



Healthy Rivers
PLAN FOR CHANGE

Wai Ora
HE RAUTAKI WHAKAPAIPAI



RAUKAWA CHARITABLE TRUST
TE POARI MANAAKI O RAUKAWA



TŪWHARETOA
MĀORI TRUST BOARD

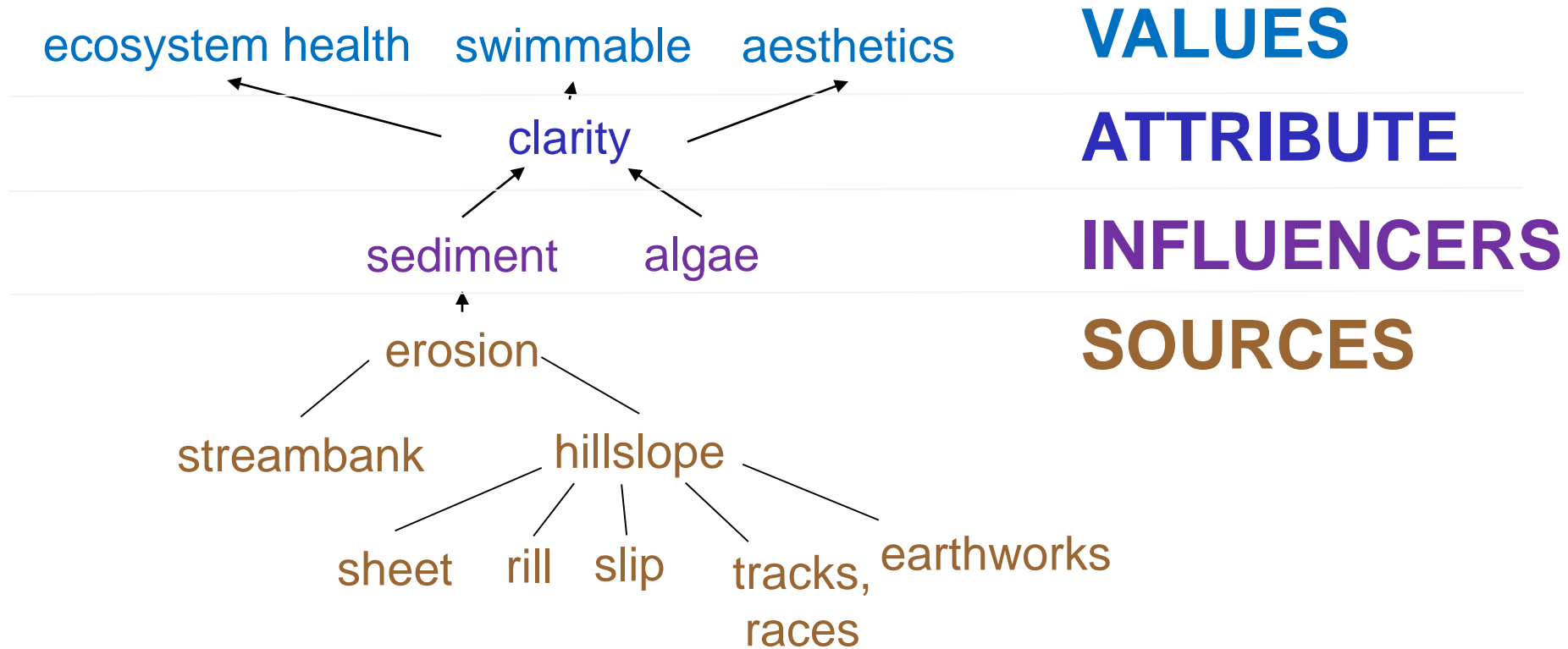


Sediment sources and mitigations

Presentation to CSG 12
June 4th 2015

Alan Campbell (WRC) and Bryce Cooper (TLG)

Context



Clarity: current state (varies in space and time)

FMU	Location	State
Upper Waikato	Main stem	A or B or C
	Tribs	1 B 10 C 4 D
Middle Waikato	Main stem	C
	Tribs	1 C 7 D
Waipa	Main stem	B or C or D
	Tribs	1 B 2 C 8 D
Lower Waikato	Main stem	D
	Tribs	2 C 12 D

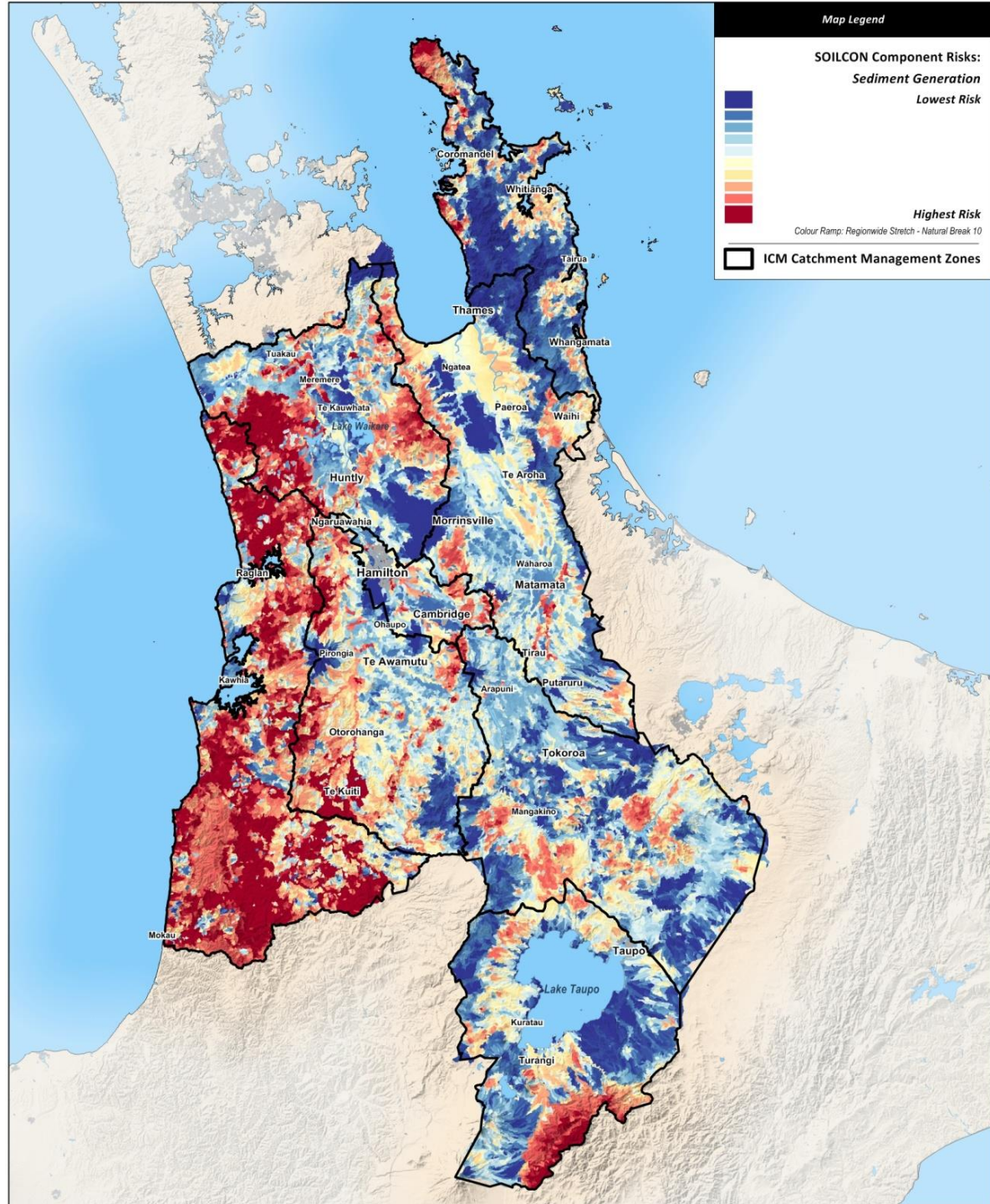
Erosion varies in space and time

- Erosion risk driven by:
 - Geology
 - Soils
 - Slope
 - Climate
 - Vegetation cover
 - Land use – e.g., arable, pastoral, forestry,..
 - Land management – e.g., stocking, tracks, stream fencing,...
- Scale is important

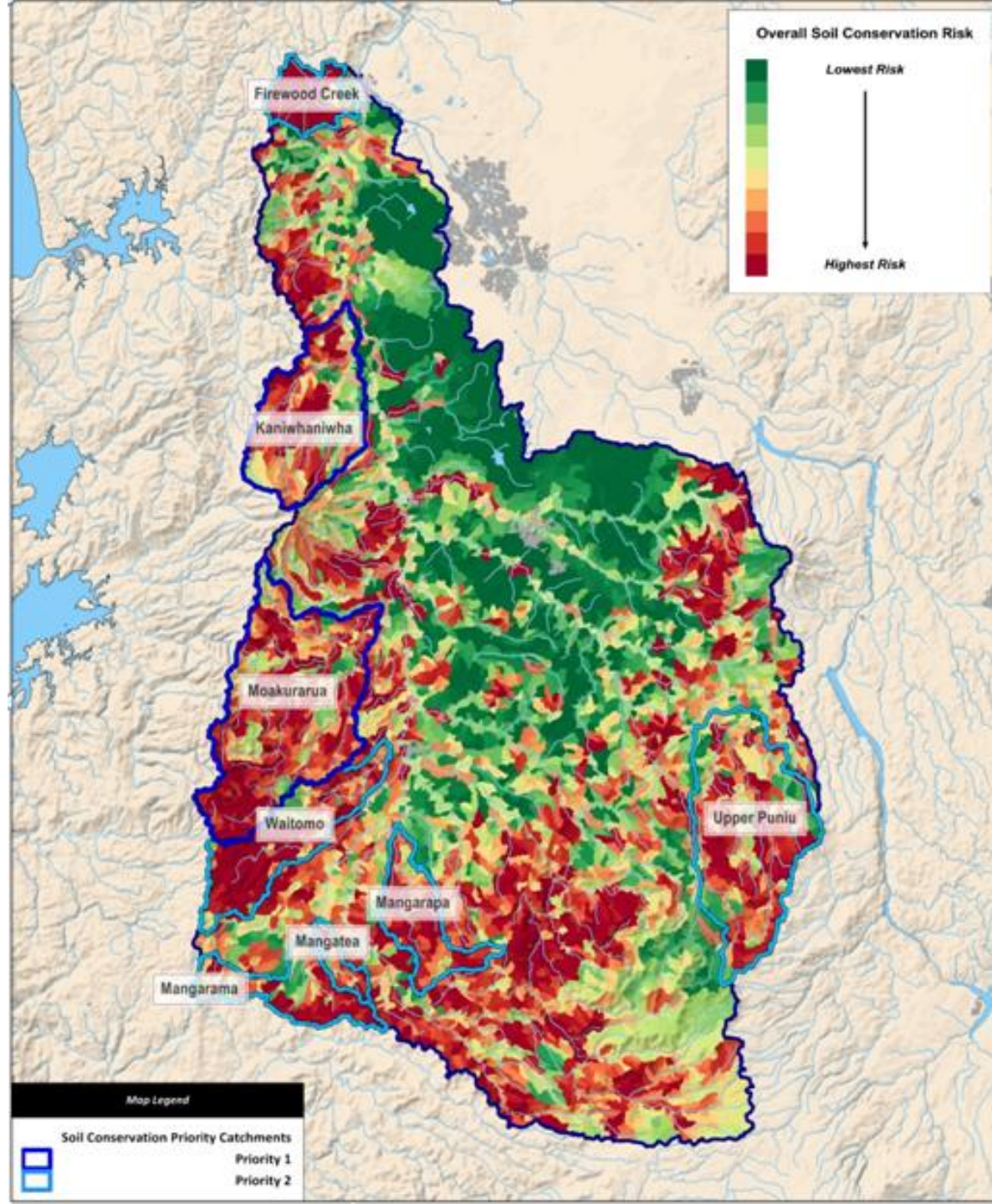
Scale is important — ‘diffuse set of point sources’

NATIONAL
REGIONAL
CATCHMENT
SUB-CATCHMENT
FARM
Paddock
SITE

Regional overview of estimated sediment risk

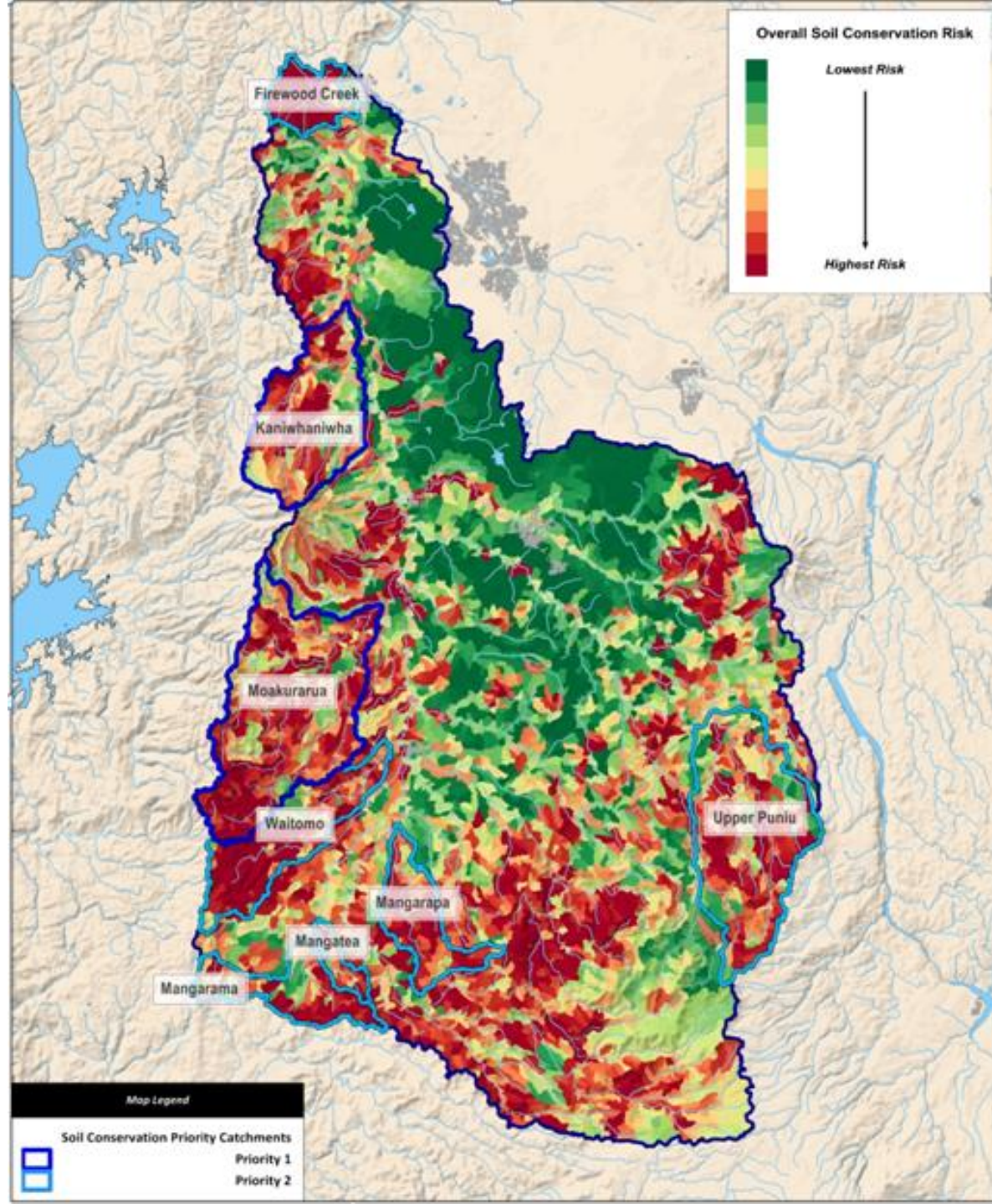


Waipā priority soil conservation areas



“Landslides and stream bank erosion are the dominant process of sediment generation in the Waipā, with these processes more dominant in pasture landscapes”

Waipā priority soil conservation areas



Slump, soil slip



Earth slip, soil slip



Earth slip



Slump, earth slip, sheet



Soil slips



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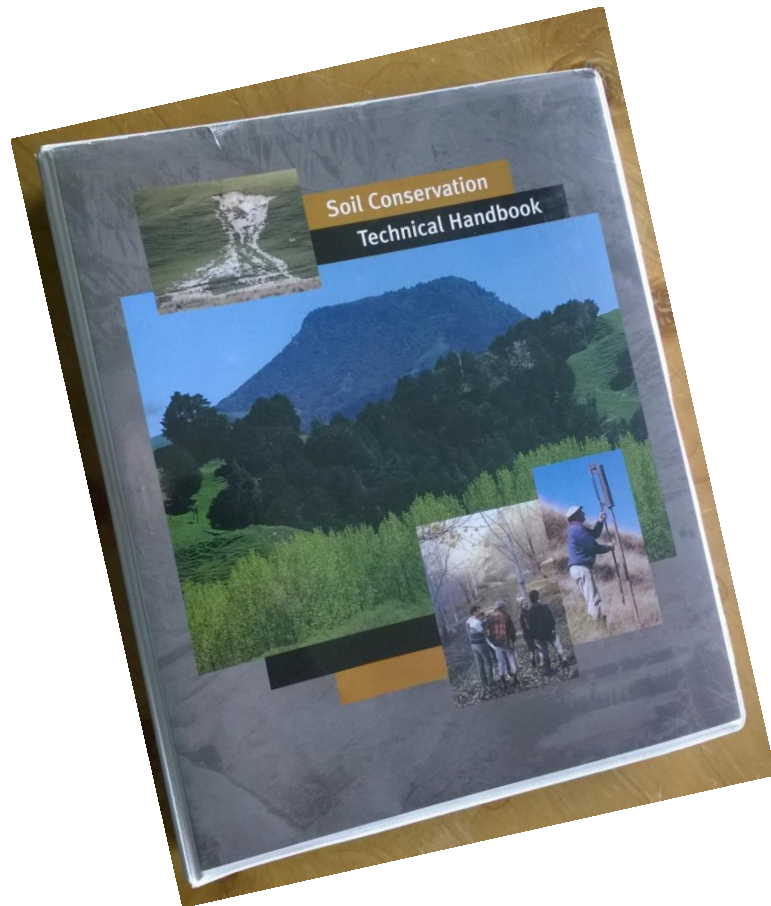
Soil slip, sheet



Soil slip



Soil conservation technical handbook



- Ministry for the Environment
- Ministry of Agriculture and Fisheries
- NZ Association of Resource Management

Best practice June 2001

Mitigations

<p>Shallow mass movements</p>	<p>Fencing – stock management Pasture re-establishment Managed reversion Pole planting</p>
<p>Deep seated mass movements</p>	<p>Fencing – stock management Managed reversion Dewatering techniques Pole planting Erosion control forestry</p>

Pole planting



Afforestation.



Mixed plantings



Stream bank erosion



Stream bank erosion



Stream bank protection



Stream bank protection



Stream bank remediation



Stream bank remediation



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Rill erosion

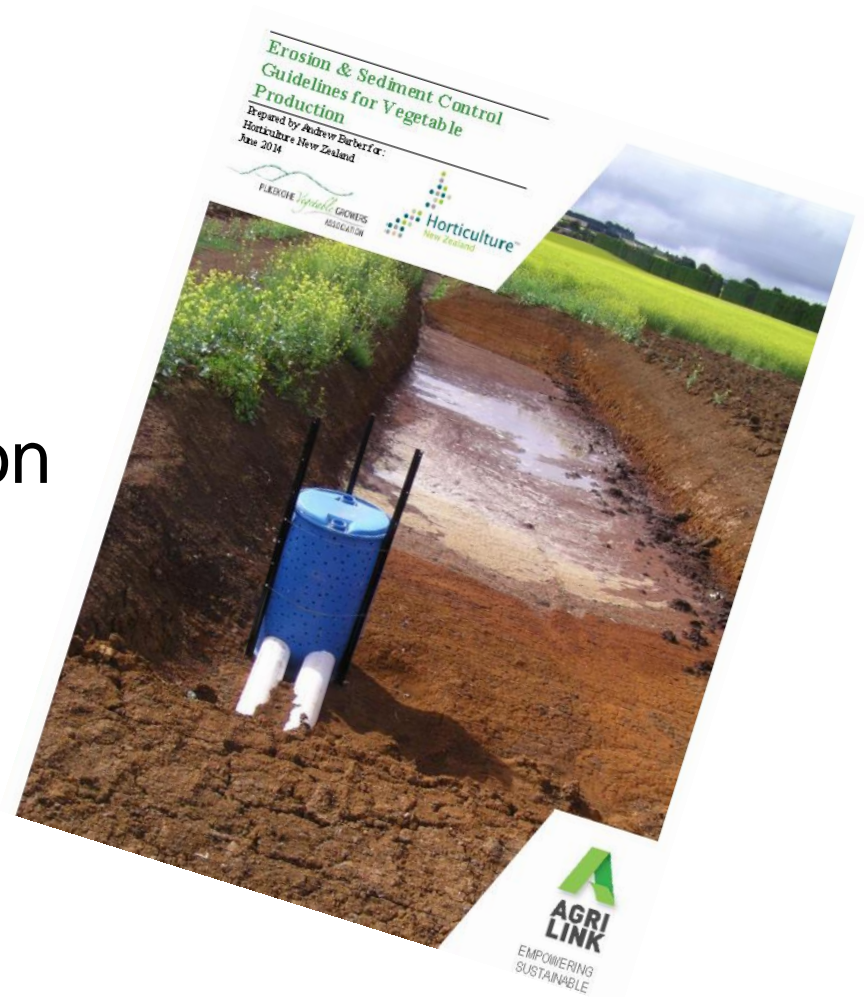


Mitigations - arable

- Minimum tillage
- No-tillage (direct drilling)
- Stubble retention
- Strip or contour cultivation
- Ripping wheel tracks
- Cover crops
- Fallow

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Pumice gully



Pumice gully



Pumice deposition



Detention dam



Detention dam

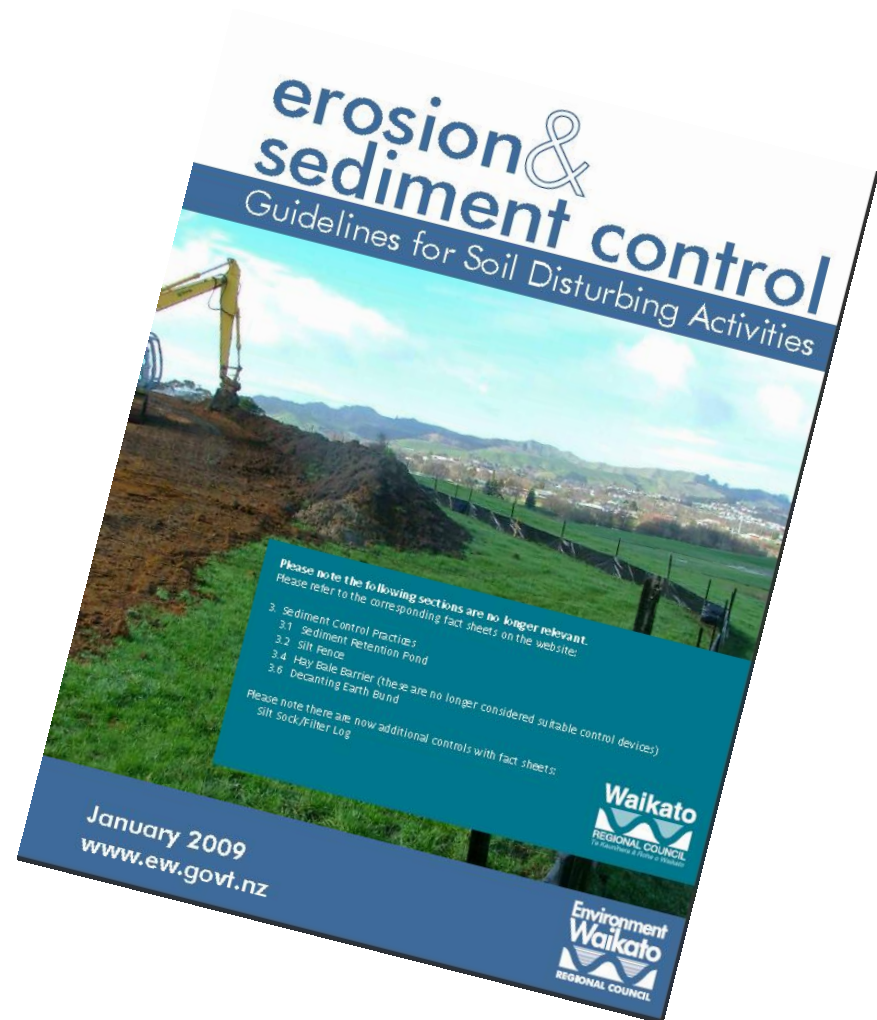


Point sources

- Tracks and races
- Earthworks

Point sources

- Tracks and races
- Earthworks



Menu

of practices to
improve water quality



WAIKATO

ROTORUA | TAUPO



Dairy for life



Key points

- Erosion processes are variable and site-specific.
- Land use should match capability
- Treatments / mitigations;
 - Well understood
 - Preventive and/or remedial
 - Site specific
 - Dependent on land use
 - Typically multi-year
 - Include land management
 - Dependent on ongoing maintenance