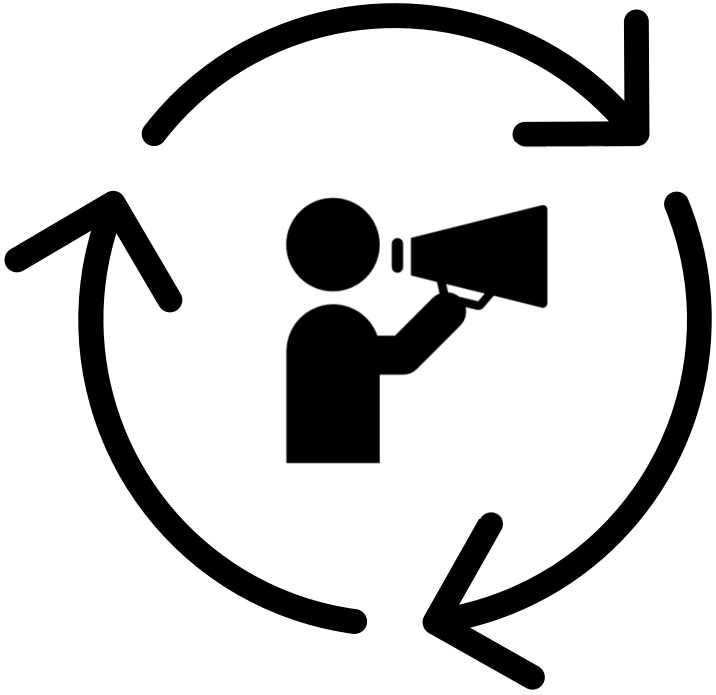
Bringing it all together

MANAAKI WHENUA – LANDCARE RESEARCH

Manaaki Whenua
Landcare Research



Getting smarter about targeting ESC

Outline

- What we said we would do
- What we did/produced
  - Papers & innovations
  - STEC News
  - Pūtaiao
  - STEC website
  - Capability building
  - Stakeholder interaction
  - Summary
- Implementation
- Outcomes
- What's happening next
- Wrap up

What we said we would do

Programme Impact Statement

By 2023, **improved high-resolution spatial and temporal data** have improved **sediment source identification** and **sediment quality assessment**, which has enabled **cost-effective targeting** of erosion and sediment control measures to reduce effects on water quality.

This has provided **confidence in farm and catchment decision-making** for RCs, iwi, land owners that **ensures land productivity** is maintained or enhanced, and **catchment water quality objectives for sediment** under the NOF are on the way to being **met**.

Assessment of soil conservation benefit to land and water has been made possible through **improvements in sediment models and economic evaluation frameworks**, as has the provision of **new information** on the **performance, costs and benefits of erosion** mitigation measures.

What we produced

Papers & innovations

50 journal papers (so far)

14 in last 12 months

% with international collaborators

New frameworks & tools

Firsts & key innovations:

- Tree influence model
- Rain radar and LS model
- Benefits & costs
- Others…..

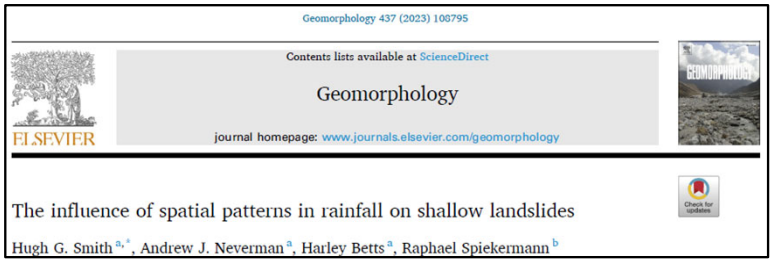

Contents lists available at ScienceDirect

Geomorphology

journal homepage: www.journals.elsevier.com/geomorphology

Comparing physical and statistical landslide susceptibility models at the scale of individual trees

Raphael I. Spiekermann [a,b,*,1], Feiko van Zadelhoff [c,d,1], Jan Schindler [a], Hugh Smith [a], Chris Phillips [a], Massimiliano Schwarz [c]


Geomorphology 437 (2023) 108795

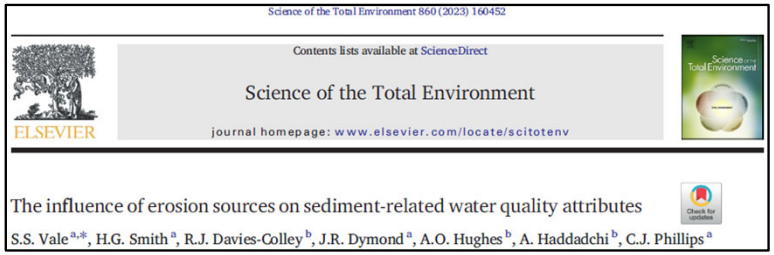
Contents lists available at ScienceDirect

Geomorphology

journal homepage: www.journals.elsevier.com/geomorphology

The influence of spatial patterns in rainfall on shallow landslides

Hugh G. Smith [a,*], Andrew J. Neverman [a], Harley Betts [a], Raphael Spiekermann [b]


Science of the Total Environment 860 (2023) 160452

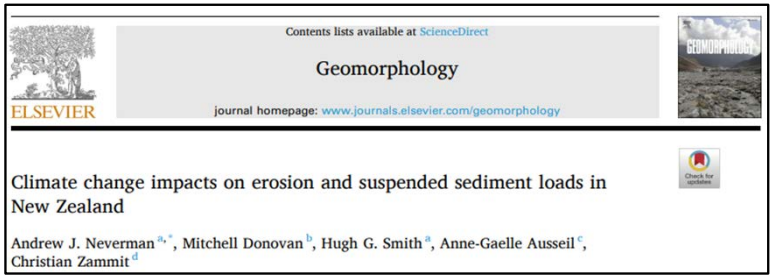
Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv

The influence of erosion sources on sediment-related water quality attributes

S.S. Vale [a,*], H.G. Smith [a], R.J. Davies-Colley [b], J.R. Dymond [a], A.O. Hughes [b], A. Haddadchi [b], C.J. Phillips [a]


Contents lists available at ScienceDirect

Geomorphology

journal homepage: www.journals.elsevier.com/geomorphology

Climate change impacts on erosion and suspended sediment loads in New Zealand

Andrew J. Neverman [a,*], Mitchell Donovan [b], Hugh G. Smith [a], Anne-Gaelle Ausseil [c], Christian Zammit [d]

What we produced

STEC News

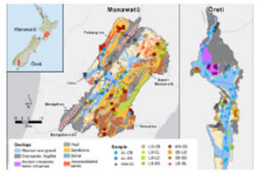
5 issues (to date)
28 “articles”

128 direct subscribers
877 article downloads

1 more issue to come

Most downloaded

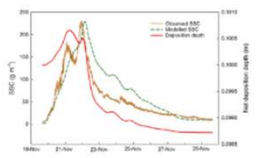
'LiDAR improves modelling of shallow landslide susceptibility for smarter targeting of erosion control'



The influence of erosion sources on sediment-related water quality attributes

12 April 2023

Erosion of fine sediment and its delivery to streams pose significant issues for freshwater quality and receiving environments. Increased sediment loads reflect the loss of agriculturally productive soils and land instability, as well as sedimentation issues that can affect infrastructure and produ...



Modelling fine sediment dynamics in rivers to improve our understanding of impacts on streambed habitat and water quality

12 April 2023

Most modelling of catchment erosion and sediment has focused on annual river loads linked to catchment erosion rates. However, to interpret the water quality impacts of [fine] suspended sediment and the degradation of streambed habitat by deposited fines, we need to understand the dynamics of sedim...

STEC’s international collaborators: a key part of our implementation pathway

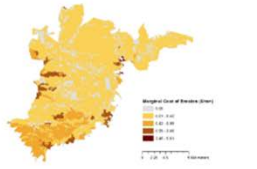
4 May 2022

STEC is fortunate to have several leading international collaborators as part of the programme. Their roles include student supervision and involvement in both collaborative and self-led research. However, one of their key functions is to help the programme and its researchers connect to the wider s...

What’s happening with our iwi partners

4 May 2022

Mā mua ka kite a muri, mā muri ka ora a mua
Those who lead give sight to those who follow, those who follow give life to those who lead While COVID has made it difficult in the past 2 years for kanohi ki te kanohi hui between STEC researchers and our iwi partners, things have been happening. While t...



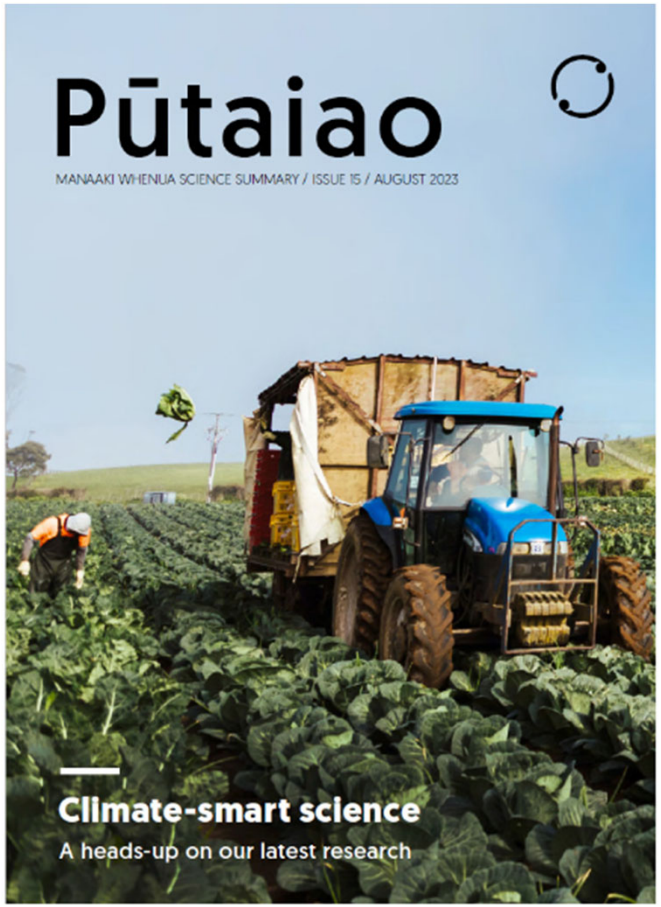
Valuing the effect of soil erosion on productivity

16 March 2021

To create efficient erosion control policies, it is important that the cost of implementing an erosion control measure justifies the benefits. While costs are typically straightforward to measure, the benefits include fewer tangible things like avoided impacts on farm incomes, impacts on the natural...

What we produced

Newsletters - Pūtaiao



Weather radar and satellites map out landslide risk

Earthflow monitoring reveals movement drivers and sediment loss

Living with nature for a sustainable future

An integrative approach to silvopastoral system designs

Getting to the root causes of soil erosion using high-res remote sensing

Getting smarter about sediment control

What we produced

STEC Website

Capability building:
the next generation of ‘erosion’ researchers

Massey University, New Zealand






Bern University of Applied Sciences (HAFL), Switzerland

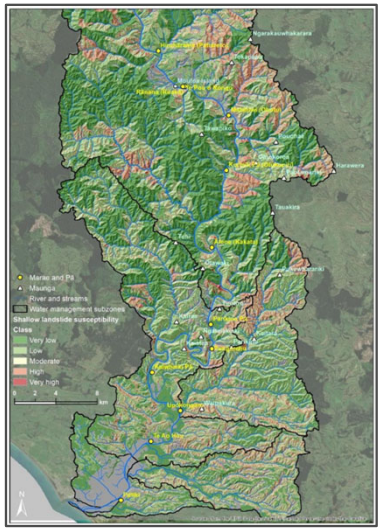


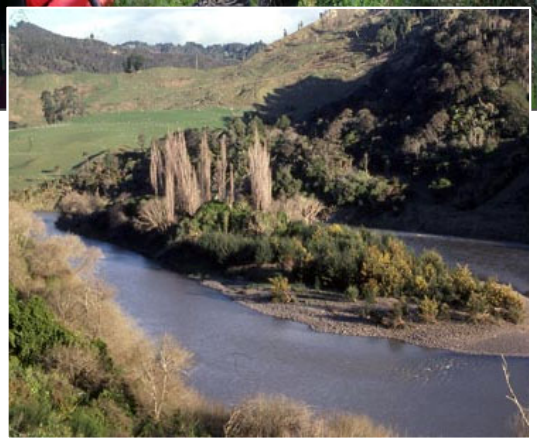



University of Salzburg, Austria

Capability & capacity building: iwi

Hui
Wananga
Resources





Stakeholder interactions

Workshops
TIAG
NZ conferences
International conferences
Webinars

Summary:
what we produced over the 5 years

50 Journal papers

89 Conference proceedings

4 Keynote presentations

6 PhD
2 MSc

4 Awards

77 Workshops & hui

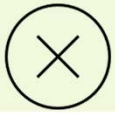
41 reports

124 articles & info. sharing

Implementation steps

What we said we would do		Confidence & Evidence
Integration with existing models:		SedNetNZ enhancement. Development of new model(s) – event-scale model, Raphael's PhD, Landslide susceptibility, etc
Informing policy:		Related commercial contracts for RCs used to inform policy development and NPS-FM implementation
Informing practice:	   	Haven't had as much specific work with landowners to assess performance of erosion mitigation on farms – in part Covid Whanganui - been providing advice on rehabilitation of key taonga sites. Manawatu – cultural monitoring. Communication (workshops, meetings, hui, conferences, STEC News, etc) and TIAG Co-funding of related commercial work and in-kind can be demonstrated.
Our Land & Water national science challenge:		Involved in several OLW projects and currently in one (LUO) which will continue beyond end of STEC
International science:		Papers in international journals. Involvement of overseas researchers. Linkages via international connections/boards/committees/reviewers etc

Implementation & Delivery

What we said it would achieve		Confidence & Evidence
New information and models across spatial and temporal scales		Lidar-based susceptibility modelling; tree influence model; connectivity model; bank erosion model; event-scale model; etc. New information & data
Primary end-users using research		Related commercial contracts applying STEC knowledge, especially RCs.
Meeting needs of primary end users		As above
Meeting Māori partners needs. Meeting cultural aspirations for catchments.		A bit hard to demonstrate as yet.
Delivering critical steps and papers		Delivered all Critical Steps. Final ‘event’ model details and legacy sediment still to come.

Photos: Harley Betts

Programme Outcomes

What we said it would achieve **within contract**	What we said it would achieve **2 years post-contract**
High-resolution information on landscape erosion susceptibility has provided confidence for partner RCs to target investment in catchment erosion control.	Iwi partners are using new knowledge to implement erosion mitigation and are seeing benefits in small sub-catchments of the Whanganui and Manawatu River
There is increased awareness among end-users, including iwi, of the need to reduce erosion to meet catchment targets for sediment.	At least 3 RCs are routinely using improved sediment modelling tools to implement NOF sediment targets through finer-res spatial targeting of measures and economic evaluation frameworks for catchment management
	A more holistic understanding of NZs erosion-sediment and water quality problem is achieved and widely disseminated, particularly among RCs and central government agencies

What's happening next....

- Programme officially ends on 30th September 2023 but ..... some things still to come
- Last STEC NEWS – October-November
- Some papers to come – over the next 12-15 months
- Website updates, including presentations – by December
- Various conferences over the next 12 months will feature STEC work
- 2 PhDs to complete 2024, 2025
- Improved tools underpinned by STEC science used in applications for stakeholders – on-going
- Programme evaluated by MBIE – currently happening – aiming for Gold!

And that’s a wrap…..

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Acknowledgements

Closing karakia