



# Water monitoring and reporting

## (VMO RA2)

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# Outline of talk

1. Review VMO programme work... on (biophysical) water monitoring and reporting
2. Overview MfE's NEMaR project (VMO co-funding)
3. Outline research challenges...



*AND... (to keep you awake!)*

*Distill a few important principles of water monitoring*

# Why monitor (and report on) water?

*'Cause you can't manage what you don't measure'*

## **Main reasons\*** (State & Trend)

1. Define STATE of the environment
2. Track CHANGE in state... over time

## **Other reasons\***

1. Global vs catchment change
2. Scientific understanding
3. Modelling
4. Policy (Is it working?)

*\*From Davies-Colley 2012 NEMaR report.*





# *Rob's water monitoring principle No1!*

There is no perfect water monitoring network

*OR*

No (real) water monitoring network can answer all Q's that may be thrown at it



# NEMaR project

*Aimed at achieving **consistent and dependable** monitoring... for national reporting...*

Workshops with expert panels...

Major findings from NEMaR\*

- **Indicators** defined (Super-index?)
- **Variables** defined (= NRWQN)
- **Timing** – monthly
- **Protocols** outlined (~ NRWQN)
- **Site ‘coverage’** reviewed (reference sites)

*NRWQN a ‘model’ for river monitoring*

(\* ) Based on several major reports to MfE (website)

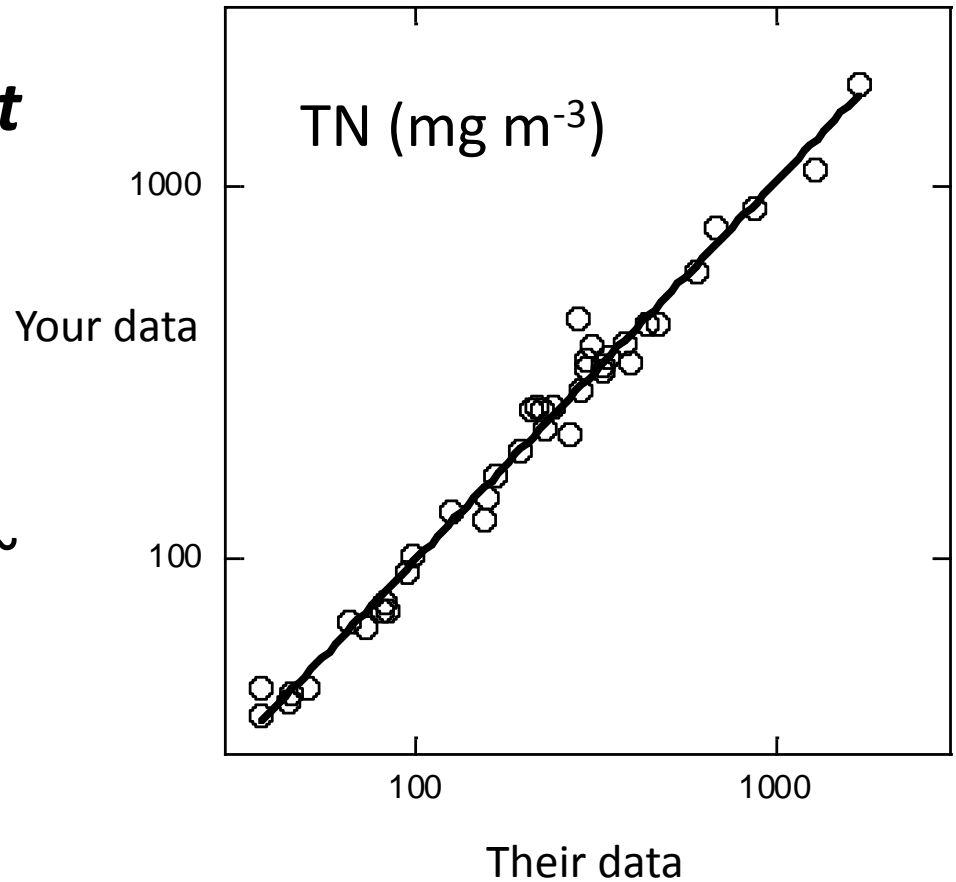


# Rob's water monitoring principle No2!

The best check on data quality is if an *independent* agency gets the same numbers as you!

*SO (for good QA)*

Have a small fraction (say ~ 5%) of measurements independently duplicated



# VMO monitoring achievements, yrs 1-3

- **Review article on NRWQN** (Davies-Colley et al. 2011\*)
- Chapter overviewing **River WQ in NZ** (Davies-Colley 2013\*)
- 2 articles on **technical aspects of WQ monitoring**
  - Pollution loads in Sherry River (Ballantine & Davies-Colley 2013\*)
  - Trends in NRWQN rivers (Ballantine et al. 2013 for *EMA*)
- **Statistical article** (McBride et al. 2013 in *EMA*)
- **Upgraded TimeTrend tool**

([www.niwa.co.nz/our-science/freshwater/tools/time-trends](http://www.niwa.co.nz/our-science/freshwater/tools/time-trends) )

- **Conference presentations**  
(e.g. on research needs in water monitoring, NZFSS 2012)

In progress -

**BBN** - community collab. pilot

*(\*) Publications available –  
at this forum or on e-request  
([r.davies-colley@niwa.co.nz](mailto:r.davies-colley@niwa.co.nz) )*





# *Some principles of good long-term water monitoring*

- Clear objectives
- Careful design
- Parsimony
- Address 'values'
- Report data summaries
- QA – ensure accuracy
- Consistent operation
- Integration (hydro/WQ/bio)



*Principles are as given in Davies-Colley et al. (2011) review of the NRWQN;*

*Similar to those of Lindenmeyer & Likens (2010) “Effective Ecological monitoring” CSIRO.*



# Water monitoring research needs in NZ

- **Turning data into information...**

*Statistical tools for reporting*

*(Future VMO work)*

- Handling “<DL”
- Efficient ID of drivers of change

- **QA in water monitoring\***

*(\*) major area of ‘unfinished business’ from NEMaR*

- A National QA programme (‘auditing’ visits)
- Pollutant loads; continuous WQ recording

- **Community monitoring**

- ‘Concordance’ of community and RC data
- Resources for RCs to foster community (esp. iwi) involvement
- SHMAK upgrades and extension

