Enhancing the Monitoring Network

PM_{10} Workshop

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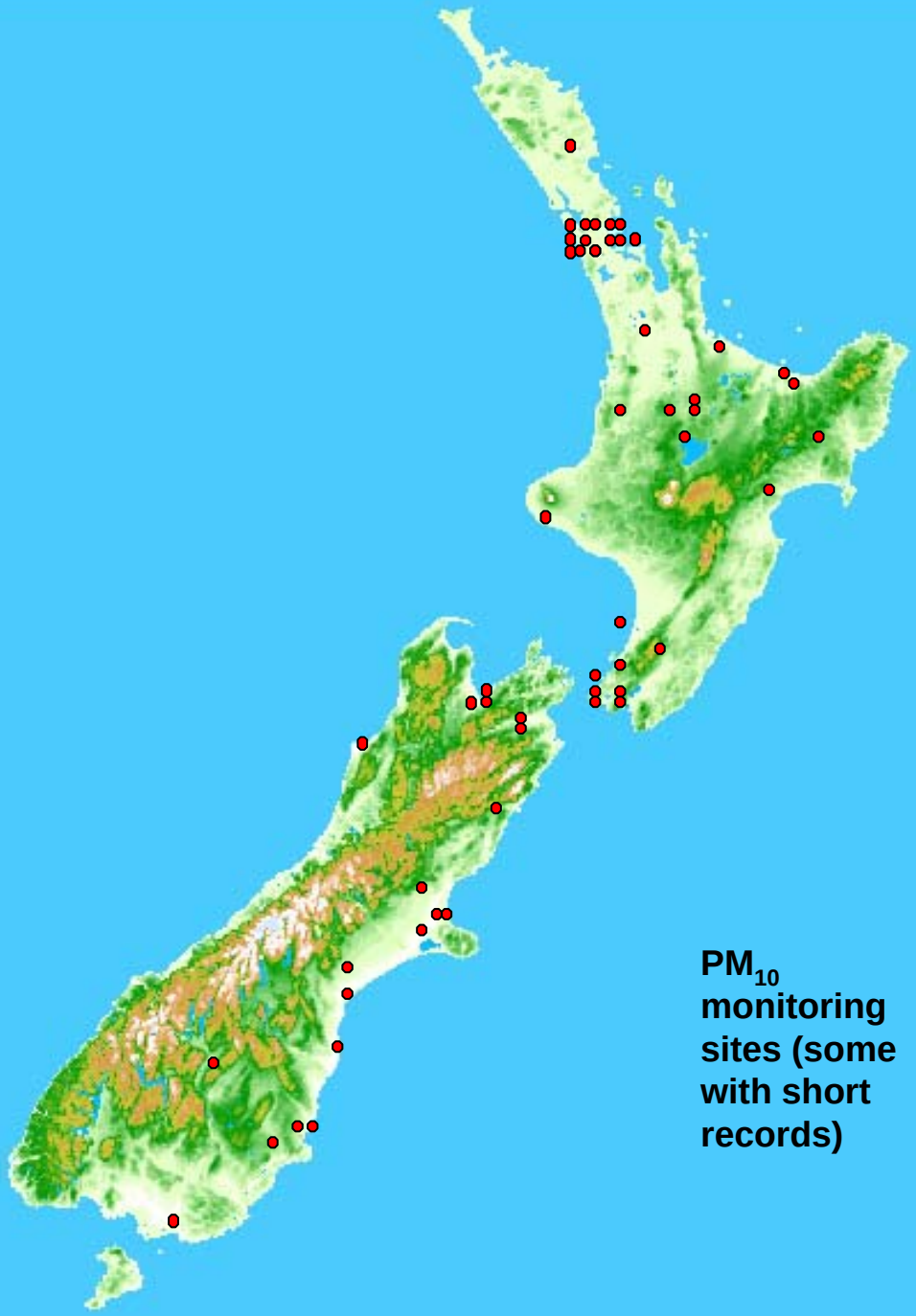
Gavin Fisher

endpoint

consulting partners



PM_{10} monitoring sites (some with short records)

Monitoring Sites (I think)

Is this right?

Where should monitors be in an airshed, and how many?

It can be useful to have sites that are (in priority order)

- **Close to a source (e.g. major intersection or solid fuel use area). These tend to show highest values.**
- **Not close to a traffic source, but representative of domestic or industrial sources.**
- **General urban – more representative of people's exposure.**
- **Background – useful to determine the portion of pollution that cannot be mitigated.**

Usually done by 'seat-of-the-pants, based on common sense and experience – not so bad so far – but room for improvement

Ways and means

1. **Just extend what was there before, trying to cover the are evenly**
2. **Target per population or area – common overseas (e.g. 1 monitor per 50,000 people used in Europe)**
3. **Undertake airshed modelling**
4. **Locate at perceived hot spots (even in response to public or political opinion).**

Supposed to do it according to a standard – e.g. AS2922 – but who knows what's in this? Often fairly subjective – and MANY NZ monitors do not comply. *(NB – NES says should comply, then requires something different!)*

Issues

1. Airshed concept:

“Airsheds” are not really airsheds – some are, but many have geophysical characteristics that mean they will not behave like airsheds

2. Airshed size:

Some are very large – one monitor won’t do – maybe even several is not enough to comply with NES

NES

“15 Regional council must monitor air quality if standard breached
If it is likely that the ambient air quality standard for a contaminant will be breached in an airshed, the regional council must:

(a) monitor the airshed in relation to that contaminant; and

(b) conduct the monitoring

(i) in that part of the airshed where

(A) there are one or more people; and

(B) the standard is breached by the greatest margin or the standard is breached the most frequently, whichever is the most likely; and

(ii) in accordance with the relevant method listed in Schedule 2.”

The intent of this is clear, but the method for deciding how it is achieved is complex.

Issues

3. Worst location:

Without very detailed modelling, this is extremely difficult to determine

4. Worst frequency:

Again hard to decide – and can be very sensitive to particular events and/or particular years

Besides – how do we decide which should be used – in general worst location and worst frequency will be different places.

Issues

5. Practicalities:

Cannot always put the monitor is the best place (access, security, noise, etc)

6. Purpose:

Is PM_{10} monitoring in NZ going to be SOLELY for the NES? Lets hope not – there are other purposes (and many existing monitors would need to be moved!)

Methods

1. Do not move or disestablish a site without very good reason.
2. Use data from consent monitoring sites.
3. For moving sites around – do at least one full year.
4. For finding new sites – do modelling, or mini-vol type exploratory sampling.
5. Use ‘sphere-of-influence’ type of concept – just how much of an area contributes to the concentration – can be just a few hundred meters, or tens of kilometres.
6. Do not compromise on quality, and review or use the results at least annually.

Weighted Risk-Element Decision Matrix

What's a WRE-DM?

Use three key elements to 'rate' a situation:-

1. **Population – more people around means more monitoring**
2. **Emissions density – more emissions in small are means more monitoring.**
3. **Weather – percentage of time its calm (ws < 2 m/s)**

Example

Area	Population (2001)	PM_{10} Emission Density (g $PM_{10}/km^2/day$)	Calms (% time wind speed <2 m/s)
Palmerston North	61,677	17.2	35.1
Wanganui	12,594	34.6	28.4
Taumarunui	3,984	5.5	52.2
Taihape	1,803	4.5	54.0

Example ctd

Area	Population (/33)	Density (/33)	Weather (/34)	Total Risk-Element Score (/100)
Palmerston North	33	16	22	71
Wanganui	7	33	18	58
Taumarunui	2	5	33	40
Taihape	1	4	34	39

Improvements

A good quantitative method, but possibly needs…

Different weightings

Factor to account for known exceedences
(e.g. not known in Palmerston North, but are known in Taihape and Taumaranui)

More refined weather input

Factor for valleys vs. open spaces

Factor for growth projections

Conclusions

Not going to see any fancy new quantitative design methods appearing overnight

Common sense and experience goes a long way

Do not mess around with (a) poor quality data, (b) shifting good long term sites, (c) short term monitoring

Use airshed modelling wherever it can be afforded

The NES is important – but its not everything

Use the data – it's the best way of making sure its valid!