The following application was submitted to the MARGINS Office:

Name:
Murray Hicks

Category: Research Scientist

Address:
Sediment Processes Group
NIWA
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Statement of interest:
I have been involved with measuring suspended sediment loads in the Waipaoa River for the last 5 years. The study aims have included determining the mean annual basin exports of suspended sediment, sediment loads during storm events, sediment concentrations and the implications for generation of hyperpycnal flows off the river mouth, and the signature of basin erosion erosion processes on the magnitude-frequency characteristics of event sediment loads. I would present the results of these investigations at the workshop. This would, I believe, be essential background information for those interested in "modern" processes of sediment transfer between the Waipaoa Basin and the continental shelf.
Note that since I will be on sabbatical at St Anthony Falls Hydraulics Laboratory from April through June 2003, my attendance at the Waipaoa Margins workshop will be conditional on receiving funding for return travel from Minneapolis to Girborne/Wellington.

Short resume:
RESUME

Full name: Darryl Murray Hicks

Present position: Principal Scientist (Sediment Processes)

Present employer: NIWA

Present work address: PO Box 8602
Riccarton, Christchurch

Academic qualifications:
1976 BSc Hons (1), University of Otago, Geology
1978 BE Hons (1), University of Canterbury, Civil Engineering
1985 PhD, University of California, Earth Science

Years as a practising researcher: 19

Honours/distinctions/membership of societies, institutions, committees:
Fullbright Scholar (1980-85)
Member of New Zealand Hydrological Society
Member of Impacts Committee, New Zealand Climate Change Programme (1989-90)
Member ASCE Hydraulics Division Task Committee on Mountain Rivers (1993-95)
Member of the New Zealand Society for Coastal Sciences and Engineering

Professional positions held:
1978-80 Scientist, MWD Hydrology Centre, Christchurch
1985-88 Scientist, MWD Soil Group, Christchurch
1988-92 Scientist, DSIR Marine and Freshwater, Christchurch
1992-2000 Scientist, NIWA, Christchurch
2000-02 Principal Scientist, Sediment Processes Group, NIWA, Christchurch

Present research/professional speciality:
Suspended sediment loads in New Zealand Rivers and yields to coast; coastal sediment transport; braided river morphodynamics, remote-sensing, and modelling

2001-2002 Research programme responsibilities:
NSOF Project Leader (Sediment Yields to Coast) in Effects of Sediments on Estuarine and Coastal Ecosystems programme ($120k).

Significant first-author refereed publications:

Hicks, D.M.; Gomez, B. (in press). Sediment transport. Chapter 9 in: Tools in Fluvial Geomorphology. Kondolf, G.M.; Piegay, H. (eds.). Wiley, San Francisco.
Hicks, D.M.; Green, M.O. (submitted). Sand transport during moderate energy events on the inner continental shelf at Mangawhai, New Zealand: a comparison between instrument-based and sand tracer measurements. Submitted to Continental Shelf Research.
Hicks, D.M.; Green, M.O.; Smith, R.K.; Swales, A.; Ovenden, R.; Walsh, J. (in press). Sand volume change and cross-shore sand transfer, Mangawhai Beach, New Zealand. Journal of Coastal Research.
Hicks, D.M.; Duncan, M.J.; Walsh, J.R.; Westaway, R.M.; Lane, S.N.; Jonas, D.L., 2001. The braided Waimakariri River: new views of form and process from high-density topographic surveys and time-lapse imagery. In: Nolan, T. and Thorne, C.

(eds), Gravel-bed Rivers 2000 CD-ROM. Special Publication of the New Zealand Hydrological Society.
Hicks, D.M.; Gomez, B.; Trustrum, N.A., 2000. Erosion thresholds and suspended sediment yields: Waipaoa River basin, New Zealand. Water Resources Research 36(4): 1129-1142.
Hicks, D.M.; Hume, T.M.; Green, M.O.; Swales, A., 1999. Magnitudes, spatial extent, time scales and causes of shoreline change adjacent to an ebb tidal delta, Katikati Inlet, New Zealand. Journal of Coastal Research 15: 220-240.
Hicks, D.M., 1999. A regionally applicable suspended sediment rating for the schist terrain in Otago. Journal of Hydrology (New Zealand) 38: 77-96.
Hicks, D.M.; Hume, T.M., 1997. Determining sand volumes and bathymetric change on an ebb-tidal delta. Journal of Coastal Research 13 (2): 407-416.
Hicks, D.M.; Duncan, M.J., 1997. The efficiency of depth-integrating samplers in sampling the suspended sand load in gravel bed rivers. Journal of Hydrology 201: 138-160.
Hicks, D.M.; Davies, T. 1997. Sedimentation and erosion. Ch. 8 in "Floods and droughts: the New Zealand experience", M.P. Mosley and C.P. Pearson (eds.), NZ Hydrological Society, Wellington.
Hicks, D.M.; Hume, T.M., 1996. Morphology and size of ebb-tidal deltas at natural inlets on open-sea and pocket-bay coasts, North Island, New Zealand. Journal of Coastal Research, 12 (1): 47-63.
Hicks, D.M.; Hill, J.; Shankar, U. 1996. Variation of suspended sediment yields around New Zealand: the relative importance of rainfall and geology. In: "Erosion and sediment yield: global and regional perspectives". IAHS Publication No. 236: 149-156.
Hicks, D.M.; Griffiths, G.A. 1992: Sediment loads. Chapter 13 in: "Waters of New Zealand", M.P. Mosley (ed.), Hydrological Society of New Zealand, Wellington.
Hicks, D. M.; Mason, P, 1991. Roughness characteristics of New Zealand Rivers. Water Resources Survey, DSIR Marine and Freshwater, Wellington, 336 pp.
Hicks, D M; McSaveney, M J; Chinn, T J H, 1990. Sedimentation in proglacial Ivory lake, Southern Alps, New Zealand. Arctic and Alpine Research, 22(1): 26-42.
Hicks, D.M.; Inman, D. L., 1987. Sand dispersion from an ephemeral river delta on the Central California Coast. Marine Geology, 77: 305-318.
Hicks, D.M.; Bright, P.S., 1981. An integrated system for automatic collection of flow and suspended sediment data. Journal of Hydrology (N.Z.), 20: 147-151.
Hicks, D.M., 1981. Deep-sea fan sediments in the Torlesse Zone, Lake Ohau, South Canterbury, New Zealand. New Zealand Journal of Geology and Geophysics, 24: 209-230.

Significant junior-author refereed publications:

Lyons, W.B.; Nezat, C.A.; Carey, A.E.; Hicks, D.M. (accepted). Organic carbon fluxes to the ocean from high-standing islands. Geology.
Westaway, R.M.; Lane, S.N.; Hicks, D.M. (in press). Remote survey of large braided, gravel-bed rivers using digital photogrammetry and image analysis. International Journal of Remote Sensing.
Walsh, J.; Hicks, D.M. (in press). Braided channels - self-similar or self-affine? Water Resources Research.
Bell, R.G.; Hume, T.M.; Hicks, D.M., 2001. Planning for climate-change effects on coastal margins. Ministry for the Environment, Wellington.Gomez, B.; Rosser, B.J.; Peacock, D.H.; Hicks, D.M., 2001. Downstream fining in a rapidly aggrading gravel bed river. Water Resources Research 37(6): 1813-1823.

Westaway, R.M.; Lane, S.N.; Hicks, D.M., 2001. Remote sensing of clear-water, shallow, gravel-bed rivers using digital photogrammetry. Journal of Photogrammetric Engineering and Remote Sensing, 67 (11): 1271-1282.
Rowe, D.; Hicks, M.; Richardson, J., 2000. Reduced abundance of banded kokopu (Galaxias fasciatus) and other native fish in turbid rivers of the North Island of New Zealand. New Zealand Journal of Marine and Freshwater Research 34: 547-558.
Westaway, R.M.; Lane, S.N.; Hicks, D.M., 2000. The development of an automated correction procedure for digital photogrammetry for the study of wide, shallow gravel-bed rivers. Earth Surface Processes and Landforms 25: 209-226.
Trustrum, N.A.; Gomez, B.; Page, M.J.; Reid, L.M.; Hicks, D.M., 1999. Sediment production, storage and output: the relative role of large magnitude events in steepland catchments. Zeitschrift fur geomorphologie (Supplementband) 115: 71-86
Swales, A.; Hicks, D.M.; Smith, R.K., 1999. Shoreface bedforms and cross-shore sand fluxes measured using an enhanced sea sled. Proceedings of Coastal Sediments '99, 4th International Symposium on Coastal Engineering and Science of Coastal Sediment Processes, Long Island, New York, June 1999, Kraus, N.C.; McDougal, W.G. (eds). ASCE, Reston, vol. 2: 1034-1049.
Gomez, B.; Eden, D.N.; Hicks, D.M.; Trustrum, N.A; Peacock, D.H.; Wilmshurst, J., 1999. Contribution of floodplain sequestration to the sediment budget of the Waipaoa River, New Zealand. In: Floodplains: Interdisciplinary Approaches Alexander, J.; Marriott, S.B.; Hey, R. (eds.). Geological Society of London, Special Publication 163: 69-88.
Nikora, V.I.; Hicks, D.M.; Smart, G.M., 1997. On the fractal sinuosity of rivers. In: Study of erosion, river bed deformation and sediment transport in river basins as related to natural and man-made changes, UNESCO, Technical Documents in Hydrology, No 10.
Nikora, V.I. and Hicks, D.M., 1997. Scaling relationships for sand wave development in unidirectional flow. Journal of Hydraulic Engineering, 123 (12): 1152:-1156.
Hume, T.M., Bell, R.G., de Lange, W.P., Healy, T.R., Hicks, D.M., and Kirk, R.M., 1992. Coastal Oceanography and sedimentology in New Zealand, 1967-1991. N.Z. Journal of Marine and Freshwater Research, Vol. 26: 1-36.
Jowett, I.G. and Hicks, D.M., 1981. Surface sampling of suspended sediment, Clutha River System. Journal of Hydrology (N.Z.), 20: 121-130.
Griffiths, G.A. and Hicks, D.M., 1981. Transport of sediment in mountain streams: performance of a measurement system during a two year storm. Journal of Hydrology (N.Z.), 20: 131-136.
Griffiths, G.A. and Hicks, D.M., 1980: Comment on "Clutha Flood of October 1978" by I.G. Jowett. Journal of Hydrology (N.Z.), 19: 75-77.
Carter, R.M., Hicks, D.M., Norris, R.J., and Turnbull, I.M., 1978. Sedimentation patterns in an ancient arc-trench-ocean basin complex: Carboniferous to Jurassic Rangitata Orogen, New Zealand. In Sedimentation in submarine canyons, fans, and trenches. D.J. Stanley and G. Kelling, eds., Dowden, Hutchison and Ross, Strousberg: 340-361.

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ABSTRACT

Title:

Suspended sediment characteristics of the Waipaoa River

Authors:
Murray Hicks (1), Noel Trustrum (2), Basil Gomez (3)

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3. Indiana State University, Terre Haute, IN, USA

Abstract:
Suspended sediment (SS)loads in the Waipaoa River basin have been measured at a main-stem site and in several tributaries. Miscellaneous gaugings have been undertaken during storm runoff events since the 1960's. Continuous, turbidity-based records of SS concentration commenced at the main-stem site at Kanakanaia in 1997 and in the Mangatu and Waihora Basins in 1999. At Kanakanaia, the annual average SS load is 6750 t/km2/yr, while the maximum gauged SS concentration is 36,800 mg/l. Concentrations can exceed 20,000 mg/l several times per year. The annual average SS yield to the coast is estimated as 14.9 Mt/yr. All sites generally show a clockwise hysteresis in the relationship between SS concentration and water discharge, with higher concentrations on the rising stages of simple runoff events and progressive reductions in peak concentrations during composite events. Gully-erosion dominated tributaries yield more sediment per unit area overall and particularly during events t!
hat ocuur often during the year. In landslip-dominated tributaries, more sediment is carried by less frequent events due to a rainfall-threshold effect on the landslip generation.

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