietnamese team: 1- and 2-dimensional modelling in MIKE FLOOD of the failure of a major dam.
2012	Secondment to South Australia Dept of Water:	Consultant team leader, leading a team in two model studies of proposed hydrological and hydraulic management of River Murray wetland water levels for enhancing wetland biota
1999	Kalamazoo River PCB Modelling, USA	Independent consultant, Reviewed sediment resuspension and sediment transport issues and their application in modelling PCB transport in a Michigan river.

3. Sediment transport and river morphology

Year	Project	Position and activities
2017	Predicting bed level changes in Hutt River	Modelling gravel bedload to assess likely changes after channel improvements
2009	Gravel Transport and Aggradation in the Kauaeranga River	Spreadsheet computation of gravel budget from 1-D hydraulic model output, to predict future aggradation and identify mitigation options
1999	Kalamazoo River PCB Modelling, USA	Independent consultant, Reviewed sediment resuspension and sediment transport issues and their application in modelling PCB transport in a Michigan river.
1999	Flow regime requirements at river mouths	Scientist, Conceptual analysis of the dependence of gravel river mouth openings and closures on river flow, lagoon size and ocean waves. Reported in conference proceedings, and applied in Flow Guidelines for In-Stream Values.
1994 - 1998	Flume Experiments and Numerical Modelling on the Stable Straight Gravel-Bed Channel	Scientist, Laboratory experiments to test existing theory on the shape of a stable river channel, including measurements of the diffusive nature of the bedload transport processes. Reported in an international journal, and applied in Flow Guidelines for In-Stream Values.
1992	Gravel Resources of the Kawhatau and Upper Rangitikei Rivers	Analysed historical river flow gaugings, calculated gravel transport rates from flow records, and identified sources of gravel from geological information. Applied this information to interpret observed bed changes and to specify requirements for further monitoring of the gravel resource.
1986	Model Testing of Bridge Abutment Scour Protection	Physical scale model to identify possible alternatives to rip-rap for protecting bridge abutments.
1985 - 1986	Wairoa River Mobile-Bed Model Study	Physical scale modelling to assess proposed protection works for a highway bridge.

4. Numerical hydraulic & hydrological modelling

Year	Project	Position and activities
2018-2019	Numerical Modelling of Flood Flows, Awanui River, Northland Regional Council	Technical oversight and calibration of a new 1-D/2-D model of river and overland flow, including NAM modelling of catchment runoff
2017-2018	Makowhai and Feilding West Catchments Horizons Regional Council also NZDF	Three 2-D models of rural flooding
2017	Tekapo B Stilling Basin	Project leader: 2-D modelling of stilling basin with salmon rafts
2017	Makotuku catchment modelling Horizons Regional Council	Numerical model of river flow and overland flow to investigate rural flooding.
2015 - 2016	Kerikeri Irrigation Dams: Dam break modelling	Modelling of dam break scenarios for civil defence purposes
2014 - 2015	Piako Low Flow Modelling	Hydrological modelling (in NAM) of low flows, to test whether modelled low flow hydrographs can indicate rating shifts due to weed growth.
2014 - 2015	Tekapo Canal Modelling for Mt Cook Alpine Salmon	Modelling of head losses and water levels at a salmon farm, investigating options for reducing head losses
2013 - 2015	TDC Motueka River WWTP river mixing study	Project Leader: 3-D modelling of dispersion from a wastewater outfall at a river mouth, with post-processing and reporting to assist water quality assessment and to support a resource consent application.
2013, 2016 - 2017	Kerikeri Scheme Simulation, for Northland RC	Lead role in review and modification of a numerical model of river flow and overland flow.
2012 - 2013	Murrumbidgee CARM - Gate Ratings, Australia	From recorded data and theory, determining gate flow settings for the 12 Murrumbidgee weirs
1991 - 1992	Numerical Analysis of Flood Flows, Awanui River, Far North District Council	Interpretation of river gauging records and MIKE-11 modelling to determine the capacity of the Whangatane Diversion Channel and its effectiveness in flood protection.