A natural catchment source for Ni & Cr-enriched sediments delivered to Tasman Bay

Paul Gillespie
and
Barrie Forrest

Cawthron Institute
Nelson New Zealand

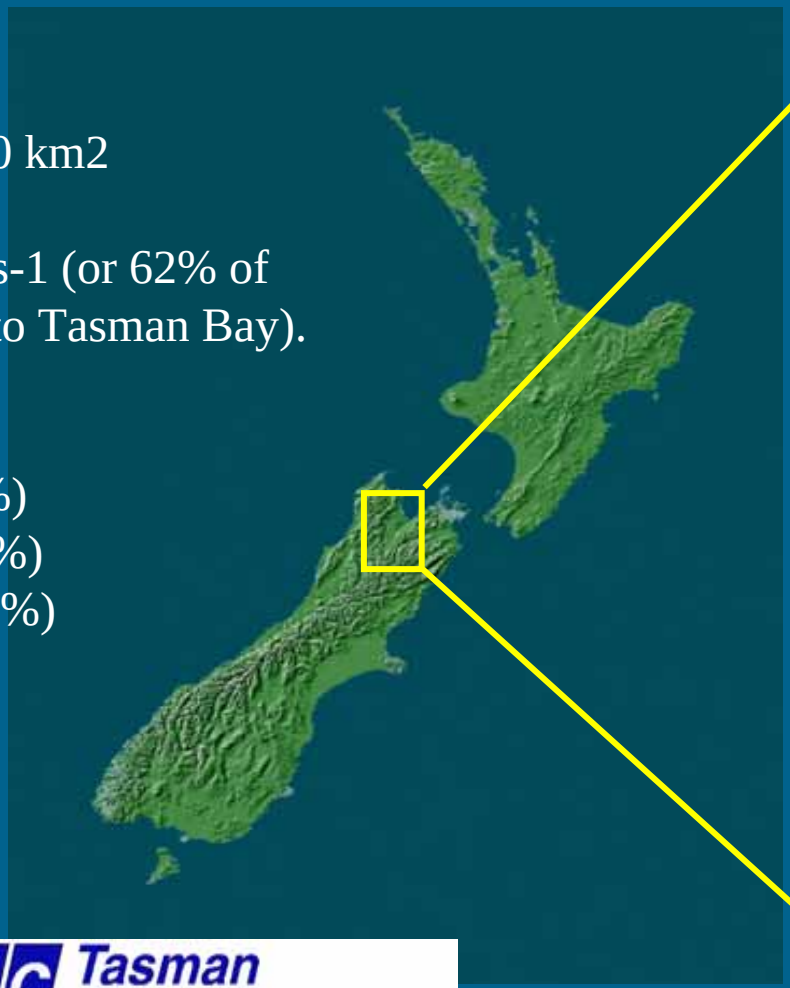
CAWTHRON

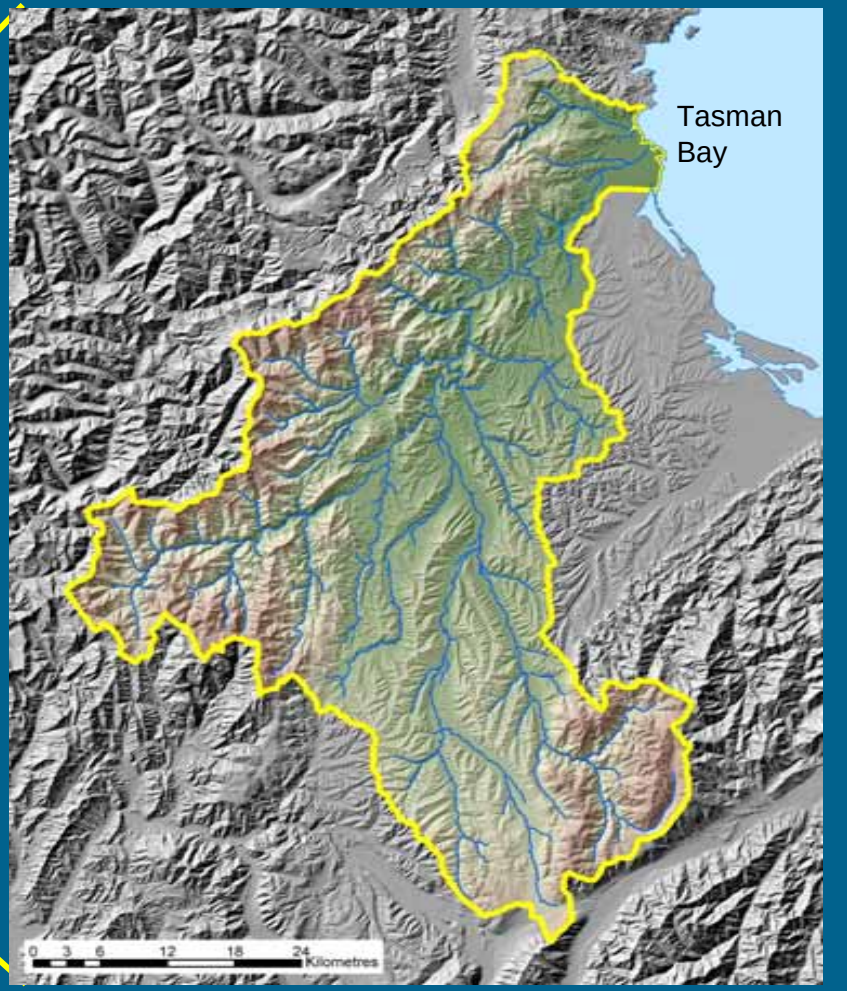
INTEGRATED CATCHMENT MANAGEMENT for the Motueka River

Catchment area = 2180 km2

Mean R flow ~59 m3 s-1 (or 62% of the freshwater inflow to Tasman Bay).

- Native forest (35%)
- Planted forest (25%)
- Prime pastoral (19%)
- Scrub (12%)





Manaaki Whenua
Landcare Research

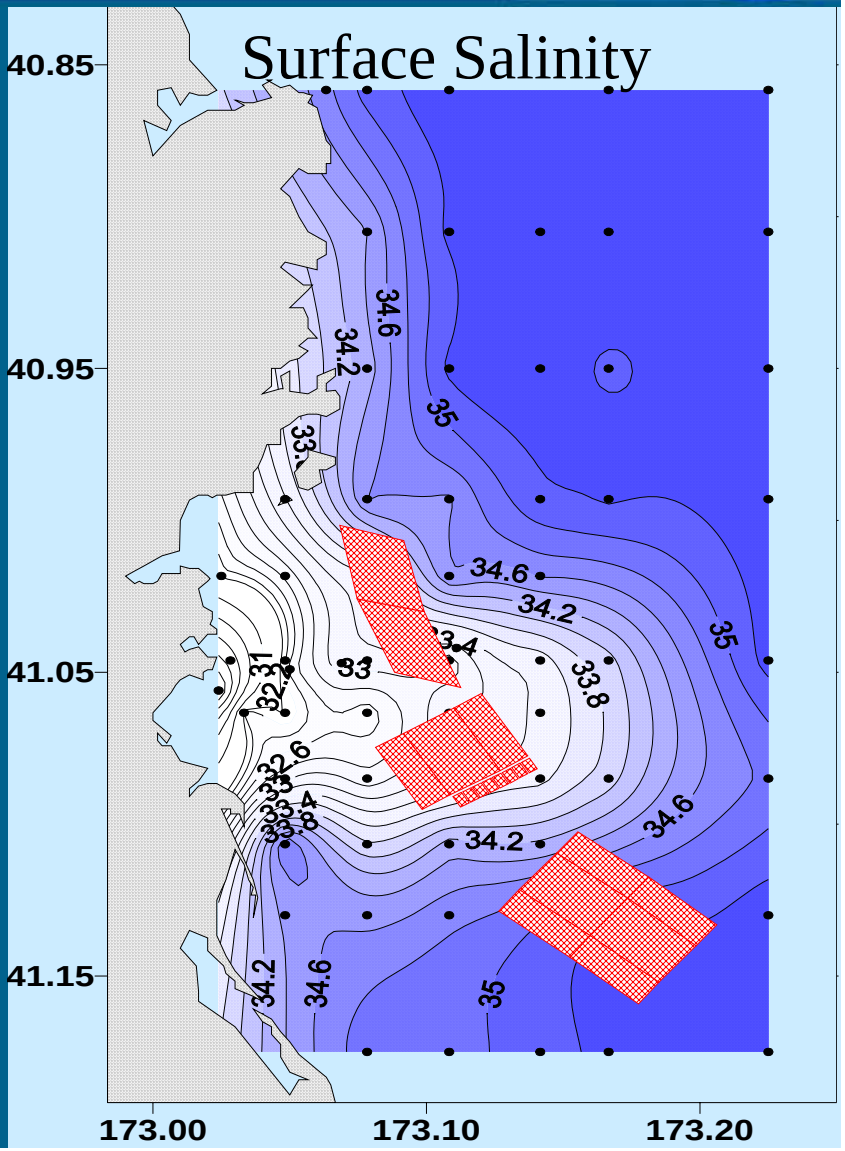
TDC Tasman District Council

http://icm.landcareresearch.co.nz

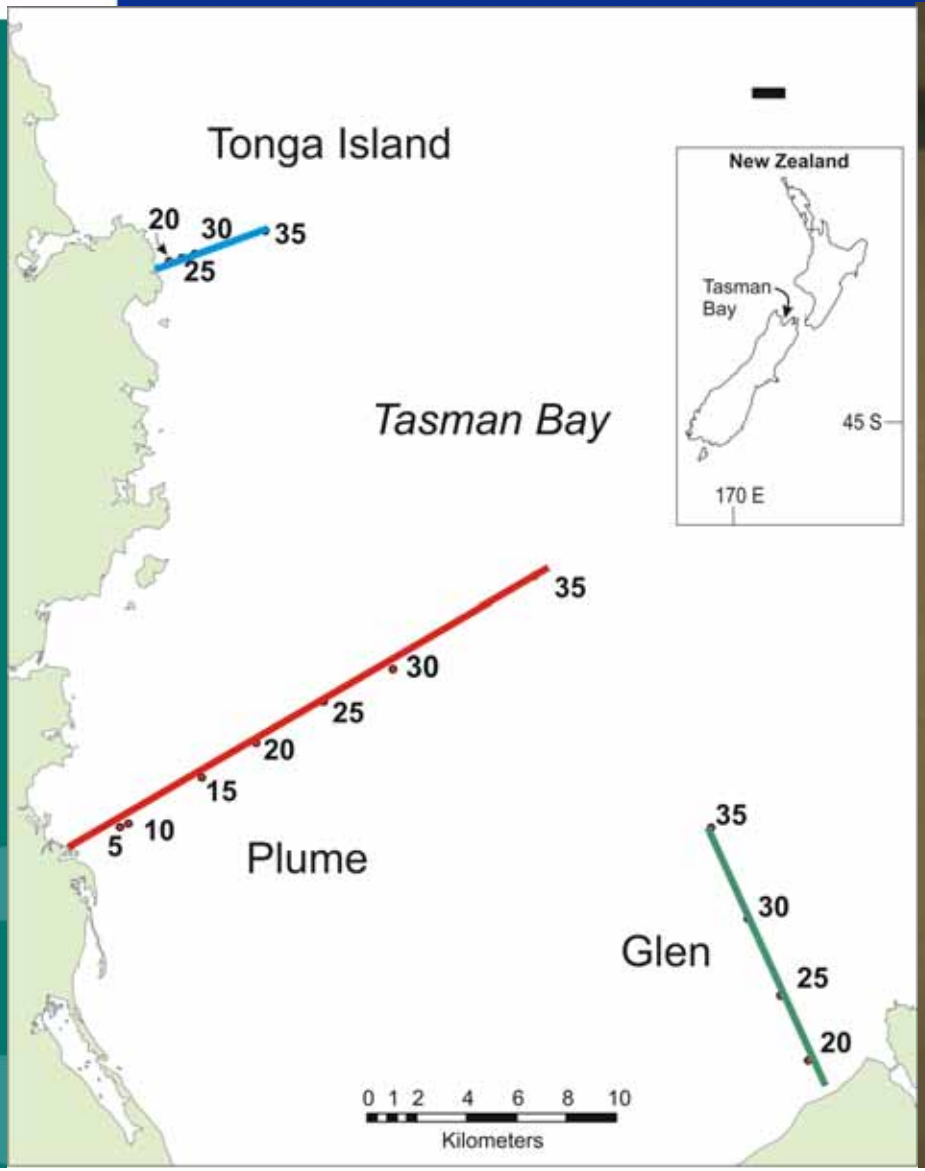
Primary Goal:

to develop a "river plume ecosystem" (RPE) concept for management of coastal environments

ICM framework
Change of thinking
Bottom-up demands



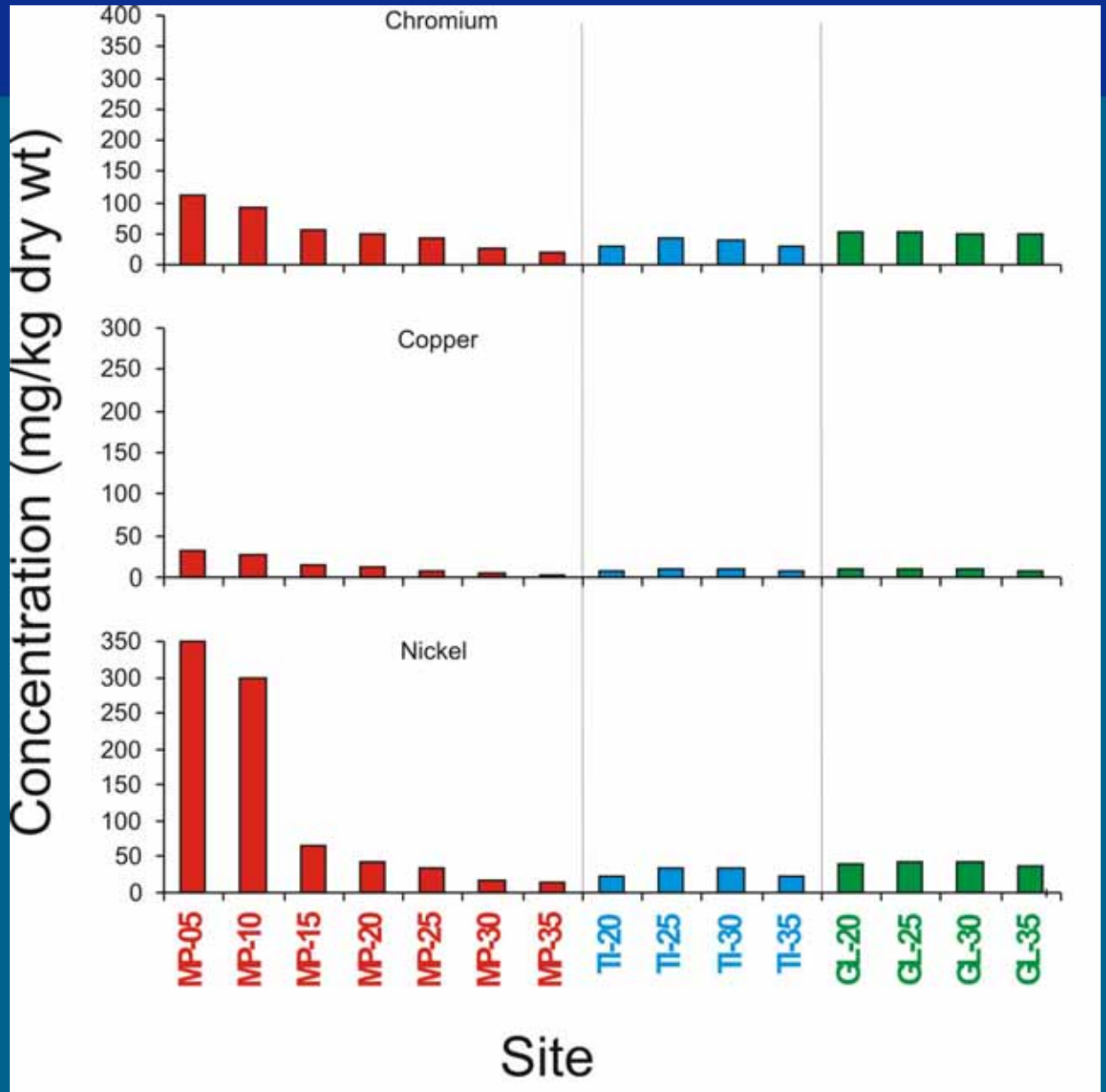
Catchment Links to the Seabed Environment



Indicators of terrestrial influences on the seabed environment:

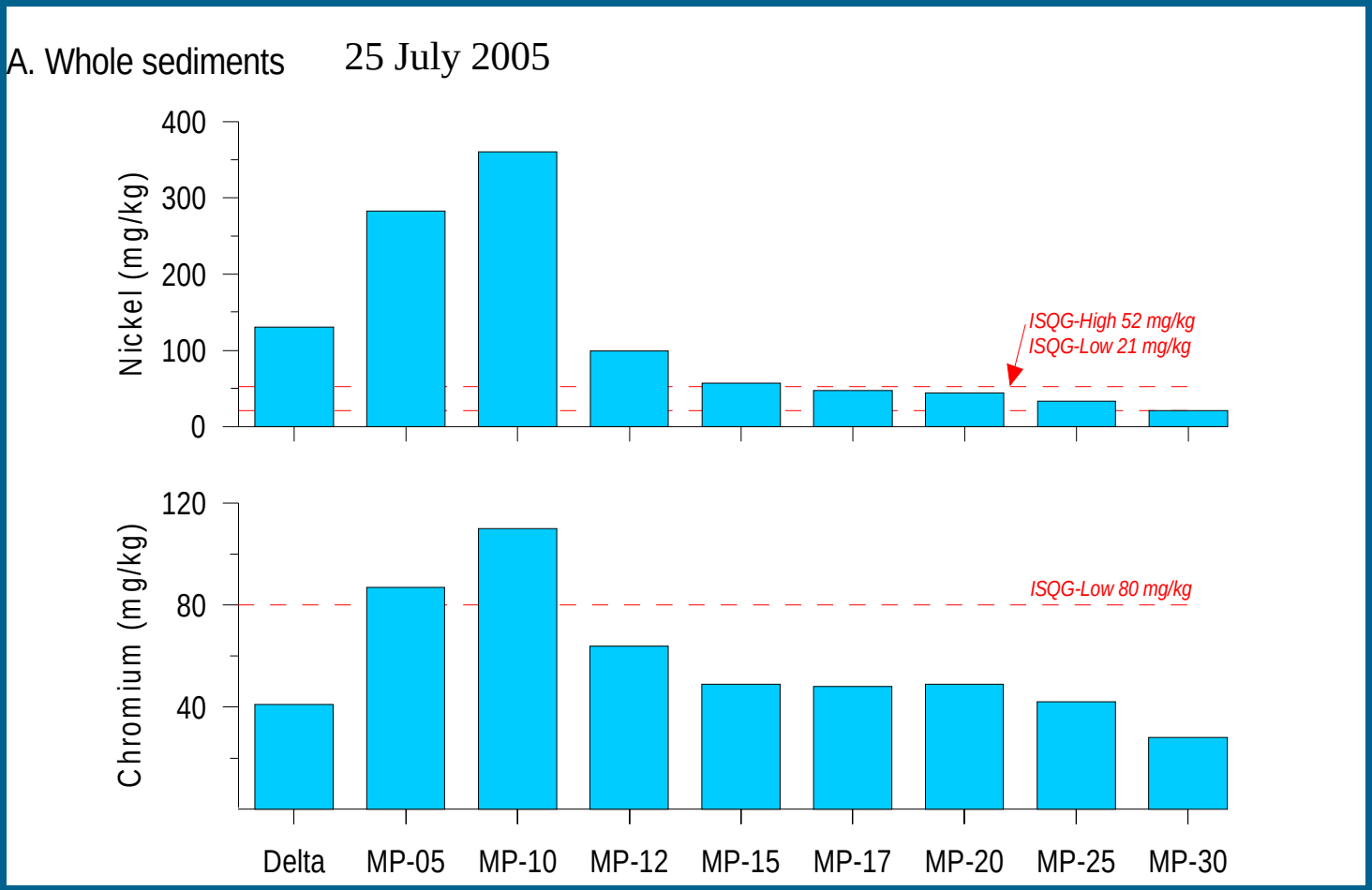
- Infauna community structure
- Stable C & N isotope ratios
- Fatty acid signatures
- Trace metals

Sediment Metals (June 2005)



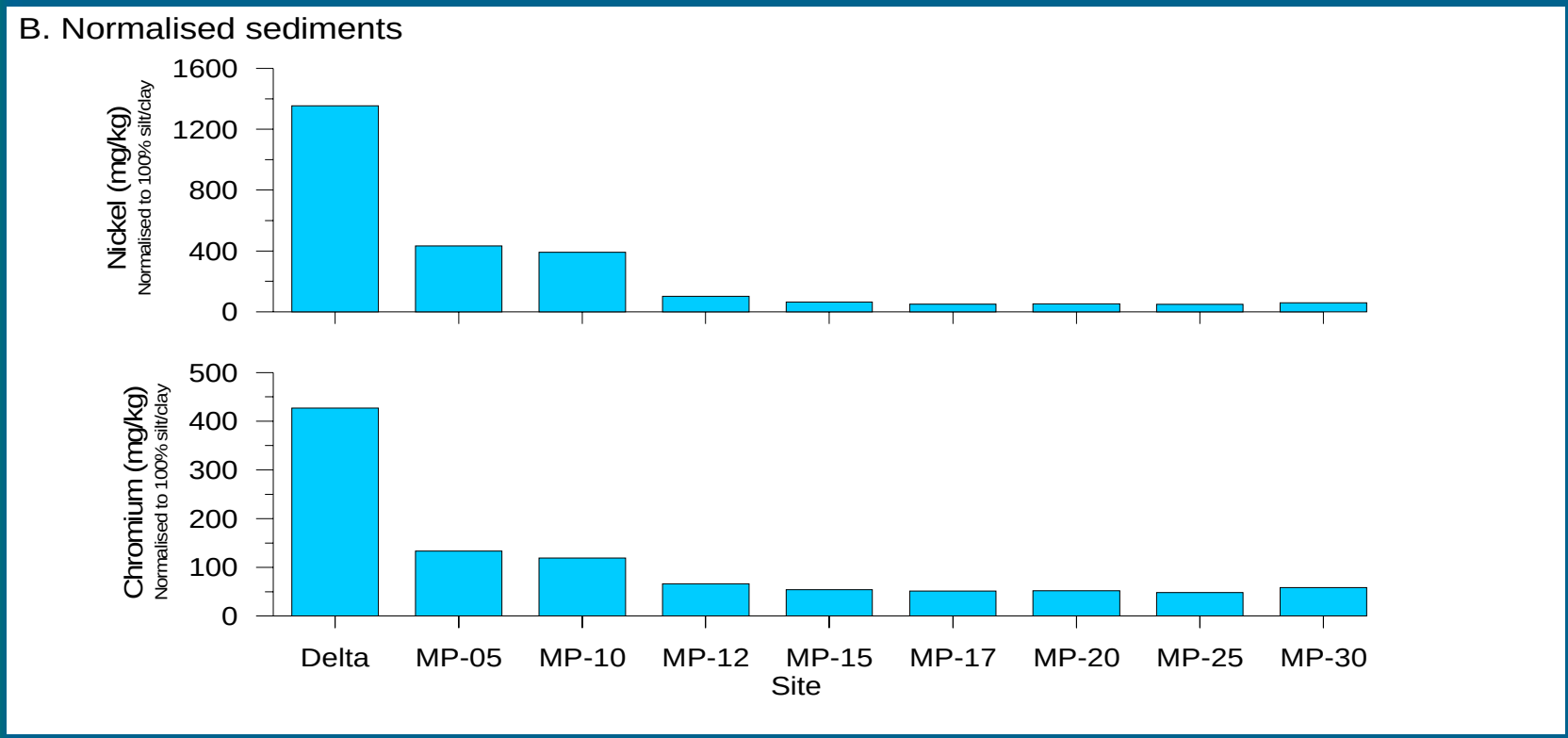
Ni & Cr-enriched Sediments in Tasman Bay

Ni concentrations up to 7x guideline levels for “probable” biological effects



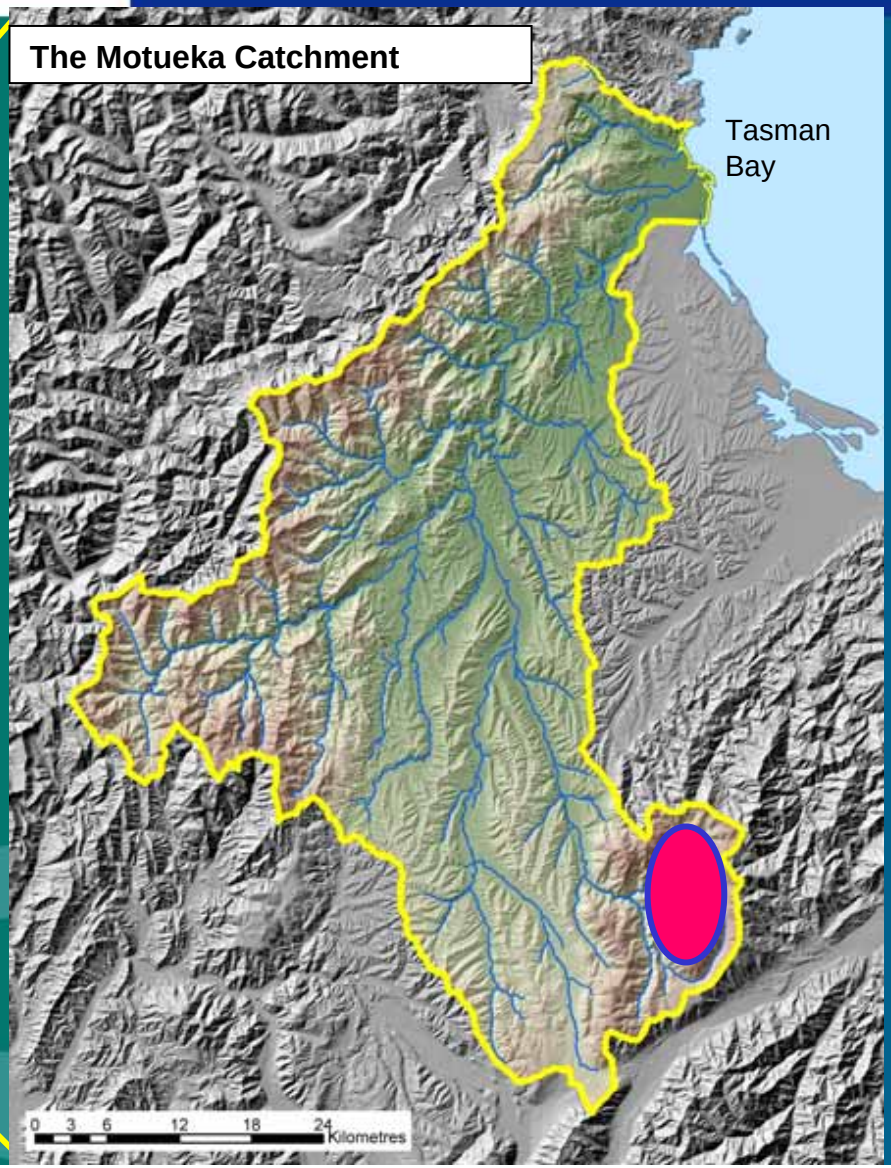
Ni & Cr-enriched Sediments in Tasman Bay

Normalised to 100% silt/clay



GOOD FRIDAY FLOOD

http://icm.landcareresearch.co.nz/science_themes/Land/easter_flood_2005.htm



March 2005:

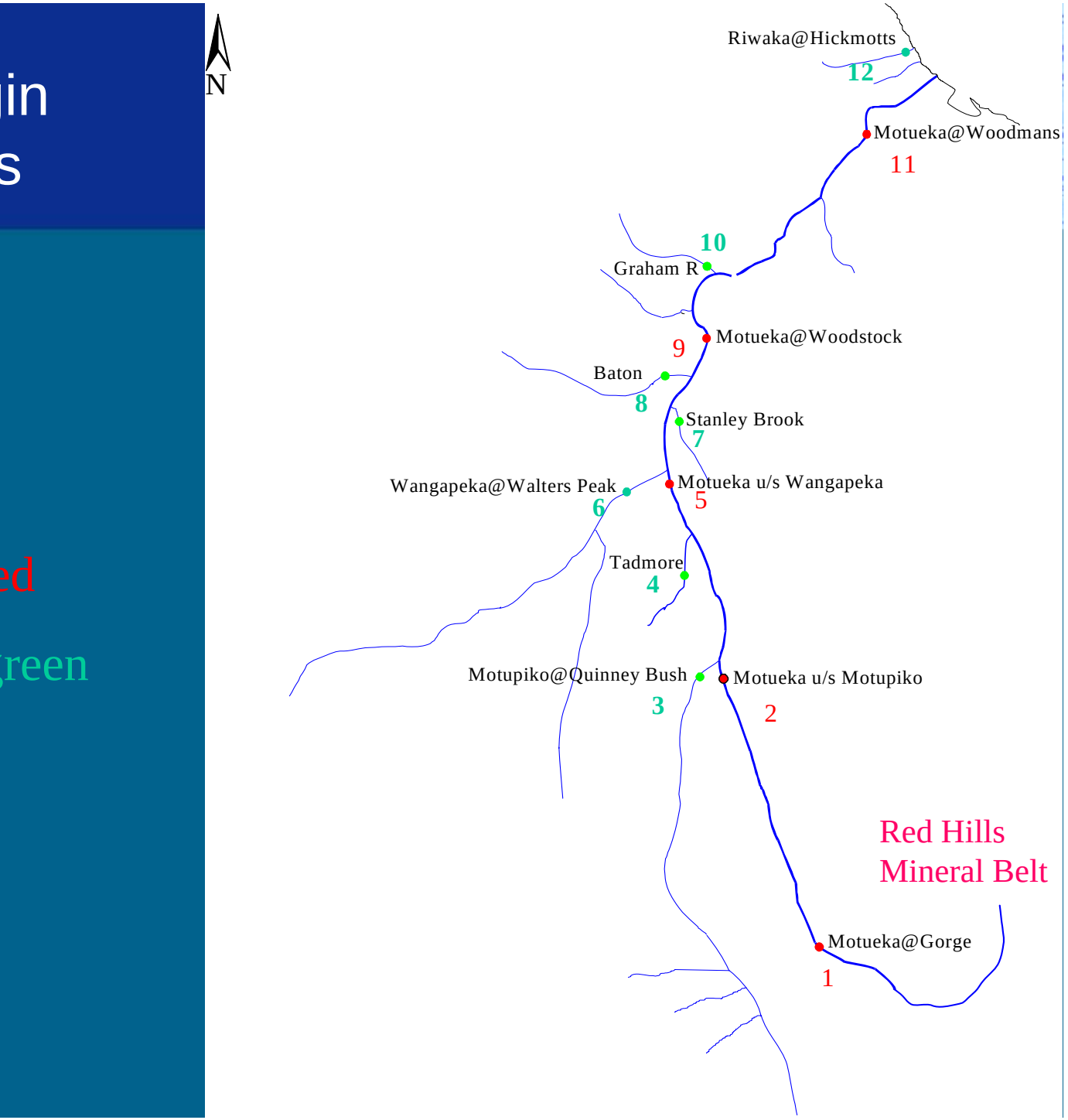
- Localised high intensity rainfall in the upper catchment
- 1 in 50 yr event

River Margin Sediments

June 2005

Sites:

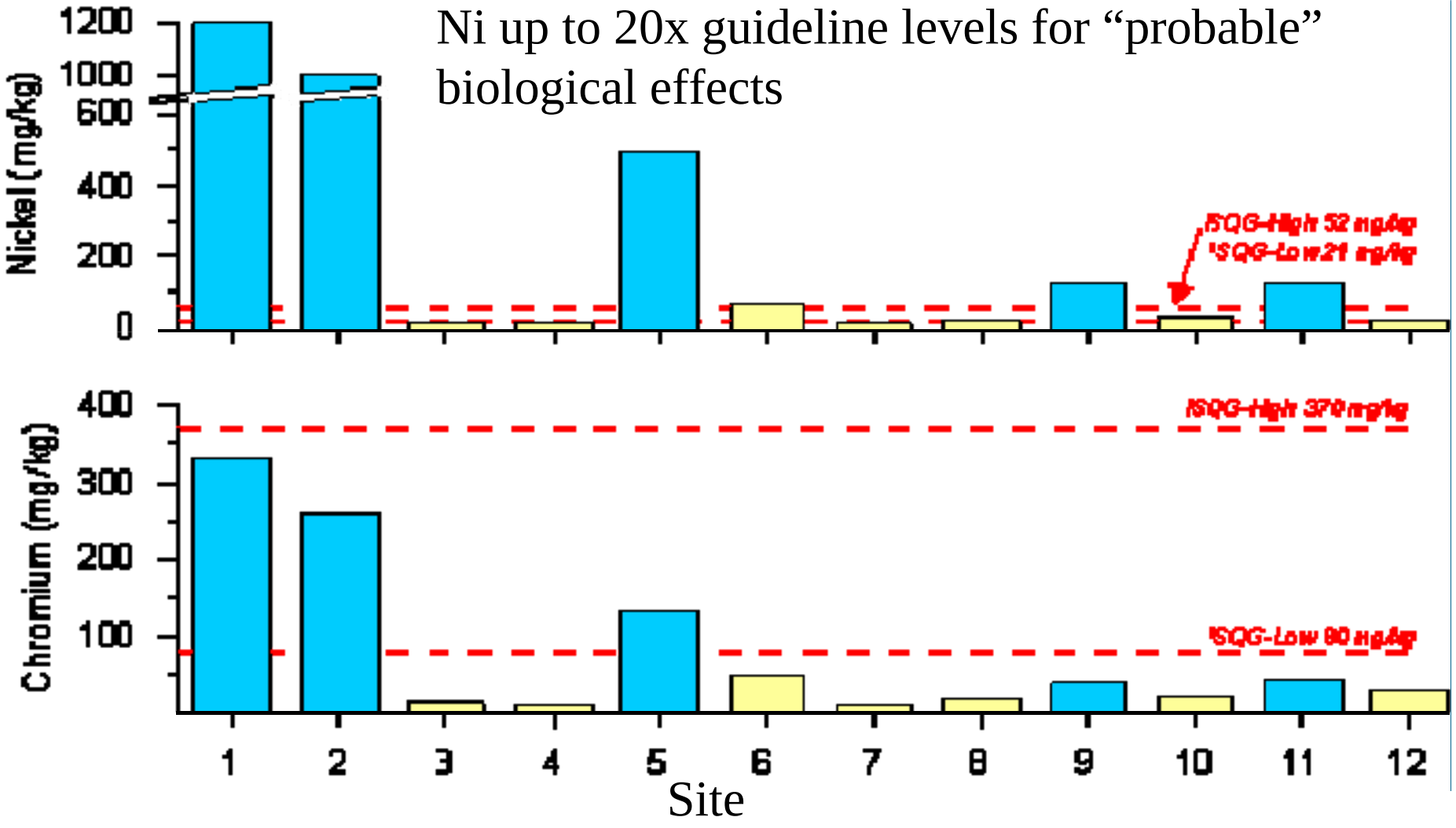
- Main stem = red
- Tributaries = green



River Margin Sediments

A. Whole sediments

Ni up to 20x guideline levels for “probable” biological effects

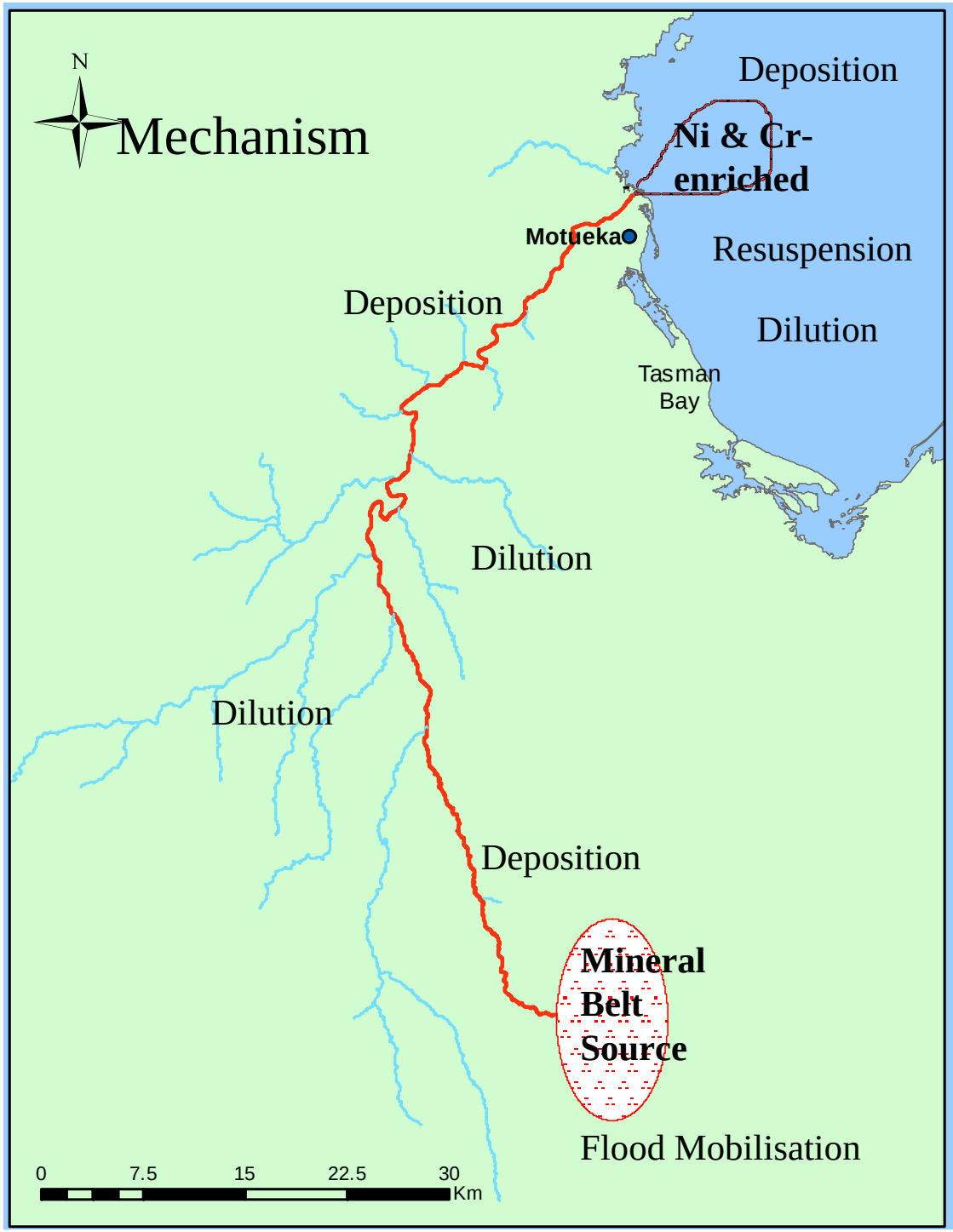


Suspended Sediments

- Samples provided by NIWA
  - Woodman's Bend during moderate rainfall event (24-25 August 2005)

Ni = 1000 mg/kg

Cr = 330 mg/kg



A Natural Catchment Source of Metals-enriched Sediments

- Terrestrial signature (~50 km^2)
- Biological communities

- Shellfish

“RIDGE TOPS TO THE SEA”