



Improving monitoring capacity and community engagement

Richard Storey, Aslan Wright-Stow, Rob Davies-Colley, Elsemieke Kin, Samira van Hunen, Rebecca Stott

- Regional councils
- Waicare
- Special thanks to our volunteers
- Photo credits: Allan Sheppard, Shirley Fraser, other volunteers



Overview of NIWA research – *The “M” of VMO programme*

Goal – to improve water monitoring and reporting in NZ at both regional and national level.

Consistency and reliability of regional monitoring

(Rob D-C and Richard S)

- The **NEMaR** project (funded by MfE; continuing as EMaR)
- **NEMS** (National Environmental Monitoring Standards) – NEMS- discrete water quality (and future NEMS-biomonitoring)
- A **National QA programme** in water monitoring – pilot in the Wellington Region (collaboration with GWRC; refer poster)

Statistics of SoE reporting (McBride)

- A better **test of significance** (McBride et al. 2014)
- Improved **time trend detection** and reporting (as applied in recent national-scale - Larned et al. 2016)





Improving monitoring capacity and community engagement

A role for citizen science

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An increasing role for citizen science in NZ?

1. Freshwater reforms:

NPS-FM requires more spatially-detailed information.

Collaborative processes for FW planning strongly encouraged.

“If solutions are to be apt, and to be widely accepted, [communities] must be able to bring their own knowledge and experience to bear, and to have direct access to broader scientific, economic, technical and indigenous information.”

– from LAWF second report April 2012

Community monitoring increases
“interactional expertise” (Carolan 2006)

LAND & WATER
FORUM 

Second Report of the
Land and Water Forum

Setting Limits for Water Quality and Quantity
Freshwater Policy- and Plan-Making Through
Collaboration

April 2012

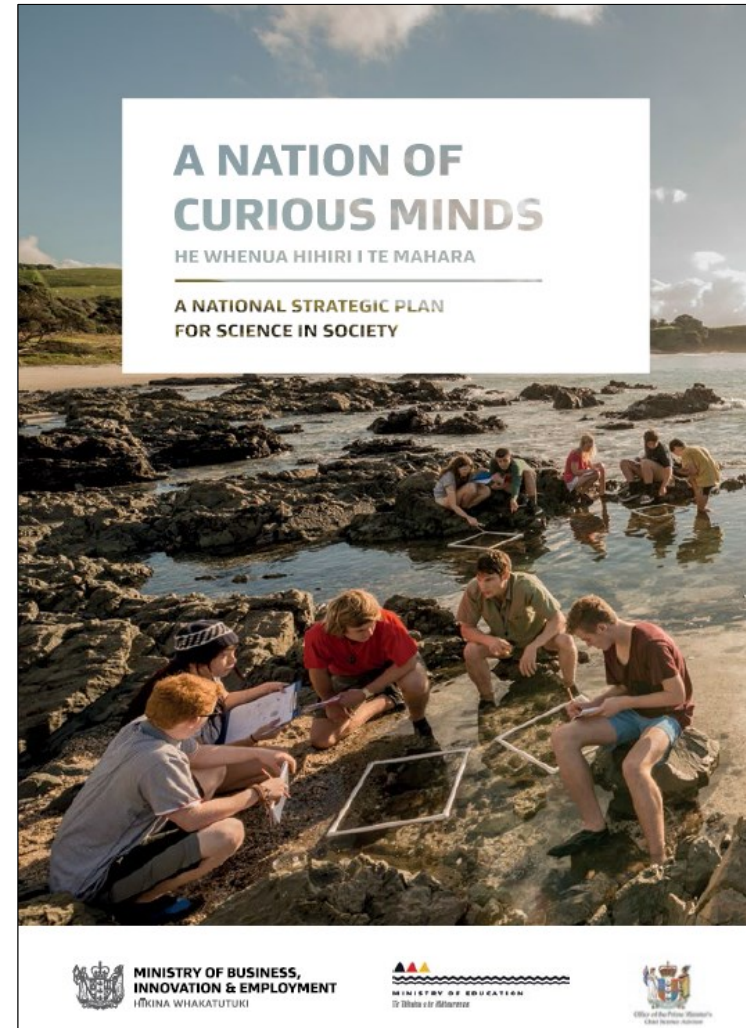


An increasing role for citizen science in NZ?

2. National Strategic Plan for Science in Society

Participatory Science Platform

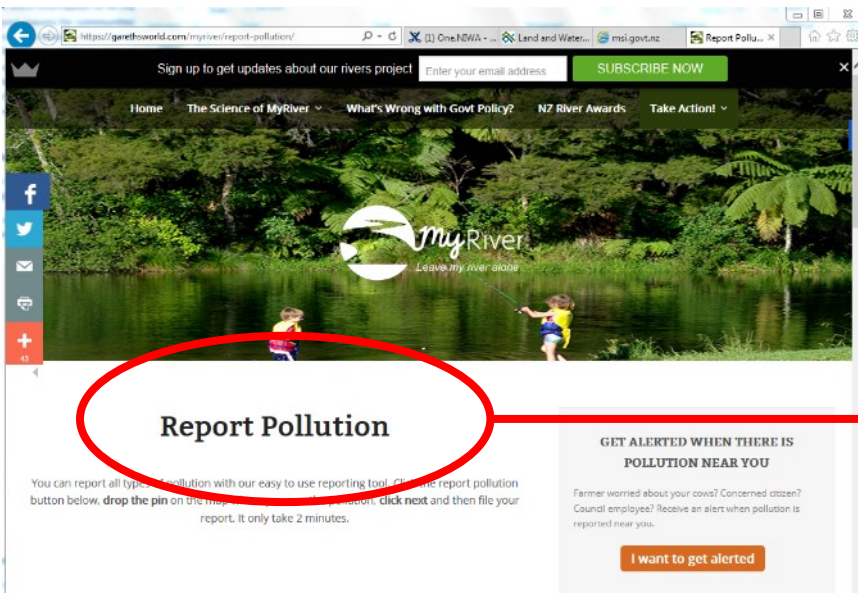
“...is a programme designed to integrate three key action areas.... by engaging young people, communities and scientists in collaborative science projects.”



An increasing role for citizen science in NZ?

3. Increasing interest at grass roots

- >600 volunteer “environmental care” groups in NZ
- 49% doing own monitoring
 - Peters et al. (2015)
- New initiatives: NZ Landcare Trust, NZ Ecol Soc workshop



Morgan Foundation

MyRiver: Tools to take control

Use of volunteer data

- Successful programmes overseas
 - Secchi Dip-in (North American Lake Management Society):
41,000 records from >13,000 water bodies



- In NZ:
 - “a lack of institutional systems for using the data”
- (Peters et al. 2015)

Why is data quality important?

- authorities and volunteers both express concerns (Peters et al. 2015)
- authorities not using data or supporting volunteer monitoring
- volunteers stop enjoying, unsure if doing anything useful



Research questions

- How closely do volunteer community monitoring data agree with professional data?
 - Can both groups distinguish good, med, poor stream health?
- What support do volunteer groups want/need?
- Does CM improve community engagement in freshwater mgmt?
- What benefits and barriers do councils see in CM?

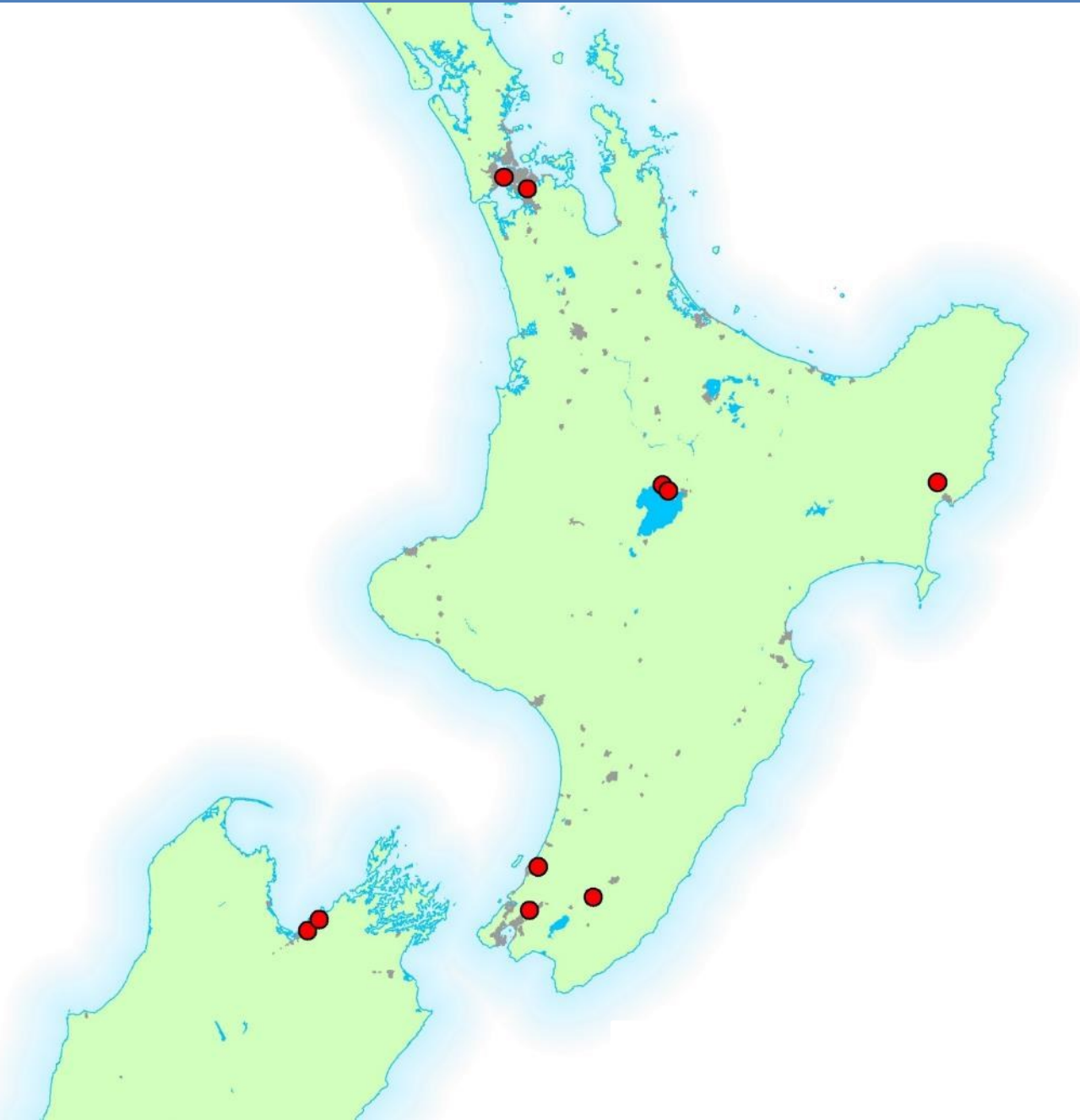


Study design

- 9 sites
- “Parallel” monitoring:
 - regional council/NIWA and community volunteers
 - same location, same time
- Duration ~18 months:
 - late summer 2014 till mid-2015
- Training provided
- Low-cost kit supplied
- WQ, periphyton (monthly)
- physical habitat and macroinvertebrates (6-monthly)



Study sites and groups



Environment

Urban: 4 sites

Rural: 3 sites

Near-pristine: 2 sites

Group composition

High school: 1

Middle-aged: 2

Retired: 4

Mixed: 2

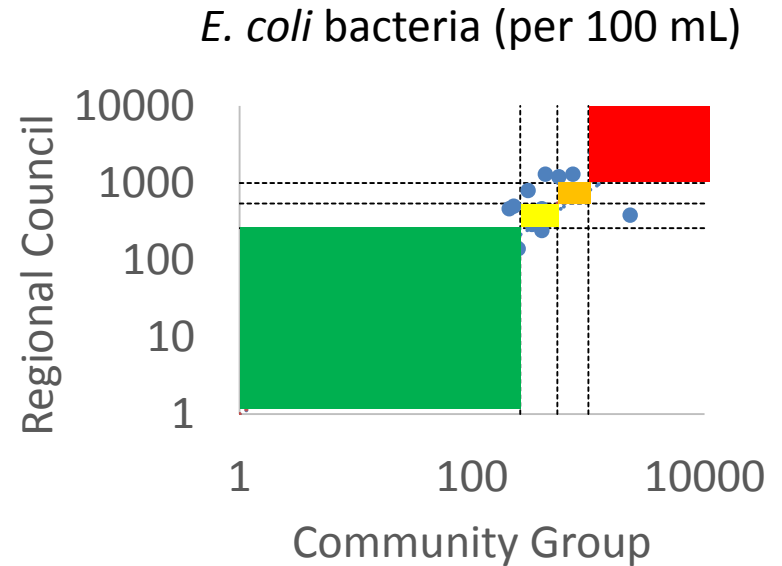
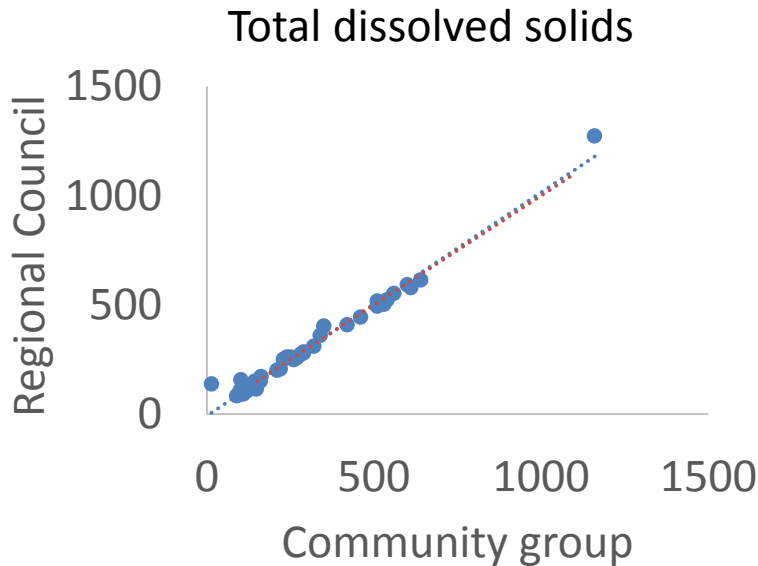
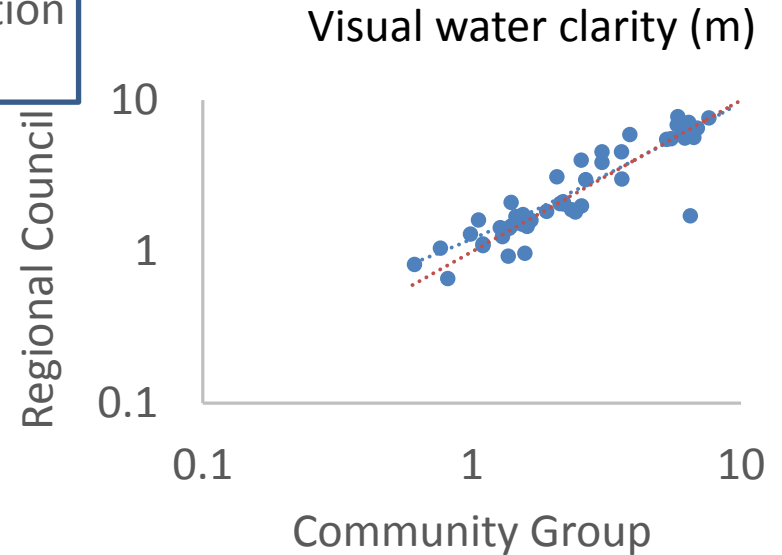
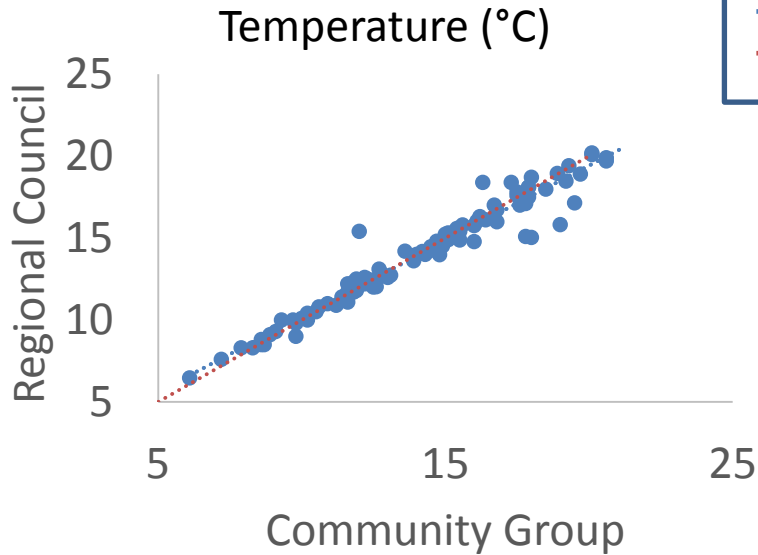
Follow-up

Focus group interviews
with

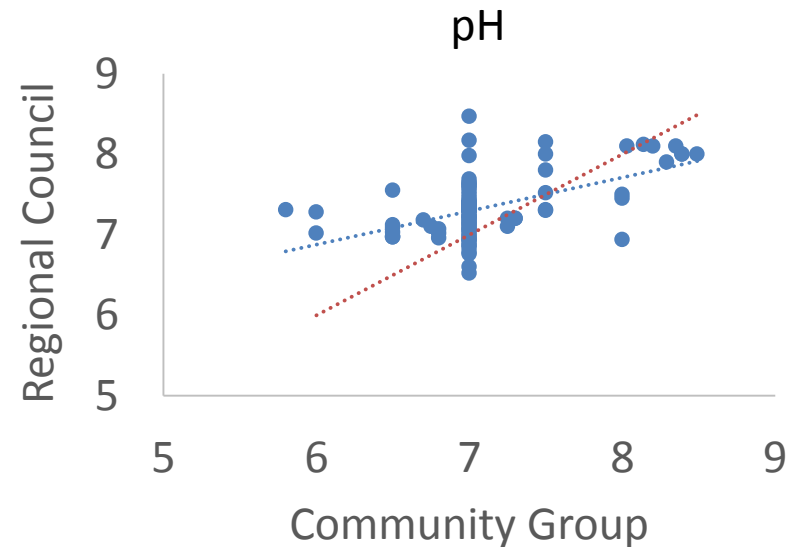
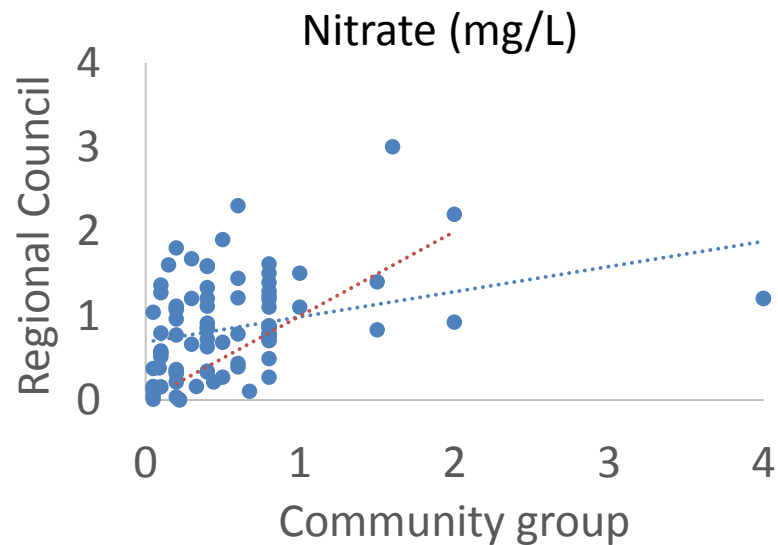
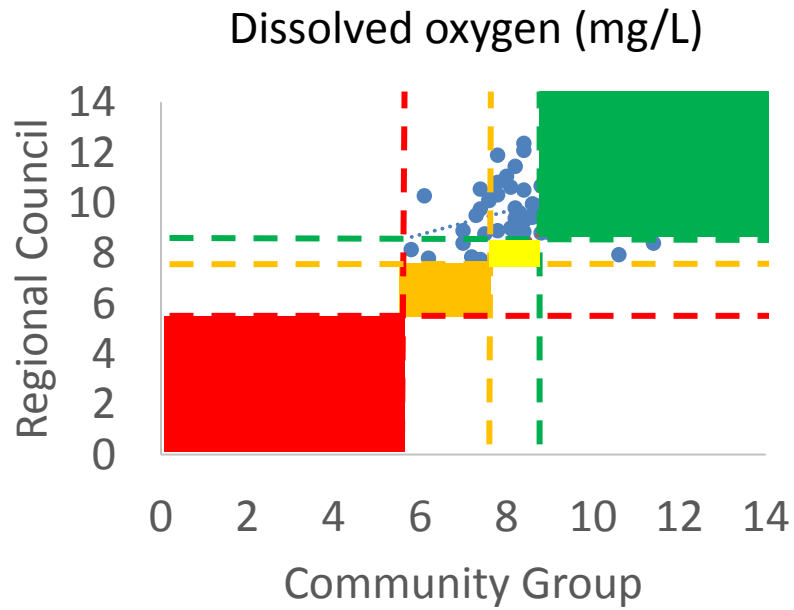
- Community groups
- Regional council staff



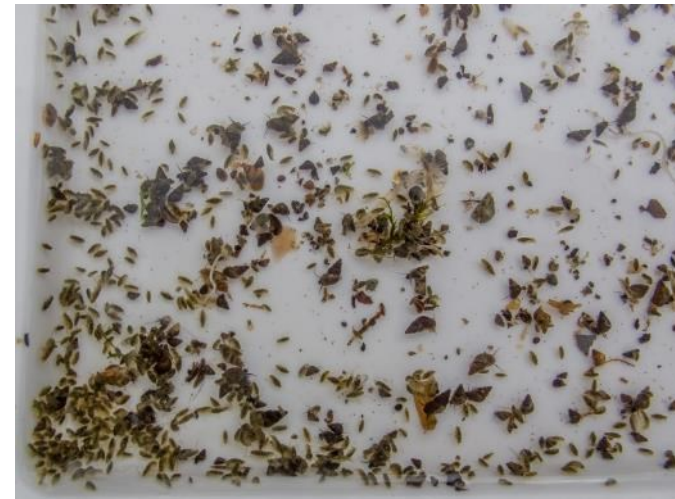
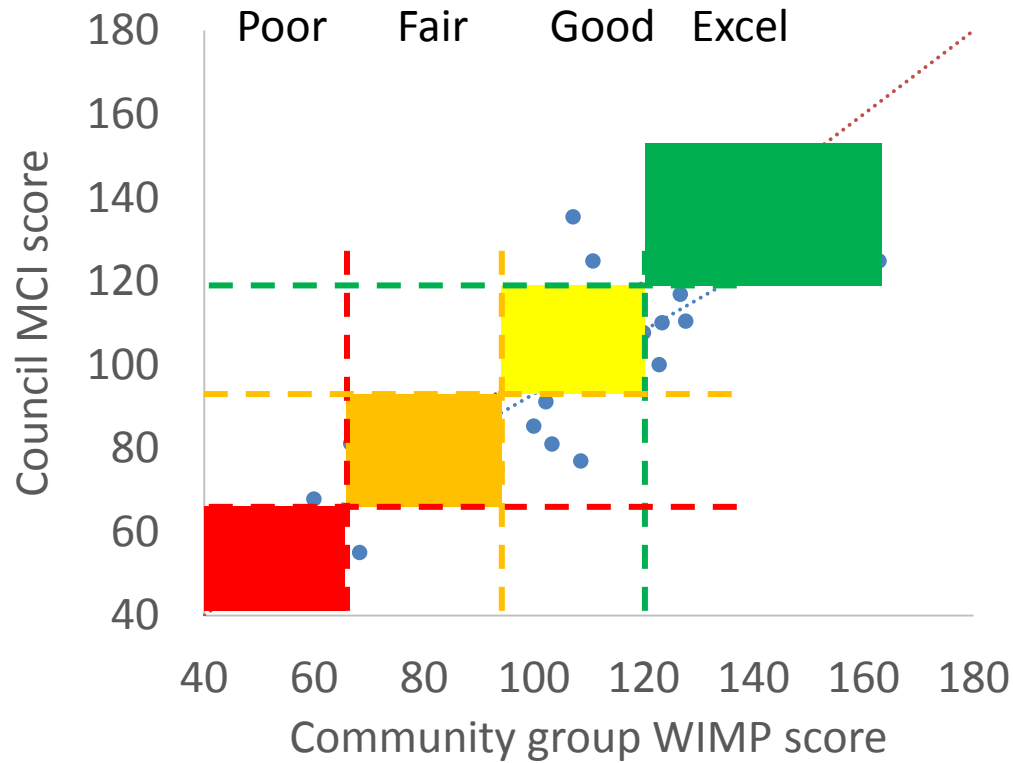
Results: water quality (the good)



Results: water quality (the bad and ugly)

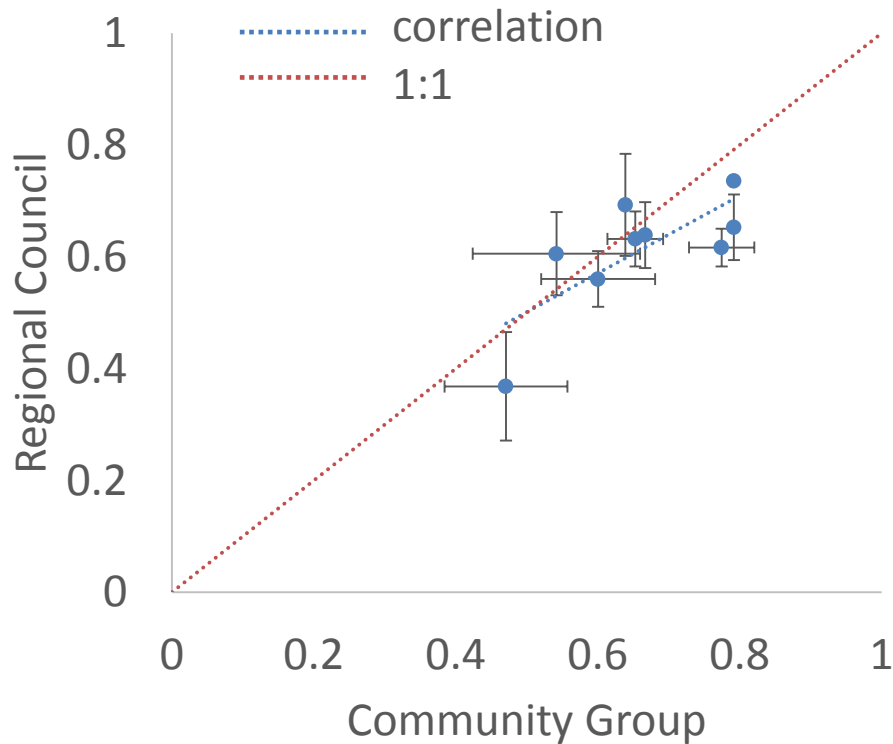


Results: Invertebrate health index (pollution tolerance)



Results: Physical habitat visual assessment

- Not expected to change over time
- professionals no more consistent than volunteers



Summary of data reliability

	Variable	Agreement	Use for monitoring?
Water quality	Temperature	High	Yes
	Clarity	High	Yes
	Conductivity	High	Yes
	<i>E. Coli</i>	Mod	Yes
	Nitrate	Low	V. degraded water only
	pH	Low	No
	Dissolved oxygen	Low	V. degraded water only
Invertebrates	MCI	Mod	Yes
Algae	% cover	Mod	Yes
Physical habitat	Visual assessment	Mod	Yes

What support do volunteer groups want or need?

- Face to face is best

Scientists:

- Training, equipment, scientific advice, encouragement, feedback, data QA & management



Photo: Wai Care

Authorities (RCs, DOC):

- Sense of making a difference:

“I’d like to see that the monitoring of this stream contributes to the quality of freshwater overall, the bigger picture”

➤ Most valuable next step: develop database and online community

Does CM improve community engagement in freshwater?

Monitoring increased

- volunteers' understanding of science
- knowledge of & attentiveness to freshwater issues
- awareness of local fresh waters
- social networks
 - as found in other community monitoring programmes



Does CM improve community engagement in freshwater?

In addition:

- some more likely and better-equipped to engage in FW planning
- almost all talked with their communities
 - increased ability of local communities to engage in freshwater planning



“People were just so interested in what we were doing when they saw us standing in the water.”

“The monitoring is almost a small forum.”

What benefits and barriers do council staff see in CM?

90% see signif. benefits, such as:

- filling gaps in SoE info
- engaging citizens
- increasing knowledge and awareness within communities
- empowering citizens to influence regional policy



“... [community environmental groups] are probably the best people on the ground to monitor and understand changes to that place and also tie in any activities in those areas with their own aspirational targets...”

What benefits and barriers do council staff see in CM?

Barriers:

- **data reliability**
- limited staff time/resources to support CM
- health and safety
- **lack of council strategy and coordination to use CM results**

But:

- Many solutions offered
- Overall positive attitude to CM



Next steps

Improved monitoring & riparian design solutions

Better tools:

Upgraded SHMAK kit: new variables, ID guides

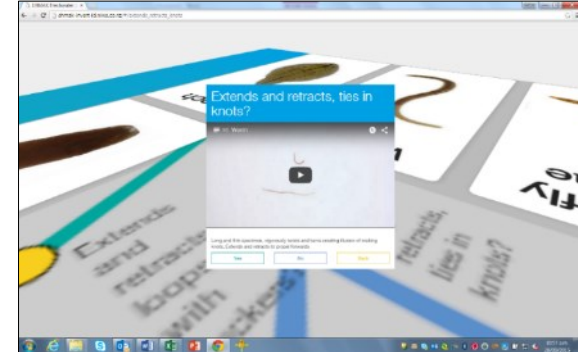
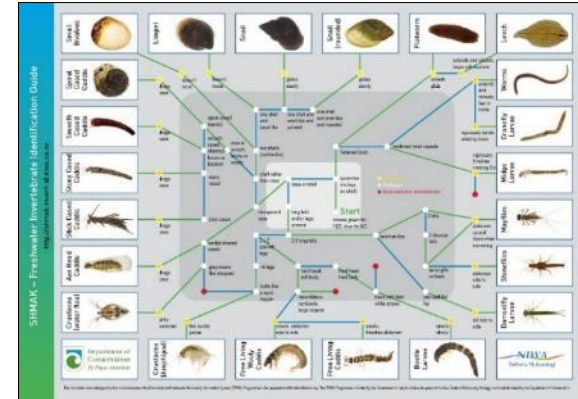
Monitoring “app”

Central database

Community monitoring to fill knowledge gaps on stream restoration

NIWA SSIF-funded project:

“Does riparian restoration work? A national-scale natural experiment with citizen scientists”



Conclusions

- Increasing role for citizen science for stream monitoring in NZ
- Volunteer data: with support, most variables can be accurate enough for augmenting formal monitoring in planning, advocacy, public education
- Community monitors need support but provide: large amounts of data, increased awareness and (potentially) more engagement



Questions for discussion

1. Would councils benefit from supporting CM?
2. How can councils better support CM?
3. How can current barriers/issues be overcome?

Barrier	Solution
Data reliability	Our study Guidance on appropriate data use
CM consistency over long term	
Limited staff time/resources to support	Tap new resources to increase capacity Up-front budgeting
Health and safety	
Lack of council strategy & coordination to use CM results	Better communication among council depts.
Other	