Project name: Sediment generation, transport, and impacts in the Motueka River

Leader(s): Les Basher, Landcare Research, Lincoln,
basherl@LandcareResearch.co.nz, 03 325 6700

Collaborators: Chris Phillips, Landcare Research, Lincoln,
phillipsc@LandcareResearch.co.nz, 03 325 6700
Mike Marden, Landcare Research, Gisborne,
mardenm@LandcareResearch.co.nz, 06 863 1345
Murray Hicks, NIWA, Christchurch,
m.hicks@niwa.cri.nz, 03 343 7872
Roger Young, Cawthron Institute, Nelson,
roger@cawthron.org.nz, 03 548 2319
Eric Verstappen, Tasman District Council, Richmond,
eric@tdc.govt.nz, 03 544 3417

Issues

- Decline in the Motueka trout fishery in the mid-1990's has been linked by some observers to increased input of sediment into the river, mainly from the Separation Point Granite terrain. This is believed to have increased the proportion of the riverbed that is covered in sand and silt and affected trout spawning, food supply, and habitat (such as the density of pools in the catchment). However, there is currently no scientific evidence to support this contention, to determine where the major sediment sources are and whether they are natural or linked to land use practices, or to clearly determine whether other factors may have played a role in the observed decline in trout numbers.
- Elevated sediment loads may also affect marine ecosystems and aquaculture, and there is a need to understand sediment delivery to Tasman Bay and redistribution within the bay.
- Understanding rates of gravel supply and sediment transport dynamics is fundamental to management of gravel extraction and bank stability.

Objective

Determine the spatial pattern of sediment generation, delivery and transport and its impacts on freshwater and marine habitats, and how riparian zones and land management practices influence these processes.

Progress and Outputs

In the last year we have

- reviewed existing information on erosion rates and sediment yield. Basher, L.R., Hicks, D.M. 2003: Review of existing data on erosion rates and sediment yield for the Motueka catchment. Progress Report for the Integrated Catchment Management programme, Landcare Research, Lincoln, Canterbury.
- installed suspended sediment samplers and turbidity probes at Woodmans Bend (provides an estimate of sediment delivery to the coast), Wangapeka at Walters Peak (provides an estimate of sediment yield from the steep, high rainfall western catchments), and Motupiko at Christies Bridge (provides an estimate of sediment yield from the hilly, low rainfall Moutere Gravel terrain). We have also provided support for the ongoing measurement of sediment yield from a series of small catchments under production forestry. Hicks, D.M., Merrilees, R. 2003: Suspended sediment monitoring report in the Motueka catchment: data report to 30 June 2003. NIWA Client Report CHC2003-078, National Institute of Water and Atmospheric Research, Christchurch
- initiated work to identify the magnitude and location of key sediment sources and erosion processes in the catchment (including landslides, gullying, bank and sheet erosion) using the 2000 digital orthophotos. Basher, L.R., Marden, M., Barringer, J., North,

H. 2003: Identification of major sediment sources in the Motueka River. Progress Report for the Integrated Catchment Management programme, Landcare Research, Lincoln, Canterbury.

- completed a preliminary analysis of river cross section data from the upper Motueka (Wangapeka confluence to Norths bridge) and lower Motueka (Alexander Bluff bridge to the coast). Sriboonlue, S. Basher, L.R. 2003: Trends in bed level and gravel storage in the Motueka River 1957–2001: a progress report on results from analysis of river cross section data from the upper and lower Motueka River. Unpublished Report for the Integrated Catchment Management programme and Tasman District Council, Landcare Research, Lincoln, Canterbury.
- reviewed techniques for characterising sediment composition in the riverbed with the aim of developing an effective technique that can be used for relating variation in trout numbers to substrate composition, and to measure change in substrate composition over time.

Future Directions

- continue measurement of sediment concentrations at Woodmans Bend, Wangapeka at Walters Peak, Motupiko at Christies Bridge until we have sufficient storm data to provide an accurate estimate of sediment yields at these sites. There is also opportunity to incorporate nutrient analyses to assess major nutrient sources.
- in the next year we will install an autosampler and turbidity probe at Motueka at Gorge to provide an estimate of sediment yield from the upper Motueka headwaters. We are also considering the use of passive sediment samplers to provide estimates of relative sediment contribution from different tributary catchments and improve the spatial coverage of sediment yield estimates.
- incorporate land use comparisons (e.g., pasture vs forestry vs indigeneous vegetation) into the sediment yield measurement progamme.
- continue mapping of sediment sources and incorporate historical analysis, using the air photo archive that extends back to the mid 1940's, to determine rates of sediment generation and the influence of land use.
- characterise substrate composition in key parts of the Motueka riverbed, including the main trout drift dive reaches and spawning areas.
- combine analysis of the river cross section data with mapping of river plan form changes to assess how well the mean bed level changes at the cross sections represent whole river behaviour.
- greater integration of the sediment investigations with freshwater and marine ecological work.