DIFFERENTIATING STRONG AND STRUGGLING VOLUNTEER BRIGADES

Ethos Consulting

July 2017

FIRE EMERGENCY NEW ZEALAND
WHAKARATONGA IWI

The focus of this research was to identify the key factors that differentiate strong and struggling volunteer brigades. The research indicates that brigades have their own unique set of characteristics. The research was conducted in three stages:

- interviews and mapping exercises
- development and trialing of the Volunteer Brigade Profiling tool
- statistical analysis of staffing data

The Volunteer Brigade Profiling tool can be used to support brigade development especially as this research suggests that a blanket approach may not be suitable for supporting volunteer brigade development.

Fire and Emergency New Zealand Research Report Number 150

This research was commissioned by Fire and Emergency New Zealand and undertaken by independent researchers. Publication does not indicate Fire and Emergency New Zealand's endorsement of the findings or recommendations.

Differentiating Strong and Struggling Volunteer Brigades

Contestable Research Fund

New Zealand Fire Service

Research Report

Ethos Consulting Group

Abstract

The focus of this research was to identify the key factors that differentiate strong and struggling volunteer brigades, then to use these findings to develop a bespoke, brigade profiling tool for ongoing, developmental, internal use. The research was undertaken in three phases.

Phase one involved a series of interviews and mapping exercises with 16 internally-nominated NZFS staff, the criteria for internal selection being that nominated participants were considered to have both extensive knowledge as well as experience of volunteer brigades. 220 volunteer brigades were reviewed in this phase. Results showed that characteristics of all brigades could be mapped within 30 key factors, 14 of which typified strong brigades, whereas 16 differentiating factors were identified as typifying brigades which were seen to be struggling.

Phase two involved the development and trialling of the Volunteer Brigade Profiler tool (VBP) based on the findings in phase one. A total of 94 brigades were profiled with this tool by 15 internally-nominated NZFS staff. Results showed that no brigades profiled exactly the same, regardless of whether they were identified in either the strong or struggling groups. What was clear however was that each brigade had its own particular set of characteristics. This emphasised the need for brigades to be understood as *unique* units, and in going forward suggests a blanket policy may not be a suitable approach to either the management or development of volunteer brigades.

Phase three involved an extensive statistical analysis of internally-held data on current staffing, including the Dashboard. Results showed that data gathered from the Dashboard and the VBP trials had no strong correlation in that they appeared to be measuring different elements of a brigade. The internal data gathered currently by NZFS via the Dashboard system seems to measure performance outputs, whereas the VBP identifies the underlying factors that influence that performance. It is therefore suggested that well-rounded insight into brigades could be gained from using both in conjunction with each other.

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Introduction and acknowledgements

The New Zealand Fire Service (NZFS) has more than eight thousand volunteers serving in nearly 400 brigades nationwide. Their highly valued contribution to New Zealand is vital, covering emergency response services across a wide range of situations. Volunteer brigades are often comprised of long standing members, in several cases inter-generational. For many volunteers, being a fire fighter is a strong part of their personal identity, it's 'in their blood' and their service to their community is rightfully felt as a source of pride. While brigades are comprised of different people from all walks of life in a wide range of different geographic locations, they are bound by the overall unifying purpose of providing effective emergency response. The unpredictability and urgency of varying emergency call-outs require a brigade to be a highly effective unit, dealing with complex, dangerous and sometimes life-threatening situations. Few other volunteer groups face such challenges.

Unity of purpose doesn't necessarily equate to unity of performance, however, and volunteer brigades, like any other groups, vary in terms of capability, functioning and performance. The focus of this research is to identify reasons behind this variance. What are the contributing factors that differentiate strong and high-performing volunteer brigades from those that are seen as struggling? This is a complex question but an important one, given the essential role brigades play within our communities. The following report is the result of an 18-month study that investigates this question in depth from different perspectives.

This report is presented in three sections reflecting each phase of the research. The first section presents a multi-method research process of understanding how brigade experts map brigades and differentiate between high functioning and struggling brigades, eliciting their observations through structured interviews.

Section Two presents an overview into the development and application of a NZFS volunteer brigade-specific profiling measure, the Volunteer Brigade Profiler (VBP). The VBP is the psychometric culmination of the material from section one.

Section Three looks at data collected from the NZFS Dashboard and other available sources. The Dashboard monitors a range of brigade composition and performance indicators. The analysis presented here looks at statistical associations among Dashboard indicators and brigade activities, and possible relationships to overall performance. This analysis was carried out with considerable academic, statistical rigor. We have, however, endeavoured to present this complex analysis in as easy a form to understand as possible.

We believe the real value of this research is its ongoing developmental application through the implementation and use of the VBP measure. Often research becomes a report that sits on a book shelf gathering dust with minimal effect. Our goal from the outset was to develop the findings of this project into a psychometric instrument that will allow ongoing monitoring of brigades and enable the NZFS to clearly identify the underlying factors that are contributing to the success or struggles any individual volunteer brigade is experiencing at any given time, and to use the same tool to also be able to monitor changes over time.

Research of this design is strongly dependent on the quality of insight provided by key informants. In this respect we are indebted to all the staff of the NZFS who were internally nominated to contribute to this project. It was a pleasure working with every one of you and we thank you for your time and commitment.

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Volunteer fire brigades in context – challenges now and into the future

Volunteer fire brigades have a long history in New Zealand communities, with the first volunteer brigade established in Auckland in 1854. Identification with the NZFS is part of this country's culture and in the conscious psyche of many New Zealanders. Most NZ children will have experienced school or pre-school visits to their local station or had fire fighters visit their classroom to talk about fire safety. Many NZ secondary schools have NZFS staff visit as part of career days. The NZFS has a presence. In a way this isn't surprising due to the numbers of people associated, particularly as volunteers. Volunteers make up 80% of the NZFS workforce. There are 8,100 volunteers and 350 volunteer stations throughout New Zealand, including some of our most northern communities such as Kaitaia, as far south as Stewart Island, as far east as the Chatham Islands and as far west as Karamea and Westport.

A strong volunteer base is therefore absolutely fundamental to New Zealand's ability to effectively respond to emergencies in local communities throughout the entire country. Supporting volunteers in the fire services is a strategic priority and understandably one of the major focus areas for the NZFS.

Challenges

As with almost any volunteer organisation, attracting and retaining suitable members can be difficult. However, the volunteer landscape in fire services is undoubtedly of greater complexity than most. Compared to other voluntary organisations, the NZFS places greater demands on its volunteers by:

- The unpredictability of call outs – when, duration and type
- The need for and commitment to ongoing training and skills maintenance
- Volunteers often being in unpredictable and dangerous situations
- Many voluntary brigades being in remote communities with small population bases from which to source members

In many parts of the country, volunteer brigades are thriving and doing a great job of serving their local communities. However, other brigades are facing significant struggles or challenges (for example insufficient staffing numbers and inability to provide daytime cover). When brigades fall under 70% of staffing establishment numbers, it is considered that this impacts upon adequacy of response. (This figure of 70% is based on the NZFS' experience rather than robust evidential analysis). As at 31 June 2015, 31 brigades were operating with less than 70% of brigade establishment. This number varies as volunteers come and go, and over the last five years the number of brigades at less than 70% of establishment has ranged from 26 to 34.

Some of the challenges facing volunteer brigades include:

- A declining volunteer base, due to factors such as required time-commitment, changing community demographics and urbanisation, or an ageing population
- Difficulties responding to daytime call-outs, due to factors such as more people commuting to work outside the community in which they live, or employers not being keen to release volunteers to attend incidents during work hours
- Difficulty in retention of current members and/or recruitment of new members

Increasingly varying factors are also reducing the potential supply of volunteers, making it more difficult to sustain the existing voluntary model. Some of these include:

- Changing work life patterns e.g. more couples are both working, resulting in care responsibilities being shared. Care responsibilities include children, elderly and ill/disabled
- Changing lifestyle expectations e.g. people placing greater value on available free time and having wider choices in how to spend that time
- Demographic migration (e.g. from rural to urban areas) and community fragmentation
- Changes in industry and business e.g. businesses leaving smaller communities. (However with technology, there is increase in mobile working and people working from home. This is predicted to increase, so may impact positively as time goes on)

- Technological advancements in industry, manufacturing, agriculture and horticulture e.g. robotics replacing manual labour
- Increased time requirements of volunteering in Fire Services, which is impacting on the pool of volunteers and people's ability to commit to being a member of a voluntary brigade (e.g. the broadening range of calls – means more callouts and increased training requirements, increased standards and expectations resulting in more compliance/administration requirements.)

Over the years, various interventions have been put in place to better support volunteers, but many of the issues with recruiting, retaining and supporting volunteers remain. The NZFS has data and information on factors (e.g. community demographic change, brigade leadership) that impact brigade performance and strength. However, there are cases where some brigades are thriving despite the presence of factors NZFS consider should be negatively impacting on their performance and strength and vice versa. The challenges facing volunteer brigades and their 'strength' are complex. Some are within the NZFS's control (e.g. developing systems and processes to reduce administration, providing IT support and equipment, recruitment support, providing training etc., support for employers of the NZFS volunteers) but some are outside the NZFS's control (e.g. community demographic change, socio-economic factors, presence of local industry/employment).

Complex issues or problems are not always able to be quickly or easily resolved. They need to be understood in-depth from a non-biased, objective viewpoint. Sometimes, in complex situations, too much data can lead to cluttered confusion. A good starting point is to understand what NZFS can and can't control. As indicated above, the range of influences and pressure points appear numerous. This research was undertaken to identify and hone in on the areas on which the NZFS should focus.

Focus and goals of this research

This research project is simply titled "Differentiating Strong and Struggling Brigades" but the complex process of understanding what actually differentiates brigades requires rigour. It is doubtful that any two brigades are exactly the same in terms of their dynamics, membership or experience level. There will be variance in the types of callouts they attend, e.g. medical, forestry, and highway/motor vehicle. The communities they serve can also vary greatly in terms of size, location, prosperity, demographic, people resources, education levels and population fluctuations, to mention just a few. There are numerous potential influences that could determine how successfully or otherwise a brigade operates. It is important to note that as researchers, we took a 'zero assumption' approach to the distinguishing qualities of high-performing and struggling brigades. We did not set out to test or follow any pre-existing hypotheses or suggested ideas, nor did we endeavour to confirm or replicate any results from existing research. We have instead applied an independent, comprehensive and in-depth methodology to guide the process throughout.

The reasons behind why some brigades are considered strong and high-performing while others are deemed to be struggling are likely to be as varied in nature as the brigades themselves and it is therefore important not to make assumptions or draw overly-simplistic conclusions. For example, Brigade A may be fully staffed and performing well, whereas Brigade C struggling for membership numbers may not be performing well. It would therefore be easy to assume that a full complement of staff is a key indicating factor of performance success. However, on further investigation we could also find this assumption is not always necessarily applicable, and that not all brigades with a full staffing complement are strong/highly functioning. Likewise, we may equally find that not all brigades with low memberships are actually under-performing and, even though they may be struggling in terms of numbers, they are performing their duties well. It could also be assumed that a brigade that has a high community presence is a key predictor to brigade strength but then find that this does not necessarily mean they are attracting membership. There are a wide range of possibilities and variables that affect brigades and even more importantly, those influences may not be static. We cannot ever say the current state of a brigade is its

permanent state; hence our goal of creating a tool that can be used in an ongoing, developmental application.

Our role in this research is to identify the key, core influences that have the greatest impact on brigades. We take a wide investigative approach to endeavour to create a map/menu of the range of key themes that affect a broad section of brigades across New Zealand. Due to brigade diversity, the potential themes will be wide-ranging and not applicable to all individual brigades, but the goal is to create an overall map that is broad enough to incorporate the relevant characteristics of any volunteer brigade. Once created, it forms the basis of our second key goal, the creation of a measure/metric that is completely centric to the NZFS Volunteer Brigades. This is where the research becomes applied and usable beyond this project/report. Any volunteer brigade will be able to be profiled to identify the key elements that influence its functioning, and then re-profiled over time to observe any changes. We see this as a key output of this project. In summary, this research will incorporate the following three phases:

Phase One

- The use of multi-dimensional methodology (Andmapping) to identify key themes that differentiate strong and struggling brigades

Phase Two

- Create a profiling tool that encapsulates those key themes
- Trial the profiling tool with brigades and analysis outputs

Phase Three

- Undertake statistical analysis on Dashboard data and investigate relationship, if any with mapping and profiling process

Phase 1: Differentiating Strong and Struggling Brigades

Methodology

One of the objectives of this project was to obtain insights into *how* high-performing brigades and struggling brigades *differed* from one another*.* The aim was to investigate and identify the key dimensions that separate brigade performance. An additional focus was to also investigate the variance within brigade groups, for example, are all strong brigades strong for the same reasons? Likewise, do struggling brigades all have core similarities or does each strong or struggling brigade have unique contributing characteristics that are unrelated to other brigades?

From an organisational development perspective, such insights could help direct where to best allocate resources, particularly when working with struggling brigades. If for example struggling brigades are struggling for similar reasons, a general blanket approach of developmental assistance would be advantageous. If, however, struggling brigades significantly differ from each other, a more individually targeted approach focusing on the unique aspects of that brigade would potentially be more beneficial.

Phase one of the project began with a series of interviews and exercises with NZFS leadership staff considered by NZFS to have both extensive experience of and insights into volunteer brigades. These participants were nominated by NZFS as being people whose perspectives were considered to be of high value. In total, 16 participants were involved with this phase. Three were staff from the NZFS National Headquarters while the remaining 13 were nominated from a spread of regions.

The National Headquarters participants were interviewed by the Research team and provided their general perspectives of volunteer brigades, focusing on what they believed characterised higher performing and struggling brigades. The 13 participants from other regions undertook a more in-depth methodology which will be briefly outlined below. The responses from both participant groups were included in the data analysis.

A number of research and statistical methods were used in this project including multidimensional scaling, factor analysis and narrative analysis. The combination of multidimensional scaling and subsequent interviewing of participants we term as 'AndMapping'. These are all complex methodologies and an extensive technical description of each goes beyond the purpose of this section; however, these methodologies are commonly used in social science research and were deemed to be best suited to this project.

Rationale

There are a number of reasons for the use of this particular research methodology, of key importance being *the most suitable fit for purpose*, i.e. to address the complexity of the task of identifying what *differentiates* between strong and struggling brigades. The method of differentiation is a very effective way of getting to the core of understanding the variation between constructs, in this case brigades. As outlined below, this process requires the participant to differentiate between brigades, not merely describe them in isolation. This is a complex and cognitively more demanding task, requiring deep consideration. It provides the best opportunity to produce a more measured, focused, in-depth, quality of response, not obtainable by simply asking a participant to describe or rate a brigade's performance in isolation. As the participants in this process were nominated based on extensive experiences and expertise in volunteer brigades, it was important to this research that we fully tap into their specialist knowledge of what differentiates brigades. The key differentiating components as identified by these participants created the lists of critical items used to develop the Volunteer Brigade Profiler (VBP) in phase two of this research. By using direct quotes in the natural, organisational language from participants, the content validity of the VBP was ensured. The items included in the profile questionnaire would be understood by informed internal users, as well as relevant to what the instrument was actually aiming to measure. As the VBP was a three- way forced- choice questionnaire, it was imperative the items were valid. This is discussed further in phase two of this report.

Multidimensional scaling is, in short, the initial visual representation or map of those

differentiations (see figure 2, page 10), often referred to as 'information-visualisation'. This mapping display is easier to understand than a series of statistical charts, although statistical procedures strongly underlie the creation of the resulting visual map.

Process

Data and information was collected from the regional participants in the following two steps.

Step one

Participants were asked to provide a list of brigades within their region they knew and understood thoroughly. The number of brigades provided by each participant ranged between twelve and twenty-six. The brigades were loaded into an on-line sorting exercise for that participant to undertake.

The participant was presented with the following instructions:

Thank you for providing your list of brigades. A number of unique triads (groups of three) of brigade names have been selected from this list and are presented on the linked site. Each name will occur several times, but each time in a different grouping. (Each name has also been assigned a number in front of it for our computer programme, but just ignore the numbers as you focus on your selections.)

For every triad, choose the one brigade you consider *most different* from the remaining two according to some criterion. Think about these three brigades in terms of your knowledge surrounding their general work culture, competencies, community engagement, morale, situation, leadership etc. For each of your decisions, you may change the criteria applied for making your choice. (For this sorting exercise, we do not need to be informed of the bases for making these choices).

Figure 1 below shows a screen shot example of a triad.

*Figure 1*. *The on-line sorting process*
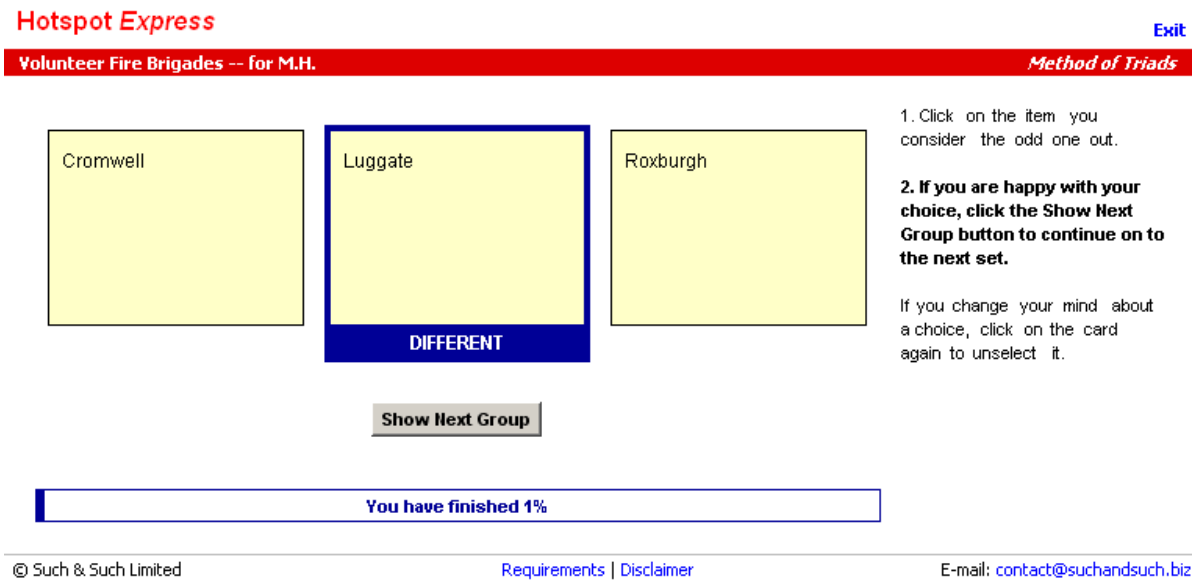
The online exercise sorting took around 15-25 minutes to complete.

The sorting responses of each participant were analysed with customized software for "multidimensional scaling", creating a multi-dimensional "map" of the nominated brigades, in which the similarities among them are reflected as *spatial* relationships. Figure 2 overleaf is an example.

Figure 2. *The spatial map from analysing on-line sorting judgements*
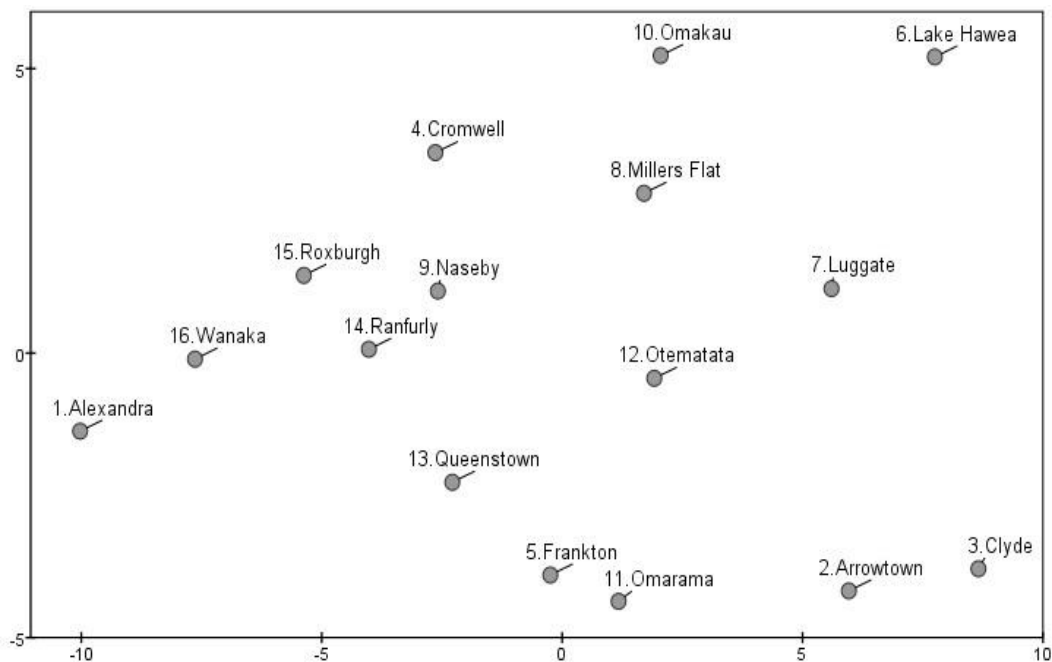
This map shows the degree of similarity and dissimilarity between individual brigades in terms of how the brigade expert has differentiated between them. The brigades mapped closer together indicate that the expert viewed them as similar, whereas brigades mapped further apart were seen as more dissimilar by the responding expert. For example, from this expert's response map, it appears there is much in common between brigades Alexandra and Wanaka, and that these brigades both differed from the Lake Hawea brigade. Indeed, the brigades seem to be ranked along some quality or gradient, with Alexandra and Wanaka at one extreme, maximally different from Clyde and Lake Hawea at the quality's other extreme. As another example, Frankton and Omarama brigades have also been mapped as similar but something distinguishes them both from Omakau.

Step two

Based on the analysis of the participants' maps, new triad sets were chosen but now in a pre-determined sequence; each 'targeted' triad combines two similar brigades (according to the map) with one brigade that was mapped as dissimilar from those two. Probing into these triads would form the basis of the subsequent interview with the participant, with the meaning of the map being explored in depth. See example below.

Set one

     1. Alexandra

     6. Lake Hawea

     16. Wanaka

Set two

     2. Arrowtown

     3. Clyde

     4. Cromwell

This sequence was repeated until all brigades within a participant's map were included in various combinations.

Each participant was interviewed either face-to-face or by video conference. For each triad in turn, the task for the brigade expert was to consider and explain what it was that differentiated one brigade from the other two brigades – which was the odd-one-out, and why? Did the other two brigades have features in common? It was expected, and was generally the case, that the "odd one out" selected by the expert in each triad set during the interview was also the brigade that was spatially furthest away from the other two following the interviewee's initial sorting in step one. Recall that the triadic context for each brigade was 'targeted' to focus attention on especially stark oppositions among them. All responses and descriptions given by the brigade expert were recorded by two interviewers.

Having described what differentiated the *individually* selected brigades, a second stage of the interview asked the brigade expert to look at *groups* of brigades in terms of *similarities* as well as *differences.* For all of the brigades under review, participants were asked to sort them into three ranked sub-groups as follows: the 'A group' – consisting of the brigades they perceived to be highest functioning; a 'B group'; and a 'C group' – consisting of the brigades they perceived to be struggling in some way. Usually these three ranks could be recognised as spatially distinct regions of the 'map'.

They were then asked to identify and describe the common themes within each group, for

example, what is common among all the brigades within your C group? What ties them together? What are the things that differ between the brigades within the C group, what is the variance? The same questions were asked of the A and B brigade groups. The final task was to describe what significant differences the participant could identify between their 'A group' and their 'C group'.

As mentioned earlier, the task for the participants was cognitively very demanding. The emphasis was on differentiating between brigades – not merely by describing brigades in isolation, but in identifying in what way(s) they were different. The map created from their initial sorting exercise (figure 3, page 23) provides an indication of the degree of difference but the subsequent interview described above provided the context(s) for those differences. While differentiating between brigades can be a complex task for a participant, it is also rich in terms of information quality. The task of differentiating requires a lot of thought and consideration. It was therefore of utmost importance that participants had extensive knowledge of the brigades within their region and it was this criterion that guided NZFS's participant selection for this phase of the research.

Across the data collection process, 220 brigades in total were discussed and differentiated by participants. Close textual scrutiny of the phrases they used yielded approximately 500 descriptions (items) deemed suitable for the next phase of data analysis. From a research perspective this was a high number of items, but it also reflected the wealth and depth of knowledge participants had on their brigades. In effect, participants provided us with a rich vocabulary of "statements that can be made about volunteer brigades". The goal of the subsequent analysis was to bring this vocabulary down to manageable proportions.

While participants were usually reviewing different brigades, from their own perspective, a number of descriptions were replicated among them as they differentiated between struggling and high performance. In a number of steps, we identified recurring themes within the phrases and sentences, and looked for relationships among those themes.

It was found that statements characterising high-performing brigades could be clustered into fourteen themes, and struggling brigades into sixteen. It is important to note that not

all high performing brigades displayed all fourteen elements, and not all struggling brigades could be characterised by all sixteen negative elements. However, these clusters cover the full range of descriptors provided at the interviews about the volunteer brigades and what differentiates between them. They can be likened to a menu that covers all possible elements. These themes are presented below. The theme headings reflect the most common descriptor used by participants within a particular cluster. For the sake of authenticity, no paraphrasing has taken place. These are direct quotes that were repeatedly used by multiple participants when describing a particular brigade, or a term commonly used to differentiate between brigades. This applies to all cluster headings. The heading is the dominant theme. Examples of direct quotes representing the theme are also presented followed by a short summary of key themes.

Results

Factors from Mapping Analysis: Strong Brigades

Professional operational standards

This factor referred to the brigade's commitment to function at the highest level of operating standard. They were diligent and took an active responsibility to ensure the effective and efficient day-to-day running of their brigade. They were up-to-date and accurate in their administrational processes and seamless in the general running of their station. Everything was in order. Low error rates were a hall-mark theme of high performing brigades.

The following were typical statements used by the participants when describing such brigades.

"Professional – functions like a paid organisation"

"High level operational ability"

"Good systems and processes"

Self-managing / Low- maintenance

Self-managing brigades operate effectively with little need for input from the wider NZFS and are solid and reliable operators. They do not reject input by NZFS, but are largely independent and run effectively. The brigade is typified as low fuss, and having low emotional reactivity. They are described as being stable with a mature leadership group.

The following were typical statements used by the participants when describing such brigades.

"Very rarely have to step in"

"Don't cause Fire Service any issues"

"Self- managing brigade"

Motivated, engaged brigade

High positive energy and motivation is the key theme of this cluster of descriptions. These brigades have an interpersonal connectedness about them with a clarity of united purpose and sense of team. Brigade members appear to be equally engaged with maintenance tasks within the station as well as with callouts. They express pride in their brigade.

Typical statements used by the participants when describing such brigades:

"Has a high level of engagement across the brigade"
"Impeccable maintenance"
"All members happy to be there and know each other well"

Recruitment success

This theme is based on the positive reputation these brigades have within the community. They are seen as a good group to be part of and the work undertaken viewed as important and meaningful. This is particularly advantageous in brigades where the quality of recruit is high – i.e. where there are skilled people wanting to join. In addition, the positive reputation of the chiefs within these brigades has a high impact on their positive reputation.

Typical statements used by the participants when describing such brigades:

"Brigade attracts members easily"
"Has a waiting list"
"People keen to join because they hear good things"

Rural / remote

Remote/ isolated brigades tend to be made up of people with similar backgrounds and often have their own sense of collective identity and common unity. Supporting one's neighbour is a key theme. High-performing rural brigades are also effective due to their volunteers' relevant skill sets, which they employ in their own practical day to day work.

Typical statements used by the participants when describing such brigades:

"Geographically isolated but robust and self-sufficient"

"Small, remote rural community but high performers"

"All members are farmers"

Community Involvement

This theme related to the integration of the station within the community, as well as the status in which the brigade is held. High-performing brigades were defined as being visible and broadly involved within their community. They were highly valued for their contribution to that community.

Typical statements used by the participants when describing such brigades:

"Strong employer support – gives time off for training and call outs"

"High profile station within community"

"Good community buy-in, well integrated into the community"

Chief's occupational status

This refers to the higher-level managerial and leadership skills chiefs use in their day jobs and how these skills are then successfully applied within their brigade. Their success as leaders (including those who are self-employed and run their own business) is very relevant and applicable to their role as brigade chiefs.

Typical statements used by the participants when describing such brigades:

"Chief works in high-management position in day job"

"Chief also a community leader"

"Chief is a successful self-employed business owner"

Leadership attributes/characteristics

This theme collected the highest number of descriptive items of all areas discussed by participants. It refers to the general leadership ability in influencing the successful performance of the brigade. High-performing leaders take responsibility for their role. They

are realistic, balanced and set high standards with clear vision.

Typical statements used by the participants when describing such brigades:

"Very proactive leadership"

"Capable, competent and effective"

"Chief has good understanding of what is and isn't possible"

Chief / Deputy dynamic

This refers to the dynamic between the two leaders of the brigade and its wider effect on the brigade's performance. It is important to note that this isn't necessarily one of friendship, but one that operates with a professional efficiency. Whether there is an interpersonal closeness or not, it doesn't affect or be allowed to affect the wider brigade's functioning.

Typical statements used by the participants when describing such brigades:

"Chief and Deputy get on very well"

"Deputy respects Chief and keeps him up to date"

"Some issues at times between Chief and Deputy"

Good succession planning

This theme refers to the emphasis of actively developing future potential within the brigade – the systematic process of ensuring all future contingencies are covered. This was a prominent theme within the characteristics of high-performing brigades.

Typical statements used by the participants when describing such brigades

"Brigade's succession is seamless"

"Great progression structure"

"Chief could leave tomorrow and brigade would be alright"

Strong leadership group

This refers to the strong alignment within the brigade leadership group. They are typified by mutual respect, consistency of approach and goals and a good working knowledge of each other.

Typical statements used by the participants when describing such brigades:

"Established management team"
"Strategic leadership team"
"Good support team under chief"

Recent brigade improvement

This refers to brigades which have previously been under-performing and problematic but through effective intervention, particularly around the brigades' leadership, performance has been noticeably turned around.

Typical statements used by the participants when describing such brigades:

"New leadership has greatly improved brigade performance"
"Leadership has turned brigade around"
"Used to be under-performing brigade but new leadership has lifted performance"

High callout rates

Brigades with high callouts have the opportunity to maintain and develop their skills through repetition. Busy brigades tend to be high- performing due to their regular exposure to emergency situations.

Typical statements used by the participants when describing such brigades:

"Busy station"
"Regular workload"

Positive engagement to NZFS

This refers to the positive interaction a brigade has with the NZFS. Through this there tends to be a clear understanding of requirements of the brigade and a commitment to high standards. Both parties feel they can comfortably approach the other.

Typical statements used by the participants when describing such brigades:

"Well informed group who understand requirements of modern NZFS"
"Leadership encompasses where NZFS is going"
"Healthy interaction between paid and volunteer fire fighters"

General Comments on High-Performing Brigade Characteristics

Many of the themes of high- performing brigades are self-explanatory and would be common across a number of organisations in different sectors. From a mapping perspective, many of the themes are closely related, for example, "Professional operating standards" and "Good succession planning" were closely related but still independent themes. Other themes mapped as less related to each other but still characteristic of high- performing brigades, for example, "Chief/Deputy dynamic" and "Rural/remote".

Leadership was the single most-reported theme when participants described and contrasted brigades across the data collection phase. However, leadership could be broken into a number of different sub-themes. For example, the occupational status of a brigade chief was a significant differentiating feature between high and low performing brigades. High performing brigades appeared to often have chiefs that in their day jobs were employed in leadership / managerial positions or were successfully self-employed and employers of staff. This theme was less common with struggling brigades. High-performing brigade chiefs were often community leaders in terms of having a high community involvement. Many participants commented that the level of visual presence and the level of respect the chief had within the community had a bearing as to whether or not people wanted to join that particular brigade. Reputation matters. Having a highly skilled chief had a positive effect not only in terms of how a brigade performed but also on how attractive it was to be a part of in

terms of recruitment.

From a competency perspective, chiefs of high performing brigades were often described as having a style that strongly resembled highly effective project managers. They appeared to be good multi-taskers, understood how to use limited time effectively and manage resources. They knew how to deliver within the resources they had, which naturally related with high professional standards within the brigade. The cluster of effective leadership and professional operating standards not only related strongly to each other but was a major differentiating factor from struggling brigades.

A corollary of this was a recurring theme in which changing the leadership had an impact by lifting brigade performance. In some cases, brigades that in the past were considered to be struggling (C team brigades) were now approaching high performance (A team). This transformation was typified by having new leadership in place. Replacing a poor-performing chief with a high-performing one appeared to have a significant positive effect on the performance of some brigades. Positive change was possible with good selection. Struggling brigades were not always destined to struggle.

While excellent leadership from a chief was prominent, it was not always a prerequisite of a high-performing brigade. Some highly functional brigades displayed noticeable tensions between chief and deputy, though this didn't appear to spill over beyond that relationship to wider parts of the brigade. There were also cases where the chief was considered by some participants as being poor in the role, but the wider leadership team were highly experienced and effective. Within these brigades, high-performance was based on the wider collective ability of the leadership group rather than ability of the chief. They were an effective unit despite the chief.

The "rural/remote" theme is also of interest as two sides of this coin feature in high-performing and struggling brigades. From a high-performing perspective, being a more geographically remote brigade, with a smaller pool of potential recruits became a source of morale and community solidarity rather than leading to struggle. There were a number of

remote brigades that were considered high-performing due to the members within that brigade. This appeared to be most noticeable with brigades made up predominantly of farmers. They were described as being highly skilled in terms of their practical abilities, where much of the machinery used during call outs was familiar enough to them in their day to day work. There was also a strong theme of neighbour looking out for neighbour and being able to attend call outs when required to.

The "positive engagement with NZFS" theme had a wide-ranging span. It not only referred to engagement with the organisation but also with other brigades within their region. There was cooperation, a want to support their neighbouring brigades. During callouts of other brigades, high-performing brigades would ask "how can we help you"? This was opposed to an 'us vs them' dynamic – a brigade version of a turf war.

Professional operating standards and good succession planning also related not only to professional performance during callouts but also to the physical presentation of both the brigade members and the station itself. Participants often commented that you could tell how good a brigade was by just walking into the station. High-performing brigades had immaculate stations where everything was clean and in order. There was a pride in the station itself. High-performing brigades also had high turn-outs for meetings and training, right down to a sense of pride and belonging displayed by brigade members electing to wear NZFS- issued clothing to meetings.

Not all high-performing brigades were perfect across the board and some were described by participants as being sometimes demanding and difficult to deal with, but they still did their job well. In essence, high-performing brigades were nimble enough to cover their gaps and those gaps didn't become weaknesses.

Further mapping analysis showed these 14 factors discussed could be clustered into three key themes:

1. **Leadership**
   - Leadership attributes

- Chief's occupational status

- Self-managing – low maintenance

- Strong leadership group

- Positive Chief / Deputy dynamic

- Positive engagement to NZFS

2. **Brigade Culture**

- Motivated – engaged

- Recent improvement

- Recruitment success*

- Professional operating standards

- Succession planning

3. **Community Involvement**

- High community involvement

- Recruitment success*

- Rural – remote

- High callout rates

* Recruitment success related strongly to both brigade culture and community involvement

Figure 3. *Summary of the key factors of strong brigades*
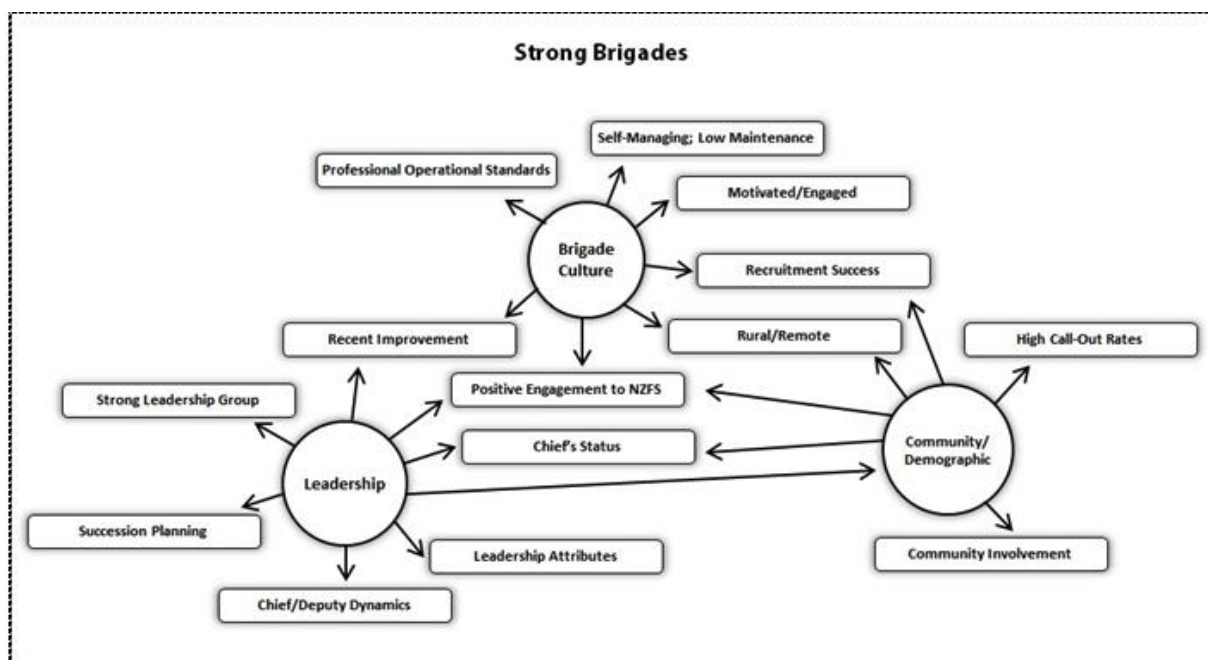
Factors from Mapping Analysis: Struggling Brigades

Unstructured practices

This is a broad- ranging theme characterised by unstructured practices and a generally unprofessional approach. These brigades tended to work their own way with a "she'll be right" attitude. Their protocols at callout were loose and they tended to charge on in rather than properly evaluate situations. Whilst there appeared to be some level of camaraderie within such brigades, it was seen as more social rather than that of a serious emergency provider. Brigades within this profile tended to have a reasonably long history of this culture.

What makes such brigades a risk is not only in their poor practice, seriously putting themselves and others in danger at emergency callouts, but also they can be seen as a 'closed shop' and an unattractive group to join. Membership will be desirable only to those who fit these brigades' cultural profile, thus a lack of membership-diversity limits the brigades' adaptive potential.

Common descriptions of these brigades were;

"Independent to level of lone cowboys"

"Culture of its own – cavalier – don't follow policy"

"Chief disregards NZFS requirements"

"Boys' club"

"Drinking culture"

Change resistant brigade

Brigades that fell within this theme were typified by a resistance to new ideas and ways of doing things, blocking any consideration to ways that may potentially improve performance. The attitude of such brigades (of the chief particularly) was one of "if it's not broken why fix it?" or "this is the way we have always done it so there is no need to change".

In reality most things can be improved and few things stay static. Technological advances

and organisational development assist performance. Being closed-off to change or advancement limits the scope of a brigade's ability to adapt, grow and improve. In addition it limits the development of the brigade members. It is at the opposite end of proactive open-mindedness.

Common descriptions of these brigades were;

"Set in their ways, resistant to change"
"Very old style leadership"
"Very regimented"

Low callout rates

This is a self-explanatory theme which highlights that some brigades are simply not very busy. A lack of regular callouts reduces the opportunity to hone skills. It also doesn't provide enough real-life situations to learn to operate as an effective team under such circumstances. While practice is important, having nothing to practice for can potentially reduce motivation for practice. Lack of regular, cohesive practice coupled with lack of actual experience makes it difficult to equip volunteers with the necessary skills to deal with unfamiliar emergency situations.

Common descriptions of these brigades were;

"Low callout rates"
"Operate in narrow callout requirements – i.e. scrub fires"
"Lack of practice due to few fires"
"Only train once a month"

Remote community

Geographical isolation inhibited some brigades' connectedness to NZFS and also limited their capacity to build a strong and skilled brigade based on the demographic make-up of the community. Often members were located far from each other and had limited access to technology. Building an available and coherent brigade is important to responding to

emergency callouts. Due to the geographic nature of some brigades, this is very difficult to execute effectively.

Common descriptions of these brigades were;

"Very isolated"
"Community geography spread"
"Remote location"

Limited recruitment pool

Some brigades simply don't have a critical mass of people within their community who are deemed suitable by NZFS to be members, or for some, the community itself is diminishing in terms of residential population.

There is also a reality that not all communities are the same or have the same pool of potential members to call upon. Although the NZFS has what appear to be very sound criteria around those who can qualify to join as volunteers, some of the research participants talked of the criteria needing to be lowered in some circumstances, to increase the number of potential members able to join their local brigade. They felt that the 'One size fits all' recruitment policy simply cannot be applied to all communities. Such communities had brigades struggling to get a full complement of members, but actually did have sufficient numbers of people within the community who were keen and available to train to become members. They didn't however fit the required criteria to join, for various reasons.

In dropping a recruitment standard, an organisation runs a major risk of lowered performance, which in turn has potentially critical implications around the delivery of emergency services. Analysis of the Dashboard data shows that having a full complement within a brigade relates to high performance. Lowering the complement can (but does not always) relate to a brigade struggling. This presents a challenging dilemma.

For example, from a community perspective it is better to have unemployed and lower

educated people doing something positive and contributing to their community, rather than doing nothing or being excluded. For these people it could also be an opportunity to build their skills and have a focus that could potentially make them more employable in their future. Training as a volunteer fire fighter is a hugely positive step. However, it is questionable whether it is the role of the NZFS to be an educational provider to those who don't fit the criteria for membership. There is no guarantee that these people could be capable of working successfully within a brigade, even with all the training and positive good will.

If exceptions were to be made to allow people to train and potentially join a brigade due to severe brigade shortage within a community, it would be critical that the brigade leadership is of a very high standard. Lesser- skilled people have potential to grow with very good leadership around them. A poor leadership standard in charge of lower- skilled people seldom ends well.

Common descriptions of these brigades/communities were:

"Derelict town/town dying"
"Community lacks good range of practical skills"
"Poor recruitment pool to call from – unskilled, uneducated, criminal records"

Members working out of town
Some members are unavailable during normal work hours due to their place of employment being away from their residential community, leaving few people behind able to attend callouts during the day.

A common description of these brigades/communities was:

"Members work elsewhere making day time crewing difficult"

Community disconnect
Some brigades were largely invisible within their community or lacked credibility mainly due

to the chief and leadership group. Community connectedness is critical in attracting potential members. If the brigade is largely unknown or not respected within the community, they are not going attract willing volunteers to join. Similarly, if a brigade is seen as a closed shop, it will tend to have an aging membership with no new members to revitalise it. This has a direct implication for contingency planning. As earlier mentioned, contingency planning is directly related to high-performing brigades.

Common descriptions of these brigades/communities were:

"Total disconnect with their community"
"Chief doesn't have community support"
"Leadership doesn't connect with the wider community"

Insufficient skills

This theme refers to the basic inability to lead a brigade. It does not necessarily relate to a lack of motive or desire to effectively lead, but the actual skill level is at a low level of development. Leadership is a central theme in terms of brigade performance and has a big impact. Sub-standard leadership, either based on a lack of skills (the current theme), or in the following four themes, basic inability, toxic leadership style, rigidity, and a lack of delegation, all strongly relate to poor brigade performance. All reflect poor leadership practice, though are different in their delivery. This is discussed later in the chapter. In general, poor leadership relates to poor brigade functioning, though as noted previously there are exceptions where a brigade can perform successfully despite their chief.

Common descriptions of these brigades were:

 "Senior officers don't have the skills to develop brigade" (this was a common comment)
"Lack of genuine management skills"
"Lack of overall skills within brigade but could improve with training"

Low leadership accountability

The key element of this theme is a chief not taking responsibility for their role as director of

operations. In some cases, it is due to a chief taking too much of a 'hands on' approach to the role rather than directing operations, effectively communicating across the brigade and ensuring the development of others.

Common descriptions of these brigades were:

"Chief won't stand back and take a leadership role"
"Poor leadership"
"Chief cannot communicate requirements"

Autocratic leadership
Dominance and power are the central themes under this heading. In such brigades the chief is *too* central and negative a figure within the brigade.

Common descriptions of these brigades were:

"Chief is overly aggressive"
"Chief is a bully"
"Autocratic, controlling chief – is a one-man band"

Inflexible leadership
This theme was typified by chiefs exhibiting an unbending and narrow range of operational scope. They view change as a threat to their established status quo. Although closely related to the 'old school' practice theme, chiefs who come under this theme do not necessarily just base their style on the way things have always been historically, as in the way of the 'old school' chief, but more exhibit a combination of a personal need for power and influence together with an inflexible personality style.

Common descriptions of these brigades were:

"Chief very closed off to new ideas"
"Chief resisting moving with organisational change"

"Chief negatively questions – why should I have to do that"

No delegation

This theme is typified by the chiefs' lack of information-sharing and/or responsibility-sharing in order to maintain their position of power over the brigade. These chiefs often justify such a stance as not wanting to burden others with responsibility they see as theirs to manage.

Common descriptions of these brigades were:

"Chief doesn't delegate"
"Chief keeps all information to himself"
"Chief sees up-skilling of members as a threat"

Low brigade sustainability

This theme reflects a lack of emphasise on future planning by brigade leadership. Such brigades are vulnerable, if, for example, key members either leave or retire and have no transition plans in place to cover for these eventualities.

Common descriptions of these brigades were:

"No sustainability systems in place"
"No progression system in place" (this statement was repeated a number of times by different participants)

Lack of robust systems and processes

Brigades characterised within this theme tended to be viewed as operationally ill-disciplined or lazy, scattered and ad-hoc in their approach. There are numerous risks associated with poor operational management. A brigade cannot function to anywhere near its full delivery potential if it is disorganised. This is a clear theme among brigades.

Common descriptions of these brigades were:

"Operationally weak"

"Poor management of people resources"

"Disorganised brigade"

Interpersonal conflict

While in some cases a degree of tension, if managed properly, can lift a team's performance it can also inhibit it. Brigades identified as having a culture of interpersonal conflict strongly related with poorer performance. Brigades which fell under this theme had a culture which was very much dominated by interpersonal conflict, some which had been ongoing for many years. In some brigades, research participants saw this as being the result of weak leadership, with the chief lacking the courage to step in and sort it out. In other brigades the chief was seen as the antagonist and cause of conflict.

Brigades, like any group, thrive on a positive and cohesive culture. Where there is ongoing conflict, there will be division within the group. It fosters an 'us versus them' or 'in-group' versus 'out-group' sub-culture, where members feel they either have to take sides or run the risk of isolation. Neither option provides an environment for positive brigade engagement or development.

Common descriptions of these brigades were:

"Personality issues within leadership group"

"Long-held festering historic issues"

"Conflict with paid staff"

"Union has strong negative influence"

Low autonomy

This theme refers to the degree of support a brigade requires either from the NZFS or from other surrounding brigades. Reasons largely due to either a lack of experience of either the chief or brigade members, or to a lack of initiative or confidence within the brigade leadership team. Such brigades can be perceived as a burden to others and come across as indecisive and ill-prepared.

Common descriptions of these brigades were:

"Very dependent on NZFS for support"

"Needs a lot of time and effort spent on them"

"Chief needs a lot of support"

General comments on related themes amongst struggling brigades

The most prominent and commonly referred-to characteristics of struggling brigades as described by the research participants were in the following 5 categories:

- Change resistant brigade
- Autocratic leadership
- Inflexible leadership
- No delegation
- Interpersonal conflict

This 5-theme cluster could be termed **power, rigidity, and change resistance.** From the mapping exercise, these themes related and interacted closely to each other but were also separate themes in their own way.

Change resistant brigade was typified by brigades with long-standing chiefs who the research participants considered to be 'past their use-by dates'. These chiefs didn't tend to bring others up within their brigade and were highly resistant to change, viewing development as unnecessary. They were not necessarily aggressive or defensive with others but more set in their ways with a strong historic perspective – they hadn't moved with the times or kept up with ongoing developments. In some cases it was more about inactivity rather than active resistance.

Autocratic leadership was typified by a bullying leadership style, sometimes aggressive and unapproachable. They were described as controlling information flows, withholding

information and defensive when dealing with people who had different opinions from their own. They were considered as unapproachable people who ruled by fear and were highly critical of others who didn't agree with them. They were not necessarily lacking in knowledge or intellectual ability in terms of fire service practice, but maintaining power to exert that knowledge was their main driver.

Inflexible leadership fell between autocratic and change resistant styles. It was typified by an attitude of" *this is how we do it here"* or "*don't try and tell us how we should do our job".* Inflexible brigade chiefs had a narrow perspective of what they would and wouldn't do, and appeared to regard change as someone else's priority (i.e. NZFS) rather than a requirement for their particular brigade. External suggestions were viewed as threatening or encroaching rather than helpful. These brigades (their chiefs, at least) often took an "*us versus them"* stance.

No delegation reflected a narrowness of shared practice. This wasn't necessarily done in the aggressive or defensive way that exemplified the toxic leader, but was just as controlling. This theme was typified as withholding of power by the chief to ward off challenges, in an active maintenance of their leadership status. Development of others was avoided which ultimately stifled the brigade's potential to improve, ultimately leading to the unit's poor performance.

Interpersonal conflict was a wide-ranging theme that spanned across one-to-one issues, within brigades and between brigades. Many appeared to be long-standing issues due to the long-term membership of many volunteers. In some cases, feuds were generational. Volunteers within the NZFS are composed of many highly passionate and committed people who identify very strongly with the service they belong to. It also means that when there is discord it will be felt and seemingly often expressed with equal commitment, which can be detrimental to the overall performance of a brigade. Whereas high-performing chiefs were often described as dealing with conflict issues quickly, chiefs within conflict-ridden brigades were either part of the conflict itself or tended to turn a blind eye to it or even just accept it

Four other themes related to each other but again were separate clusters, these being:

- Remote community
- Low call out rate
- Limited recruitment pool
- Members working out of town

This grouping can be termed as **geographic and demographic issues** as opposed to attitudinal disposition as outlined in the previous section.

Remote community reflected a physical disconnect with the wider NZFS and in some cases reflected a lack of IT services and resources within that community. Participants often described such communities as transient with an unstable population to call upon, wide distances to cover and few members to cover the span.

Due to the geographic location, some brigades simply had very few callouts and so members had little opportunity to develop their skills or improve through consistent repetition. This was in direct contrast to many high-performing brigades that were constantly busy and therefore well practiced.

Limited recruitment pool reflected a number of issues including simply not enough people in the community available during day-time at least (e.g. a dormitory settlement for people employed elsewhere) and/or people being unsuitable for the brigade due to age (e.g. a retirement community), lack of suitable skills or disqualification of potential members due to criminal record or lack of learning/training capability. There were instances where people wanted to join their brigade but were excluded by their background. Some research participants questioned whether the NZFS volunteer membership criteria could be realistically applied to such communities where recruitment is already very difficult.

Two further themes mapped closely related but were also independent of each other, these being:

- Low brigade sustainability
- Lack of robust systems and processes

These could collectively come under the heading of **systems and planning**. Both reflect a lack of operational professionalism, but the timing of their inefficiency differs. Lack of robust systems and processes were reported as more a day to day issue, a culture of being operationally disorganized and scattered. Reporting was poor and systems unclear. Lack of succession planning reflected a lack of future emphasis. Like the high-performing brigades, succession planning was a very common theme; where emphasis was placed on it, it typified high functioning brigades; where emphasis was lacking, it typified a common descriptor of struggling brigades. The reasons for lack of planning with struggling brigades differed. For some brigades it was part of a chief maintaining their position –an "if no plans are in place I can't be removed" stance, or a matter of belief that nothing will actually change in the future or that if it does, they will deal with it then and only if they need to. For others, their somewhat chaotic and reactive style inhibited their ability to plan outside the current moment.

An additional related theme cluster was:

- Insufficient skills
- Low leadership accountability
- Low autonomy

These were closely-related themes reflecting a simple **lack of skilled ability** to functionally run a brigade. These themes were not necessarily related to chief- related power plays or operational inefficiency. In some cases, these brigades worked with the very best intentions but were simply not up to the complexity of running an effective brigade. "Useless leadership" reflects a common description made by research participants. When drilled down, it was often typified by a chief who simply wouldn't stand back and still wanted to rather than actually leading the process of the callout.

Insufficient skills often reflected some developmental gaps of skills/experience at critical levels within a brigade. For example, some brigades described in this way were typified by lacking an experienced middle core of members – a lot of newer members but lacking an experienced group at the next step up. Similarly, some brigades were described as having

few if no skilled members below the chief and/or deputy.

A final theme emerged:

- Community disconnect

This related to a disconnect between the brigade and the community it serviced. This often had negative implications for recruitment of members and for the broader identity of the brigade within its community.

There were clear indicators of struggling brigades, and research participants were able to describe them in comprehensive detail. It was also clear that there were differentiating features between struggling brigades; they struggled in different ways to each other. This will be expanded upon further in the following section.

Overarching themes with struggling brigades

Three clear themes emerge within the characteristics of struggling brigades. First, some brigades appear to be struggling due to demographic circumstances while other brigades underperform and are struggling more due to how they are led and/or how they function operationally.

Struggling due to demographic issues:
- Remote community
- Low call out rate
- Limited recruitment pool
- Members working out of town

Struggling due to leadership-related issues:
- Change resistant brigade
- Low leadership accountability
- Autocratic leadership

- Inflexible leadership

- No delegation

- Interpersonal conflict

- Low brigade sustainability

- Lack of robust systems and processes

- Insufficient skills

- Unstructured practices

- Low autonomy

Struggling due to community disengagement:

- Community disconnect

Figure 4. *Summary of key factors of struggling brigades.*
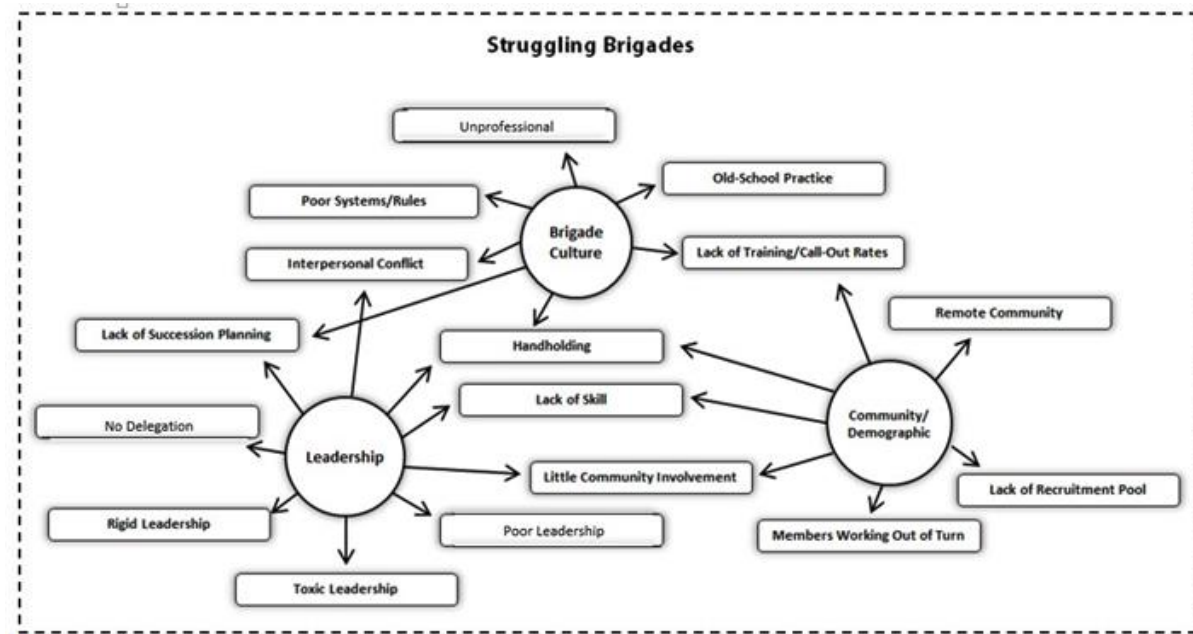
Bringing the maps together

A final stage analysis explored what core themes (if any) emerged among the 30 clusters identified. Was there a common thread that tied these 30 themes together, a simple organisational framework? The reductional analysis found three core underlying features that all clusters related to, regardless of whether a brigade was high performing or

struggling. These were: Leadership, Brigade Culture (particularly professional operating standards) and Community/Demographic. All statements made by participants about brigades and differentiating brigades fell under one of these three broad umbrellas. All themes from the Andmapping process were subcomponents of these three core areas. Themes within and between each dimension also related to each other. For example, a high performing chief had an effect on community involvement, which also positively related to recruitment success. Few themes were strictly unrelated.

Key points

- All research participants were nominated internally by the NZFS based on their perceived expertise and extensive understanding of volunteer brigades. Participants undertook an online mapping exercise and subsequent interview process to articulate features that differentiated strong and struggling brigades. The researchers had no pre-conceived ideas as to which factors defined strong versus struggling brigades. These definitions were applied by the internally nominated experts themselves and were guided by their differentiating descriptions.

- Research participants differentiated between strong and struggling brigades in a number of ways. From over 500 descriptions presented by participants, a map was created covering the range of themes represented by these experts.

- Fourteen themes characterised the range of descriptions of strong brigades, while sixteen themes characterised the range of descriptions of struggling brigades.

- All themes stemmed from three core areas, Leadership, Community/Demographic, and Brigade Culture.

Phase 2: On-line questionnaire – the Volunteer Brigade Profiler (VBP)

The next step of this project was to design an instrument based on the information gathered from phase one. The resulting measurement instrument, the Voluntary Brigade Profiler (VBP) is comprised of a battery of statements for an informed, internal observer to endorse or reject, according to how well they match a target brigade, to quantify the observer's experience. This purpose was best served by keeping the language of questionnaire items as natural and relevant as possible to the NZFS therefore, only descriptions presented by research participants during phase one were used as items within the VBP.
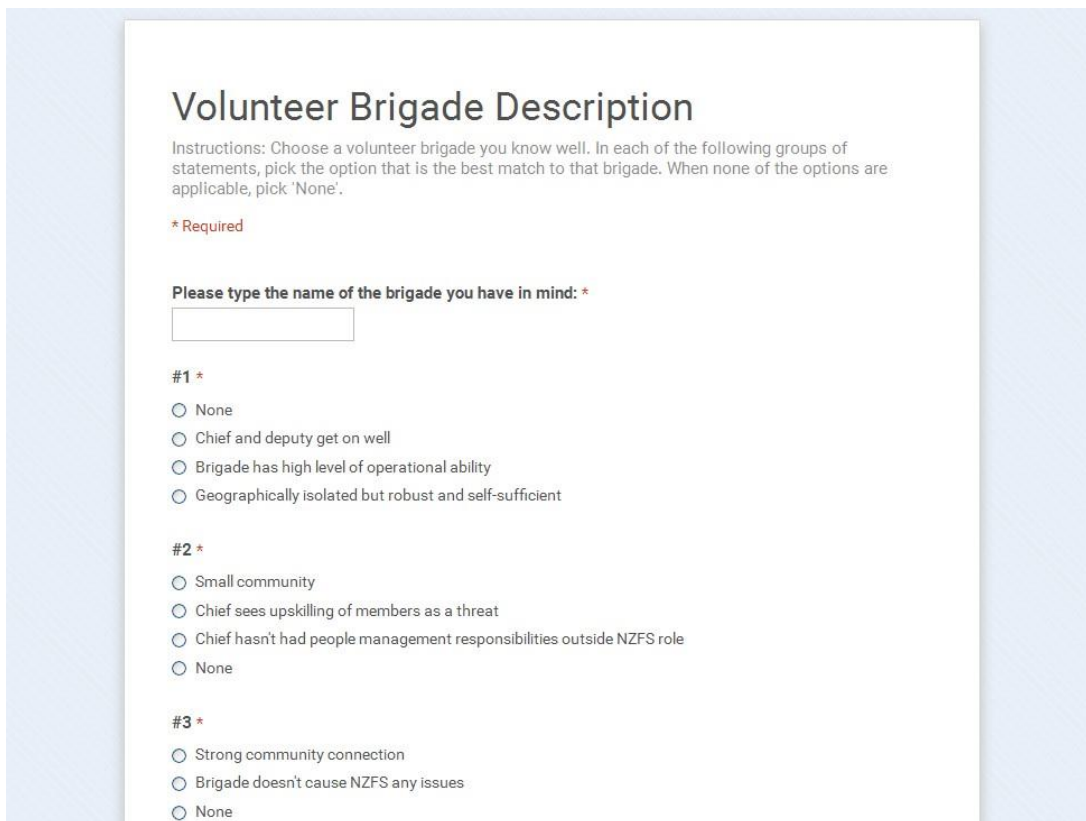
It should be noted that careful consideration by the NZFS would need to be given as to the most appropriate respondents for the VBP questionnaire, for example, as many of the descriptive statements pertain to brigade leadership, it would not necessarily be appropriate for Chief Fire Officers to rate themselves, unless the tool was being used more in a 360 review context, a use to which it could be well adapted.

The development of any measure of this type is a technical discipline within itself so the following methodological description is kept to a summary level.

Phase one explained how a vocabulary of several hundred phrases and sentences, characterising strong and struggling brigades, was elicited from a group of nominated participants. These were then organised within a framework of 30 themes with three over-arching "spheres of influence", leadership, brigade culture and community/demographic. In the process of statement analysis, redundant and synonymous statements were merged or eliminated, until 129 core statements remained. As future users of the VBP were likely to find it a lengthy and arduous task to rate all 129 statements separately, we opted instead for the efficiency of a multiple-choice format, arranging the statements into 43 three-answer combinations. Users were instructed to choose the statement from each of these "trilemmas" that best applies to the target brigade (or to select 'none' if none applied). It

may be that two or even all three statements from a trilemma are true of the target; in such cases, the user must choose the statement that is *most* relevant or applicable. This forced-choice format was easily implemented as an on-line form (Figure 5).

Figure 5. *Questionnaire example*

Trilemma design was an important consideration. One example of bad design is a combination where three statements all express the same theme, for if one were true of a brigade, then the others would be likely to apply as well. By the same token, to include two statements from a single theme – or even closely-related themes – is less than ideal. It is also desirable to vary the contexts: that is, if one trilemma presents a statement from theme 'X' in the company of statements from themes 'Y' and 'Z', then the next statement from 'Z' should appear in the company of different themes ('A' and 'B', say); repeating the previous combination of themes would be a duplication, wasting the user's time to provide little new information.

We therefore followed a rational combinatorial procedure to assign statements to

trilemmas so that the user's responses were as informative as possible. 18 trilemmas present forced choices among positive statements (for the 14 scales formed from descriptions of strong brigades), and will often be skipped when a low-performing brigade is the focus; 15 involve negative statements (from the 16 scales descriptive of struggling brigades). The remaining 10 trilemmas combine and contrast statements from both polarities. The on-line questionnaire presents these trilemmas to every user in a fixed sequence, which alternates between all-positive, all-negative and mixed. The order of the three choices within each trilemma is randomised for each user.

Responses to the 43 trilemmas are referred back to the 30 thematic scales by a spreadsheet, and summed into 30 scores. Note that this leaves open the option of fine-tuning the instrument in the future. The spreadsheet can be modified if, according to the preponderance of evidence, an item does not belong in the theme to which we assigned it, but empirically comes under the umbrella of a different theme.

The completion of VBP questionnaire results in a specific brigade profile being produced. Examples of these are provided later in this section. In most cases a brigade will show scores on two profiles; a positive indicator and a negative indicator. The greater the weighting on the positive indicator profile will highlight where a brigade is strong, and likewise, a greater weighting on the negative indicator profile will highlight where a brigade is struggling.

It is also important to note that these profiles are a moment in time and the current profiles used as a base line. As earlier indicated, brigades can change and the VBP could be used to mark changes within a brigade over time as much as an indication of current state.

Key points
- To ensure the content validity, as well as organisational relevance, only descriptions in their natural language, as supplied by research participants were used to create the VBP. No other amendments/additions form any part of this profiling questionnaire.
- The VBP is a specific measure designed to understand the characteristics of volunteer brigades within the NZFS at a point in time.

Methodology

15 participants completed the VBP resulting in 94 completed brigade profiles. Ten of the participant group had already been involved in phase one of this project. The other five participants were nominated by participants from phase one. These five additional participants were people who the original participants believed would provide a useful insight into the process, as they had significant involvement with particular brigades under review. In this exercise we got participants to complete a VBP focusing on specific brigades that fell either into their strong or struggling categories from phase one. The 94 brigades profiled provided a statistically robust base from which to conduct further analysis.

Results

As the VBP is a newly created profile measure, the 94 completed VBP questionnaires were subjected to an extensive factor analysis to understand its psychometric structure and possible relationships between themes within the profile. Put another way, we explored if there were patterns within a brigade's profile, or if there were clear indicators as to "types" of brigades. Did brigades that had been identified as strong in phase one of the research significantly profile as strong through the VBP? Conversely, did brigades that had been identified as struggling also profile as struggling? Did strong brigades profiles show any similar shared patterns with one another or was there variance between them? Did profile patterns amongst struggling brigades emerge or did their profiles show distinct differences?

The statistical analysis undertaken in this process produces a large amount of data which is normally presented in the form of tables of correlations and other statistical language that can be difficult to understand without having a background in statistical research methodology. For ease of understanding and consistency, these results are presented in a map format similar to the result outputs in phase one. This solution provides a visual representation of relationships among items and themes that are easy to comprehend. As outlined in phase one, points that are presented closer together represent similarity, whilst

points that are further apart represent dissimilarity.

As earlier explained, the VBP is made up of 43 three-way choices, with the participant's responses collapsed onto the 30 scales. To emphasise the specific strengths and vulnerabilities of each brigade profiled, the 30 descriptive values are shown as 'radar' or 'spider web' plots, a form of radial diagram.

Three points should be emphasised about these scales:

1. The label we have assigned to each one is an attempt to sum up the common theme of items contributing to it. The labels are provisional, and are open to revision.

2. Two scales have similar labels, but one bears negative connotations ('remote community') and the other is more positive ('rural / remote'). The former is an umbrella for items that bear on community isolation and limited volunteer pool, as a source of stress. The latter subsumes items that address remoteness as a source of community solidarity, identity and pride.

3. The forced-choice nature of the questionnaire means that observers cannot give a high rating to all the scales. Every item picked from a 'trilemma' – increasing the rating of one scale – is a rejection of the other two items, where points cannot be given to two other scales. This forced-choice questionnaire design is more efficient to complete and ensures a respondent gives deeper consideration to the most relevant description applicable to the brigade under review. By comparison, on a Likert-scale type questionnaire for example, where a respondent is simply asked to rate individual items/descriptions on a scale e.g. from 'strongly disagree' through to 'strongly agree' there is a known tendency to largely respond somewhere in the middle of the scales.

The following profiles are actual examples taken from the 94 completed brigades. To recap, the VBP produces two profiles for each brigade – a positive indicator and a negative indicator. As can be seen, for Strong Brigade 1 below, scores only appear on the positive indicator profile, indicating that in the eyes of this reviewer, this brigade is currently not

experiencing any of the negative factors. On the profile of Strong Brigades number 2, while most scores fall on the positive indicator profile, some issues have been identified on their respective negative profiles also.

As we move to the Struggling Brigade profiles, most scores fall on their negative indicator profiles, but we can still see where some positive indicators have been identified on their accompanying positive profiles.
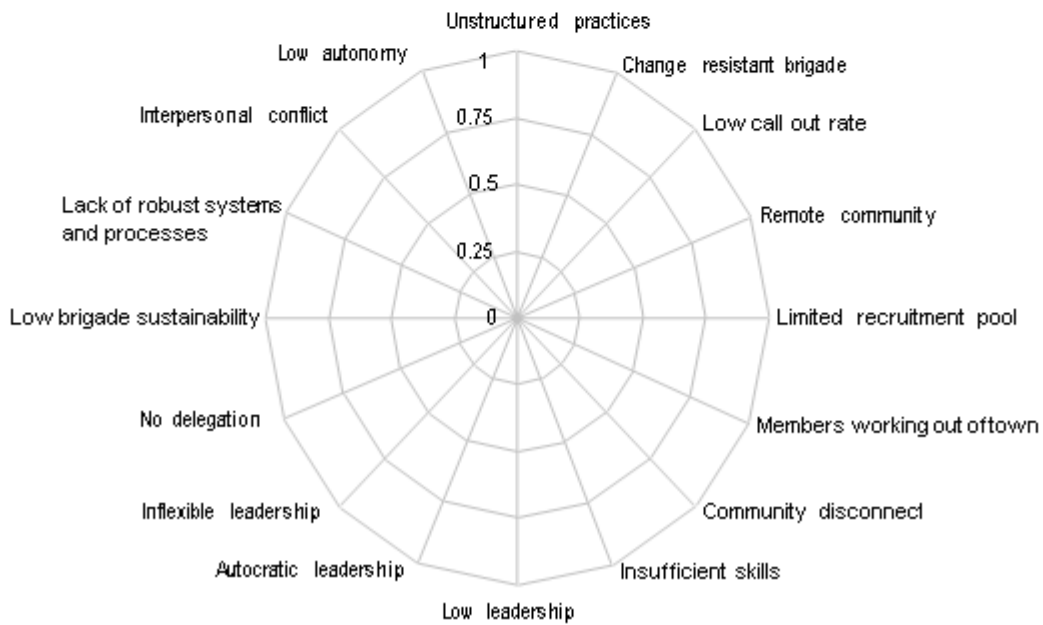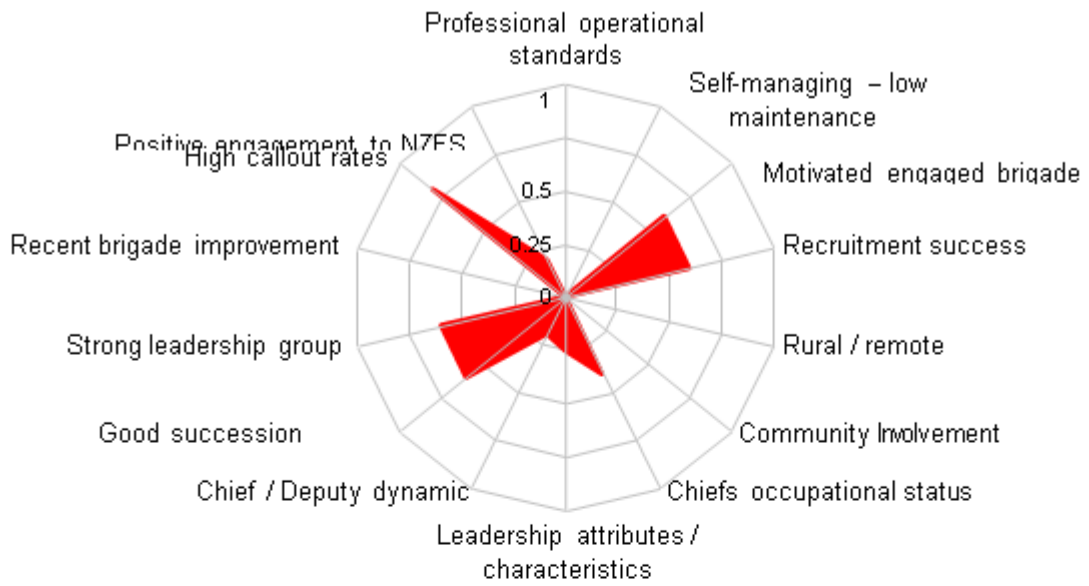
Figure 6: *Strong Brigade 1*

Figure 7: *Strong Brigade 2*

Figure 8: *Struggling Brigade 1*

Professional operational
standards

Self-managing - low
maintenance

Positive engagement to NZFS   High callout rates

Recent brigade improvement

Strong leadership group

Good succession

Chief / Deputy dynamic

Leadership attributes /
characteristics

Motivated engaged brigade

recruitment success

Rural / remote

Community Involvement

Chiefs occupational status

Chief / Deputy dynamic   Chiefs occupational status

Leadership attributes /
characteristics

Unstructured practices

Low autonomy

Interpersonal conflict

Lack of robust systems
and processes

Low brigade sustainability

No delegation

Inflexible leadership

Autocractic leadership

Low leadership

Change resistant brigade

Low call out rate

Remote community

Limited recruitment pool

Members working out of town

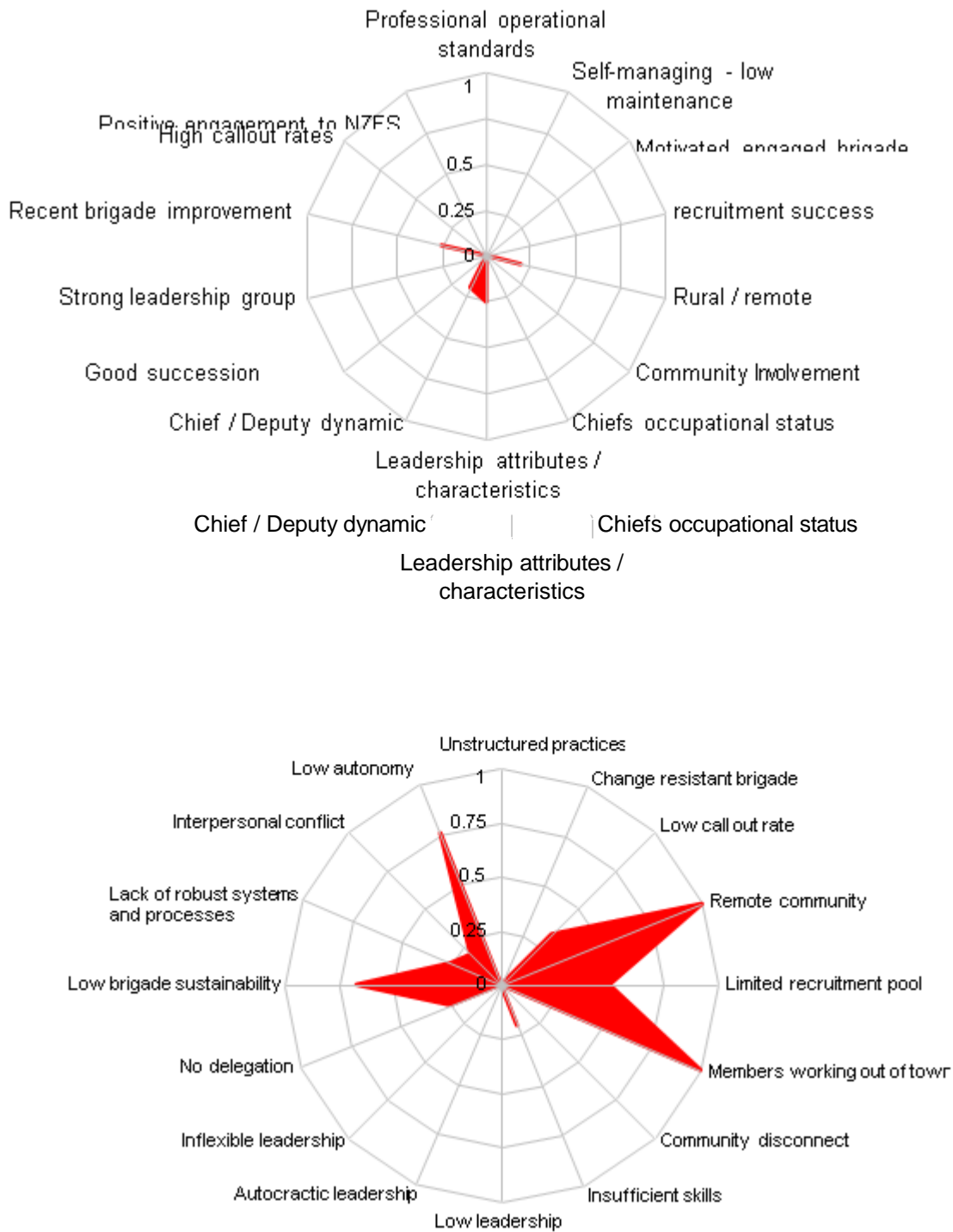Community disconnect
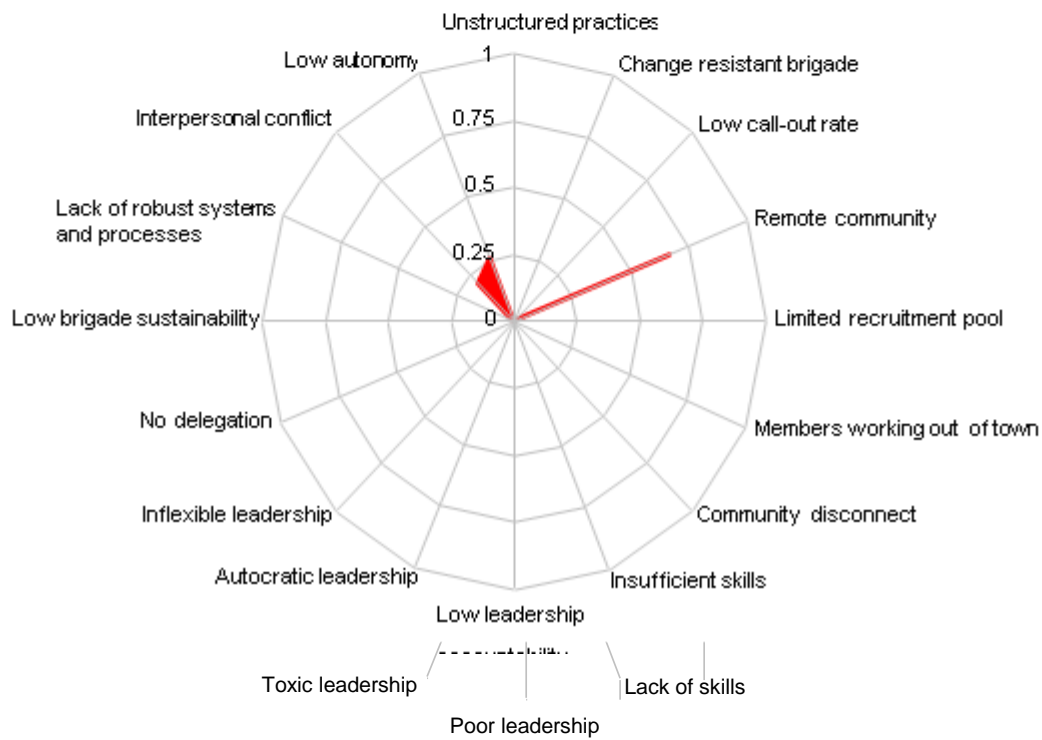
Insufficient skills

Figure 9: *Improving Brigade 1*

Overall analysis of the 94 brigade profiles shows that no brigade profiles in the exact same way. Each brigade appears to be unique regardless of it being a strong or struggling brigade. This has an interesting implication for the NZFS in working with individual brigades. It would appear a blanket approach of treating each brigade the same would not be advantageous. If, for example, a brigade is identified as struggling, via the VBP tool the NZFS can now extract more information and pinpoint the kind of stress the brigade is under in order to provide a more targeted approach to any form of assistance rather than a 'One-size fits all' policy.

Strong and struggling brigades clearly fall into different sides of the overall map. Brigades that were identified as either strong or struggling in phase one of this research remained in these categories when profiled using the VBP. The VBP clearly differentiates between strong and struggling brigades.

The VBP is a measure specifically designed to provide a map of a brigade at its current point of time. Our analysis suggests it can differentiate between strong and struggling brigades and provide specific insights into the variations between those brigades. From a practical perspective, the questionnaire takes between 10-15 minutes to complete and is therefore more economic than an extensive interview. As with any measure, it requires ongoing evaluation and changes made if required. Future use should also investigate multiple reviewers' perspectives on the same brigade – what degree of variation is there, if any, from different people's perspectives.

It is of great importance that any future use of the VBP is *developmental* in focus and it is clearly understood that is not designed to be used as a *performance* measure. It should be used in conjunction with other approaches to understand and identify how to assist brigades and where those areas of assistance should best be focused.

Key points
- Brigades that were identified as being strong in phase one of the research also profiled positively on the VBP. When using the VBP, no brigade that was initially rated as a strong brigade subsequently profiled as a struggling brigade. Similarly, brigades that were

identified as struggling also profiled as struggling, on the VBP.

- A very important finding showed that none of the 94 brigades profiled were exactly the same. Each brigade was unique and had its own profile shape (characteristics) regardless of being strong or struggling. Brigades could be strong or struggling for different reasons. This suggests each brigade should be viewed in terms of its own characteristics. A blanket approach to working with brigades would not be effective.

- Characteristics of both positive and negative profile elements were evident in strong and struggling brigades. For example, some struggling brigades sometimes also had elements of positive features and some strong brigades recorded scores on the negative profile. However, these were not prominent.

- While each brigade profile was unique, there were themes and patterns within the strong and struggling brigades. When all the scores from profiles within each group (strong or struggling) were combined, the analysis showed that struggling brigades had a greater variance. In other words, struggling brigades struggle for a wide range of reasons. Strong brigades, while differing from each other do not differ as widely as struggling brigades.

VBP – Comments Section

As part of the VBP, participants were able to provide written comments regarding their profile responses and given the opportunity to add any additional thoughts they had. The addition of this section provided a further opportunity to gain further data and insights.

A total of 155 statements was collected from the comments section and underwent a sorting and grouping process to identify key themes. This was a similar process used to identify key themes in section one. Analysis from this process showed the emergence of several distinct themes. In order of highest to lowest frequency commented upon, these themes were leadership, staffing numbers, dynamics, individual attitudes and behaviours, skills and training, improvement and processes. All themes contained both positive and negative comments. Some examples are below.

Leadership

"Proactive chief and deputy who allow members to become involved"

"Chief is well liked, and has been around a long time"

"Chief has sought assistance to resolve issues"

"New chief has improved brigade"

"Chief is very good at his job and is well liked"

"Good chief- management, all members have involvement in the running of the brigade"

"Top performing brigade due to strong confident leadership"

"Leadership is a problem due to lack of motivation and innovation"

"Management is poor due to dominant chief"

"Chief difficult to communicate with – a know it all and can be dishonest"

"Chief makes excuses for slack members"

"Old school chief trying to control new members into doing things the old school way"

"Chief not connected with community but no one to take their place"

Staffing numbers

"Recruitment lifted by door knock campaign"

"Recent recruitment drive saved brigade"

"Recruitment and retention of members a problem in small community"

"Brigade in community of mostly very young or aging people who are not suitable volunteers"

"Small isolated community struggles to attract new members"

"Small brigade sometimes has trouble with day manning"

"Biggest problem for brigade is attracting new members in a small community"

"Due to low numbers members having to do more than one role"

Dynamics

"Brigade works well as chief and deputy complement each other"

"All members have a job to do in station so all feel part owners of the brigade"

"Generally friendly atmosphere"

"Resignations due to conflict"

"Brigade has personality issues that create tensions and affect the ability of members"

"Chief and deputy noticeably don't get along"

"Brigade has problems due to friction between chief and deputy"

Individual attitudes and behaviour

"Some individuals don't want the responsibility of their role"

"Chief tries to dominate neighbouring brigades"

"Chief doesn't like to embrace things that VSOs put in place to help the brigade out"

"Chief has very dominant personality and won't accept some things"

"Some members not engaged, only turn up to training nights when they feel like it"

"Chief borders on bullying tactics"

Note. Some of these items could also been applied to Leadership theme

Skills and training

"New station officer has brought improvement to brigade training levels"

"Not a high callout rate but skills are good due to commitment to maintaining levels through regular use of the training department"

"Chief's over- involvement at callouts prevents others from developing"

Improvement

"New members who have attended new courses have really improved the brigade and will take senior roles in a few years"

"New Training Officer has improved all aspects of brigade requirements"

"Brigade has improved with the appointment of the new Chief"

Processes

"Station is kept clean; safety notices well displayed, book work orderly, good management structure"

"Very poor succession plan in place"

"Not keeping up with data input is sometimes an issue"

The comments section provided a further opportunity to collect perspectives of brigades. As with phase one, leadership, both positive and negative was the most commented on theme of this phase. The importance of leadership and its effect is drawn out further when each theme is mapped against each other in terms of similarity / dissimilarity. Leadership was closely related to and had a strong effect on the themes of dynamics, individual attitudes and behaviour and improvement. Processes and skills and training related closely together while numbers mapped independently from the aforementioned themes.

Phase 3

Analysis of existing quantitative data

Overview

In this phase of the project we performed an exploratory analysis of the available quantitative indicators of the composition and performance collected by NZFS over time of volunteer brigades within the NZFS. This data was provided for analysis from a range different data sheets including information from the Volunteer Dashboard system. The purpose of this phase was to investigate any themes that could emerge from current NZFS data that may be insightful and useful. It is important to note however that NZFS measures and our research processes and findings in phases one and two are not necessarily measuring the same things and should be viewed as independent of each other. We have not set out to test the validity of the NZFS data, critique it or create alternative measures to surpass any current systems. The following section is presented as simply as possible with a series of key summary sections for ease of understanding.

The NZFS evaluate volunteer brigades in a variety of ways. The measurements do not all say the same thing or converge on the same conclusions. Nevertheless, we have found there is a pattern among these measurements across brigades. Seven aggregated scales or factors emerged from the sea of data, providing a summary description of individual units. The main body of this phase explains the origin of these factors. The seven factors are provisionally identified as: **Staffing, Shortfall, Workload, Processes, Skills, Qualifications and Commitment.**

On face values, no single factor score stands out as an obvious indicator of whether a brigade is performing above expectations as a model for other volunteer groups, or alternatively is stretched beyond its capabilities. In particular, these factors are largely independent of one another: they do not *converge* to single out at-risk units. If a predictor

of overall performance can be obtained from the quantitative data, it is likely to be a *combination* of factor scores considered in context. It may be that *outliers* are of particular importance – that is, brigades that fall outside the general distribution of one or more factor values.

For instance, some brigades are far more active than their staffing level predicts e.g. one particular brigade has a chronic problem recruiting the full volunteer complement but is growing far faster than one would expect from this staffing shortfall.
Two other variables 'Growth' and 'Turnover' are possibly relevant to the question of 'brigade performance' and are used in this analysis, without assimilating them into the aggregated scales described above.

Finally, this analysis should be considered as a work in progress. The general framework of this analysis is open to the inclusion of further future data.

Analytic Approach

The general approach taken here is correlational. Factor Analysis (FA) was the main statistical tool, used to identify which indicators are empirically related across brigades, and to group them together into a more manageable number of underlying 'factors'.

Volunteer Dashboard

This analysis drew upon information from the Volunteer Dashboard, the online reporting system for tracking brigades' performance, preparedness and compliance. As its name suggests, the Dashboard interface uses colour-coded flags in the manner of dashboard gauges to signal departures from objectives. It compares quantifiable outputs from a brigade against benchmark values, delivering reports to the Chief Fire Officers and to various levels of NZFS management.

We were provided with a "Measure Definitions" document, which describes the specific outputs and corresponding benchmarks covered by the Dashboard grouping these under

broad headings. Among them,

1. *Personnel* – as well as the number of volunteers in a brigade, flagging whether too many were inactive, or not attending training sessions;
2. *Qualifications* – whether volunteers were available with expertise in particular skills.
3. *Operational Skills Management* (OMS) – whether everyone has acquired the basic central or core skills;
4. *Station Management System* (SMS) – flagging lapses in the record-keeping and paper trail after operational incidents;
5. *Audit status* – whether corrective actions had been completed.

To foreshadow the results below, four broad themes or factors emerged from the analysis, where each factor summarises the scores on several of these outputs.

- The *SMS* measures were all sufficiently inter-correlated to coalesce into a single factor, which we provisionally labelled *Accordance with processes*.
- The second factor, *Qualifications*, combined three measures from the *Qualifications* heading, along with 'Operational Staffing' (from *Personnel*) and 'Audit Status'.
- A third factor, *Member Skills*, combined two *OMS* measures. The emphasis on **all** volunteers meeting the standard is what distinguishes this from *Qualifications*.
- The fourth factor combined two remaining *Personnel* measures, along with 'sufficient number of officers' from *Qualifications*, and a measure of turn-out promptness. We identified it as *Commitment* although *Participation* would also be appropriate.

Caveats

Various caveats apply. Just because a measurement can be made, does not necessarily mean that it is related to the topic of interest. We are also aware that many volunteer brigades may regard the provision of emergency services as a higher priority than documenting their every activity. Special caution is required with the green / amber / red performance concerns obtained through the Dashboard interface, which record lapses from

NZFS goals and guidelines but do not rate a brigade's performance on less easily-quantified variables. In general, the map is not the territory.

- We summarised the available quantitative information about the brigades as **seven scales or factors**
- Brigades' values on these scales differ systematically across **geographical regions** and **type of brigade**
- These are possible areas for predicting brigade performance

**Staffing and understaffing (shortfall)**

One primary source provided for analysis contained staffing information for 395 brigades – classified as **V** (Volunteer), **A** (Auxiliary), **C** (Composite, where volunteers share premises with paid staff), **Sub** (Suburban) and **FPB** (Fire Police facilities, i.e. Operational Support Units). Note that this list does not entirely overlap with other data analysed. Some brigades have staffing information but no workload indicators. These include several Operational Support Units, but also Composite brigades at Masterton, Nelson, Trentham and Waitemata, plus the Onetangi Suburban brigade. Conversely, there are also brigades for which workload indicators are available but not staff levels or classification.

The main contents of the spreadsheet are the **complement** agreed upon in each brigade's Business Plan, and the actual volunteer **count**, over several years, from 2008 to December 2013. Volunteer counts are recorded for 2009, 2010, 2011, 2012, June 2013 and Dec. 2013. These staffing-level snapshots in turn provide the staffing **shortfall** for each year – the difference between the count and the complement (where a *positive* shortfall indicates a reserve of volunteers). The trend across the six snapshots for each brigade provides an index of its growth. Ngaruawahia was the fastest-growing brigade during the period (slipping to 21 in 2011 but then rising to 33 in the next two years); while Wairoa and New Brighton were in negative growth (Wairoa shrinking from 30 in 2009 to 21 in December 2013). As well as the *absolute* growth, we considered the *relative* growth, i.e. as a fraction of average count.

Naturally there is a great deal of redundancy and repetition among these indicators: the agreed-upon staffing targets change little from one assessment to the next, and are highly correlated across brigades; actual volunteer counts are also relatively constant, as in turn are shortfalls. We applied Factor Analysis to these indicators to reduce them to a small number of parameters for subsequent analyses. We included *Mean* complement, *Mean* count and *Mean* shortfall in this analysis, as well as the growth trend, and finally a turn-over score.

Two principal components accounted for 77% of total variance. One factor is in effect an average across the complements and counts for all years; the second is an average of all years' shortfalls. We retained these as "Staffing" and "Shortfall" indicators, as shown as Figure 10. The two indices are not significantly correlated: overall, there is no tendency for larger brigades to have more problems (or fewer problems) with recruiting volunteers. As for the 'growth' and 'turnover' indicators, they are not *strongly* related to either component, as shown by their central location in the solution.

Figure 10. Loadings of complement / count variables in two-factor solution
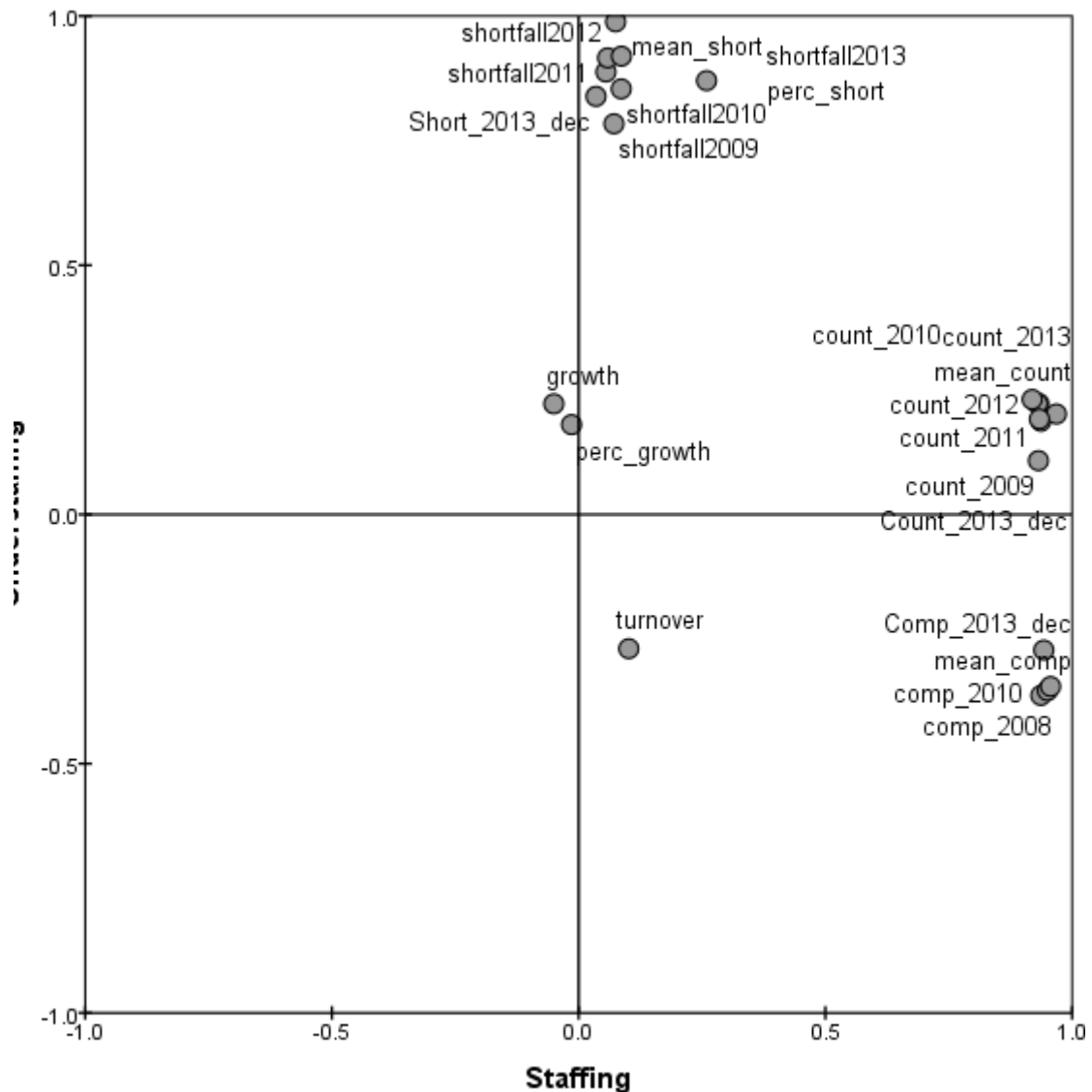
The Auxiliary Brigade labelled #138 (Figure 11), for instance, repeatedly assigned a target complement of 12, tended to recruit actual counts of 4 or 5, so its "Staffing" value was -2.1 (the lowest in the country) while "Shortfall" was also -2.1. Note that the process of factor analysis rescales these composite indicators and shifts their range from the original numbers. "Shortfall" is lowest (-4.3) for Composite brigade #68. Here the target complement is 37, and actual counts have ranged between one-third and one-half of that (though growth has been strong over the five years covered by the spreadsheets).

Figure 11. *Staffing scores for brigades (colour-coded by type of brigade)*
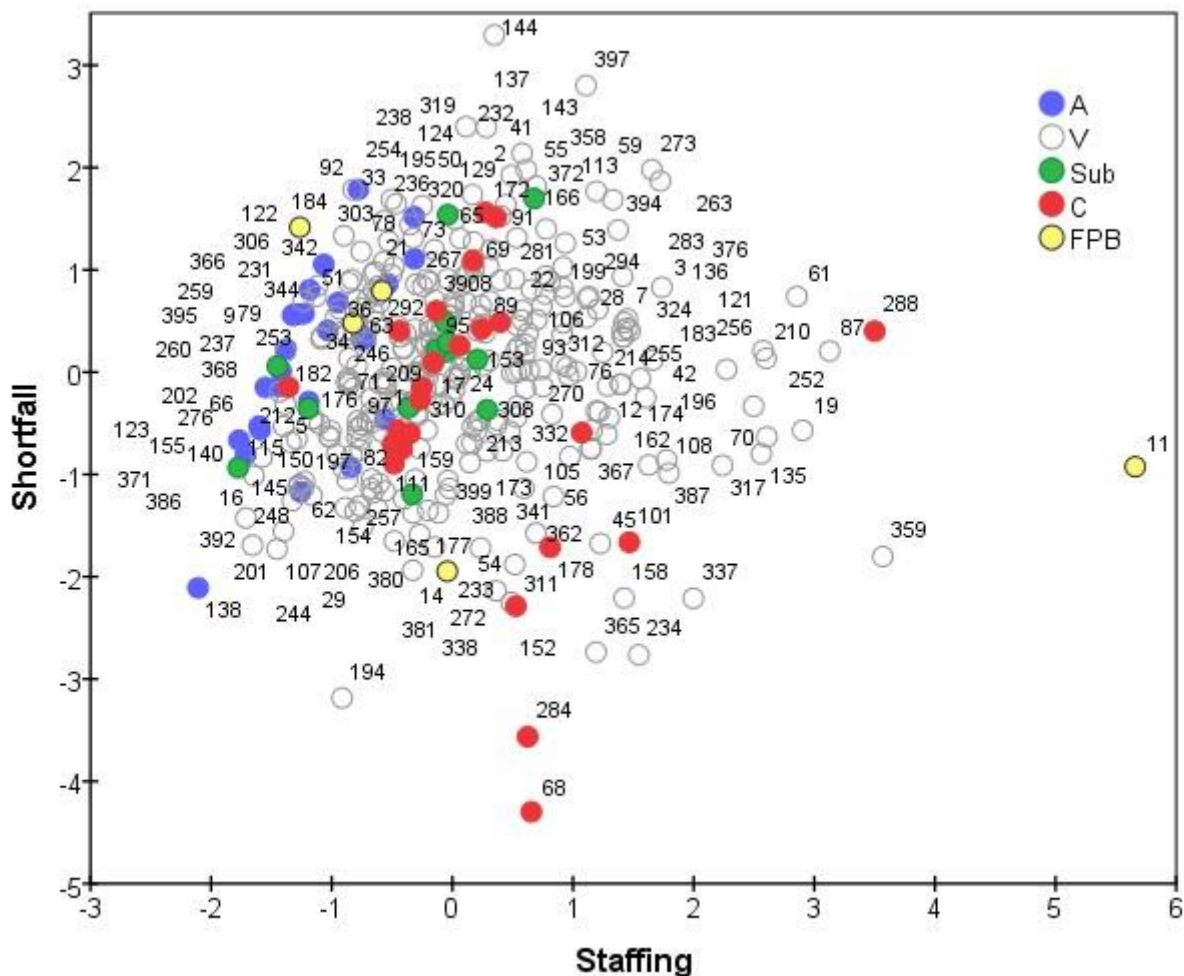

However, the earlier overall comparison obscures differences in the *kind* of brigade. For the 28 Auxiliary brigades in isolation, there is a highly significant positive correlation ($r = 0.65$): larger brigades find it easier to meet their targets. The same is true for the Suburban brigades, where the correlation between Staffing and Shortfall is $r = 0.55$, although this is less significant due to the smaller number of such brigades (only 13).

When we look at the range of staffing levels within each type of brigade, there are no surprises: Auxiliary brigades tend to be smaller than the others. Operational Support groups also tend to be smaller than Volunteer and Composite stations, with the exception of the Auckland OS Unit.
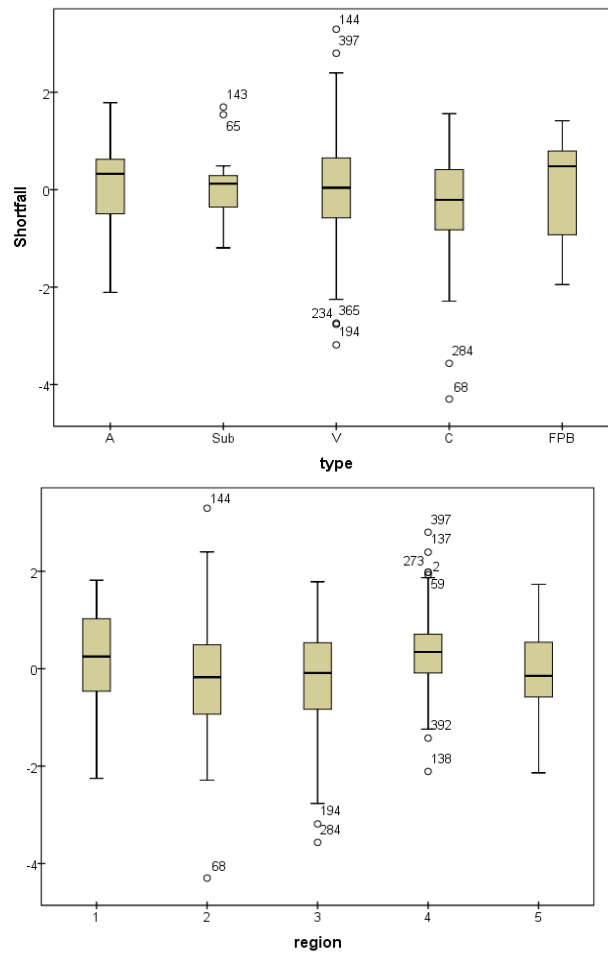
There are also variations when brigades are grouped by region. Brigades in Region 1 are slightly larger than the others, the difference being marginally significant ($p = 0.013$).

Figure 12. *Distribution of staffing scores, grouped by brigade type and region. Each box shows* **median** *value for that type or region (thick central line); first and third* **quartiles** *(lower and upper margins of box); main* **range** *(vertical 'whiskers'); and* **outliers** *(numbered dots)*
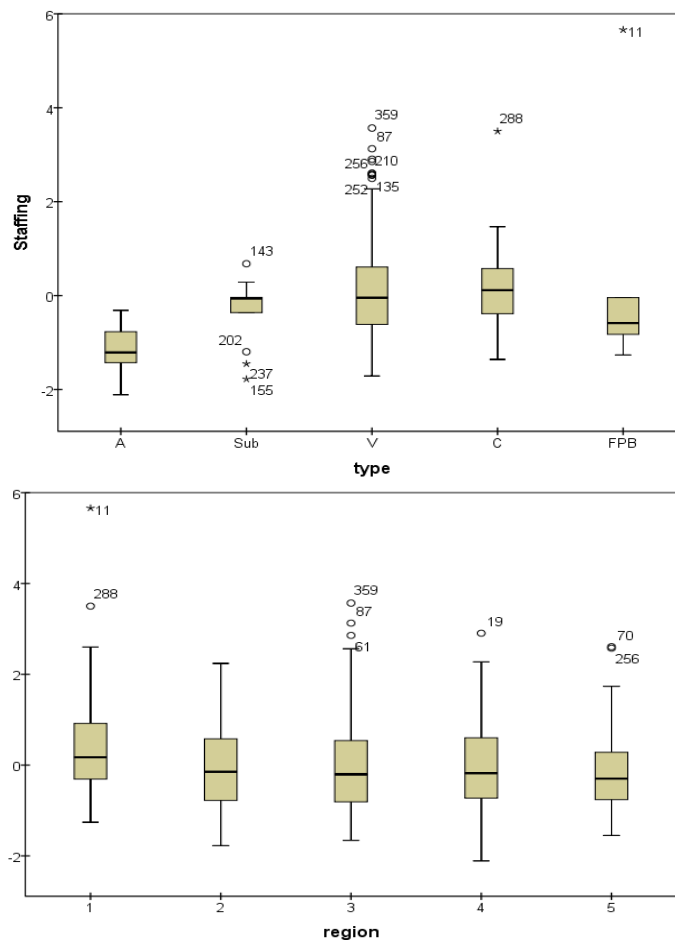
Turning to the Shortfall index, variations are also apparent. Grouping stations by type, Operational Support groups tend to be in positive, with more volunteers than they need. Composite brigades tend to be negative, with volunteers reluctant to join. Looking at regional variations, Regions one and four appear to show the least recruitment problems, but the variation within each region is large enough that this apparent difference is not significant.

We considered *changes* in brigade staffing – the 'growth' index mentioned earlier. In the ideal world, the most understaffed brigades would react by becoming the fastest-growing, but in fact the opposite is the case (Figure 14). There is a small but positive correlation between Shortfall and growth (*r* = 0.22): understaffed brigades are experiencing negative growth.

This index is not significantly different between regions, or between kinds of brigade.

Figure 14. Staffing Growth against Staffing Shortfall scores (brigades colour-coded by type)
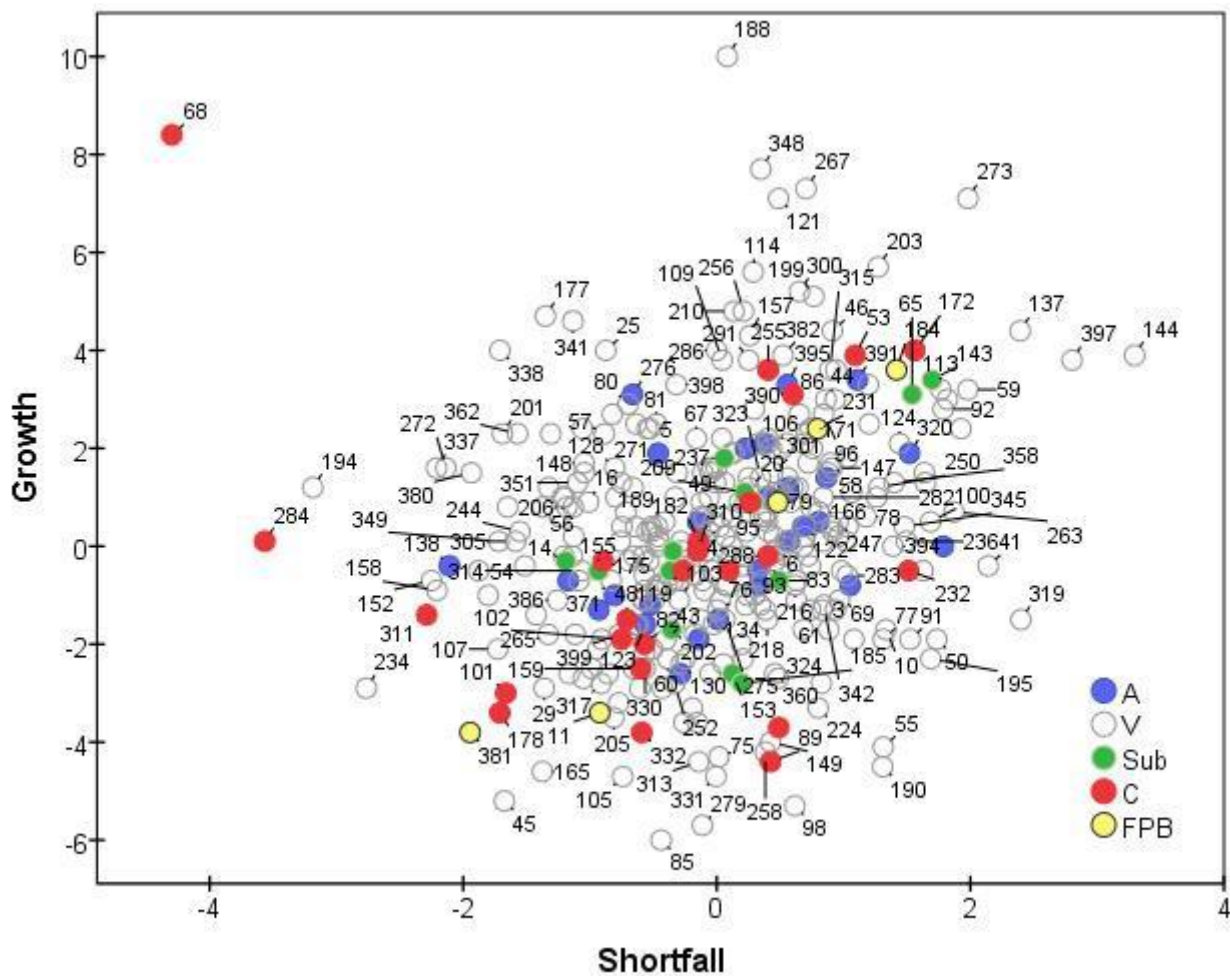
As part of the available information we also mentioned a "turnover" quality: calculated in a provided data spreadsheet and defined as the average number of staff departures over a three-year period (as a fraction of the average staff count for the same period). Values range from 0, up to 0.55 for one station where an average of 4.7 volunteers left each year from an average staff of 9.5. As noted, this quality is not associated with staffing, and this remains true when different types or regions of brigade are considered separately. There is a weak, negative correlation between Turnover and Shortfall (-0.26), i.e. brigades with a shortfall report more loss and replacement of members (Figure 15).

Figure 15 clearly shows that Turnover varies between the different types of brigade, being lowest among the Auxiliary and over twice as high among the Composite (Figure 16). It also

varies across region, following a regular North / South gradient with most turnover in Region one and least in Regions four and five. This difference is significant despite the large range *within* each region

Figure 15. *Turnover against Shortfall scores (brigades colour-coded by type)*
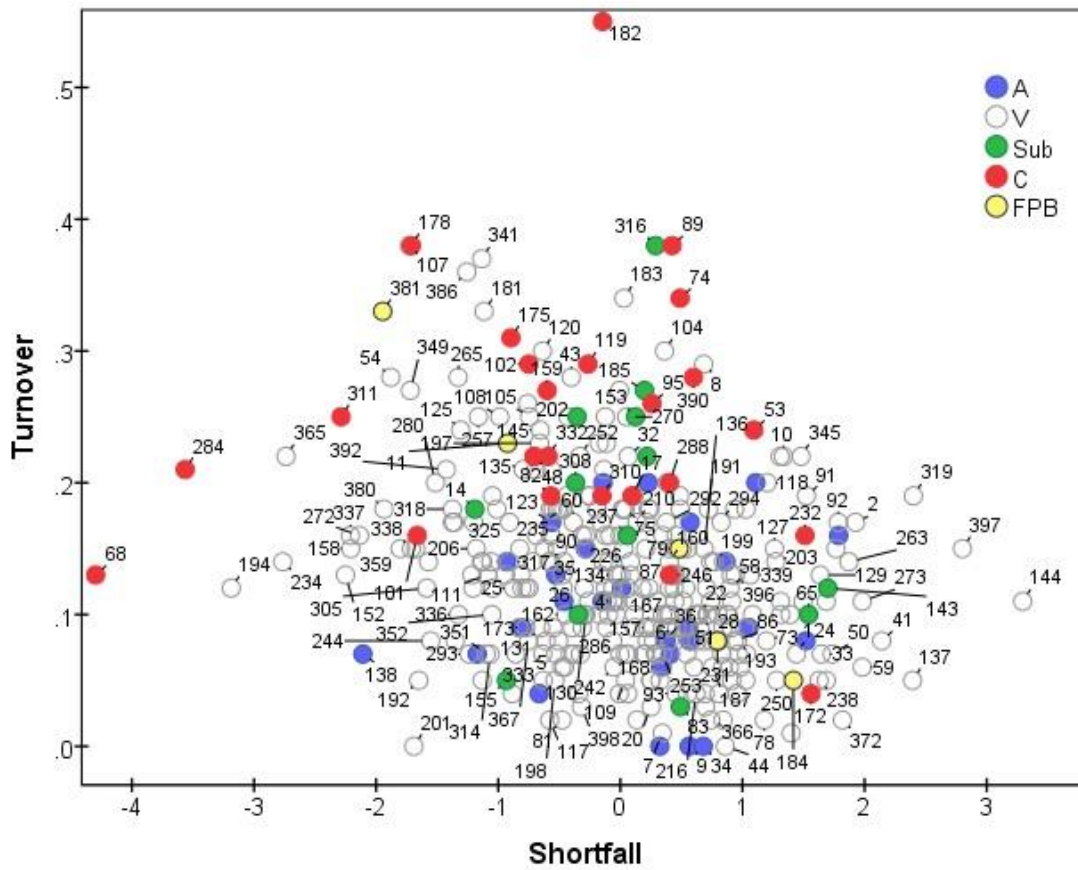
Figure 16. *Distribution of Turnover scores, grouped by brigade type and region*
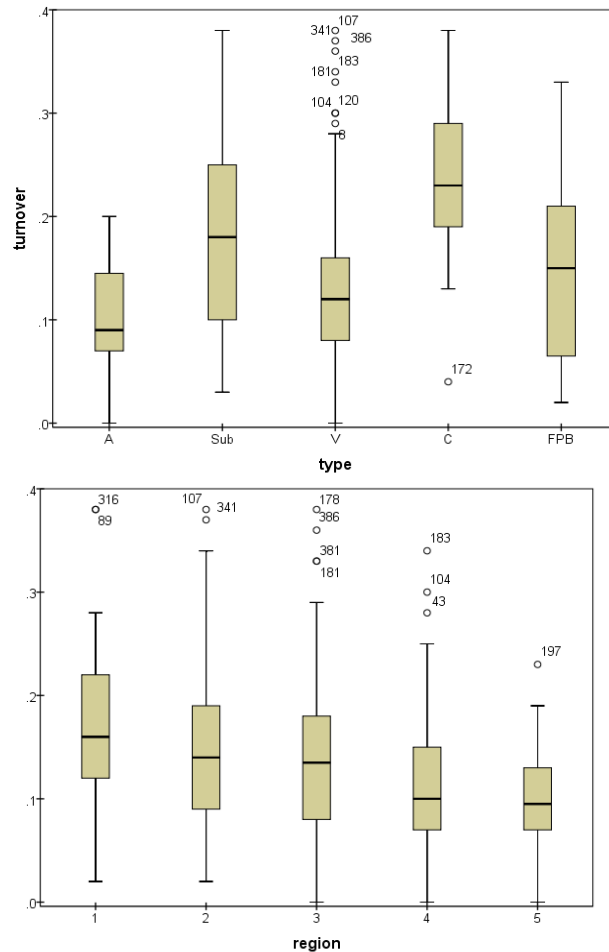
Key points

- Among measures of staffing, brigade **Staffing** *[average count and complement]*, **Shortfall**, Growth and Turnover are more-or-less independent.
- Looking at Auxiliary and Suburban brigades in isolation, Size and Shortfall are more closely related (larger brigades find it easier to recruit enough volunteers).
- Size and Turnover vary **between regions**, and between **types of brigade**.

Workload

2013/14 Data was provided by NZFS which recorded workload for Volunteer Stations under the following five headings for each brigade:

Incidents in First Response Area (Number of incidents at which the station listed was the first response)

Total Appliance Turnouts (Number of responses by the listed stations. This is a count of the number of times that appliances rolled out the station door regardless of the incident location)

Total Incidents Attended (Number of incidents attended by the stations regardless of the incident location. Excludes cover moves)

Back up incidents (Incidents outside First Response Area)

And in addition, **Total Incidents Attended** for the previous year.

We are aware that the nature of the workload varies greatly across brigades, depending on local conditions, initiatives and decisions (e.g. Rolleston and Tawa take on additional paramedical training and responsibilities; there may be overlaps with other volunteer groups such as St John's Ambulance).

Further date provided on daytime crewing includes a breakdown of incident numbers and durations into specific kinds, times of day and durations of activity. However, it is not clear whether this breakdown is consistently applied, while segmenting brigades by the nature of their activity is not necessarily linked to questions of robustness and high performance, so we have not analysed this particular data in depth.

This data also contains summary workload records, again for the 2013/14 year. Specifically, *Total Incidents, Total Turnouts* and *Total Duration* are recorded for each brigade. These do not replicate the values from the first set of records, appearing to use different criteria or different units. This is not an issue here, where we are interested in the correlations among these indicators, and whether they are sufficiently associated with one another to reduce to

a single summary value for subsequent analysis.

Factor Analysis confirms that the correlations among these indicators are indeed high.

In particular, counts of "incident" and counts of "turnout" are strongly associated with one another and are in effect measuring the same quality. The first two components of Principal Components Analysis (being the simplest form of factor analysis where the components it produces are the factors) account for 85% and 10% of the total variation across the brigades, that second factor indicating that there are *some* differences between the activity measurements (Figure 17). In particular, there is a distinction between Backup call-outs (assisting neighbouring brigades) and specifically local call-outs. The 'local call-out' factor dominates the incident-count and turnout-count variables, while "Total incident duration" lies midway between these two extremes. This distinction arises because local conditions are not identical for all brigades, with the accessibility and capability of neighbouring brigades affecting the number of backup calls independently of overall activity.

Figure 17. Loadings of incident / turnout variables in two-factor solution
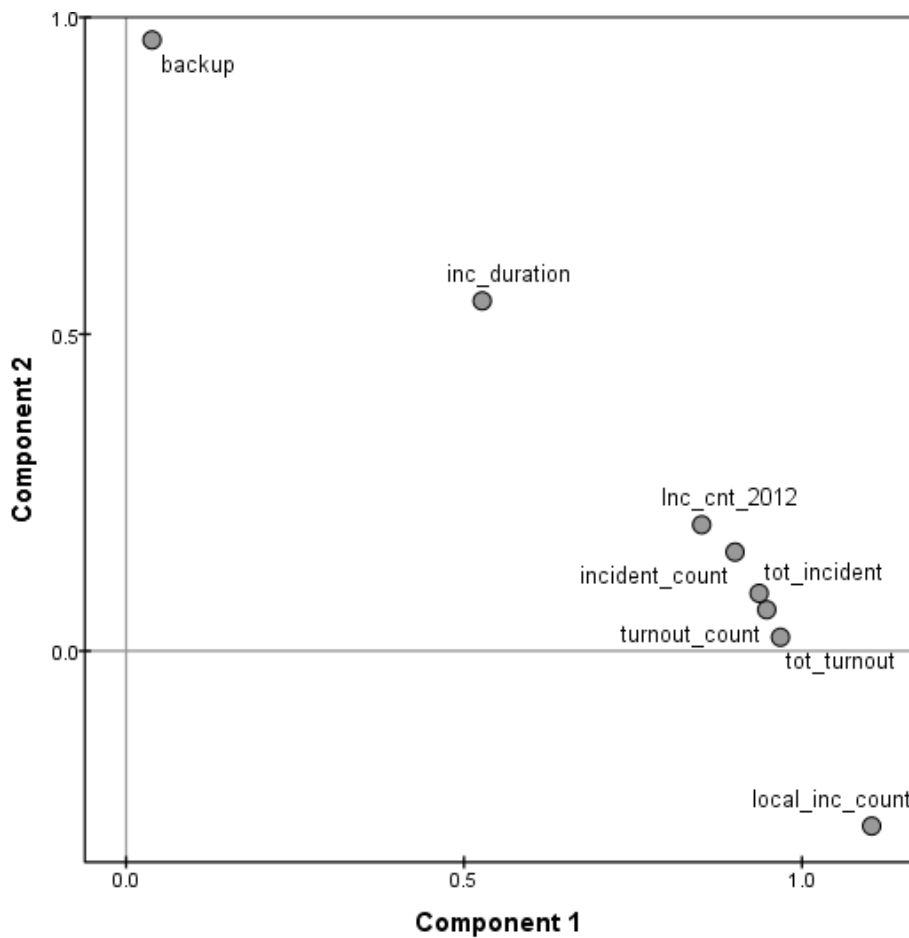
However, the second factor is not well-supported by the data, and we retained a single Activity factor, *Workload* – which collapses Backup, Incident-duration and local-count indicators in with the others. In essence this is a weighted average of the different indicators (each one weighted by its reliability, i.e. how well it is associated with the others).

Naturally *Workload* is associated with *Staffing,* but the correlation is not perfect (r = 0.70). Some brigades (#153, #273) have a workload substantially higher than their muster would predict; others are in the opposite situation (Figures 18 and 19). This is a convenient point to note that *Workload* is **not** a strong driver of the Turnover measure (r= 0.185).

Figure 18. *Workload against Staffing scores (brigades colour-coded by type)*
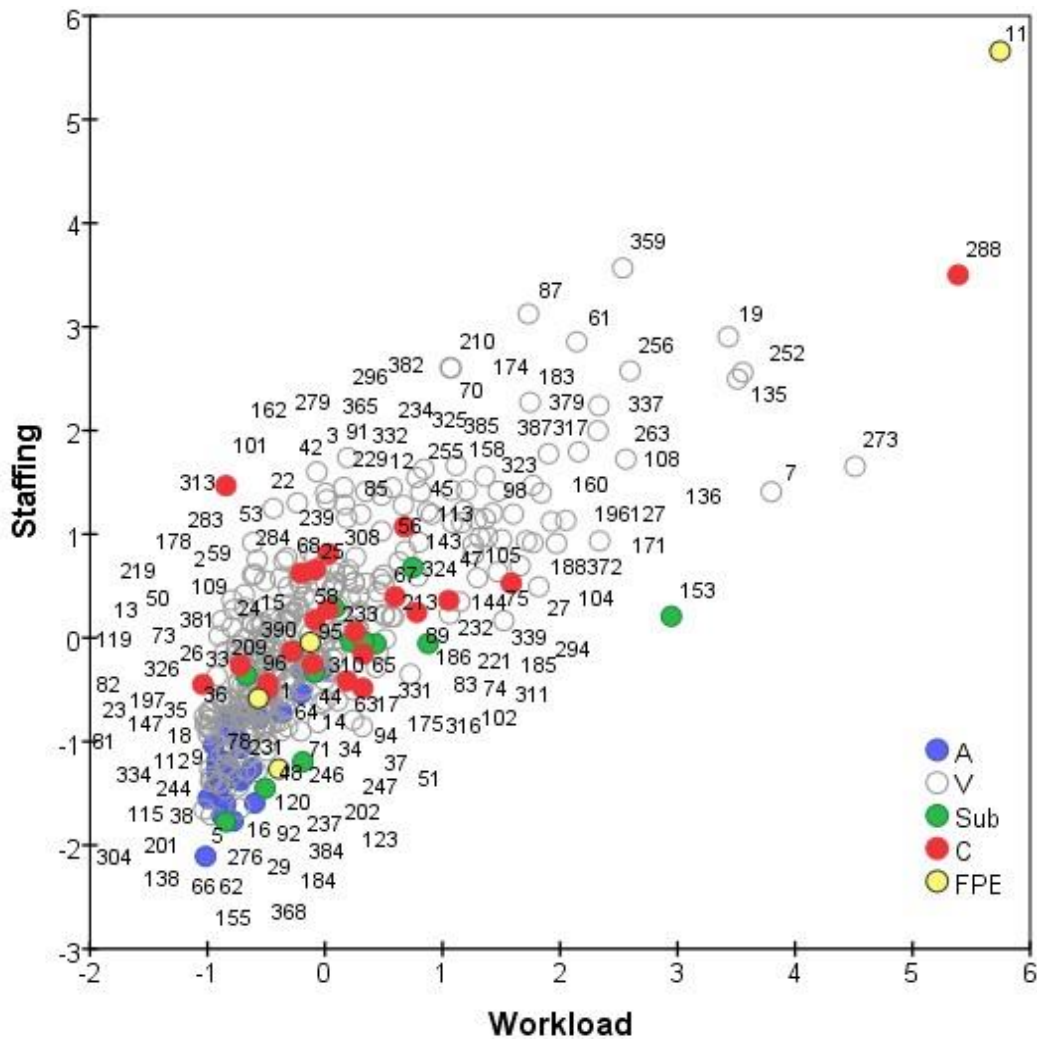
There are significant group differences in Workload between the kinds of station. Sub brigades are on average the most active, followed by Composite, while Auxiliary brigades are least active, followed by FPBs – Auckland being the exception. This contributes in turn to the mismatch with Staffing, for as noted above, Suburban brigades are *not* the most highly staffed. This places these stations on the low staff-to-workload-ratio side of the distribution (Fig. 19).

Brigades can also be grouped by region. Here again there are differences, which are significant, and also systematic *Workload* varies along a North-South gradient, with brigades in Region one having on average the highest workload, and those in region five having on average the lowest. This is what one would expect from shifts in the population over the years since the brigades were established (northward drift and urban drift) while their

boundaries or 'catchment areas' remain fixed. As noted earlier, the regional differences in *Staffing* are not as marked. The net result is to place Region five brigades on the high staff-to-activity side of the distribution (Figure 19).

***Figure 19.** Distribution of Workload scores, grouped by brigade type and region*

Figure 20. *Workload against Staffing scores (brigades colour-coded by region)*

Key points

- Measures of activity (incident count etc.) can be summed up as a *Workload* factor.
- Activity is associated with *Staffing*, but some brigades are more or less active than their size would predict.
- Activity varies between brigade type, but also between regions.

Performance Measures

This section looks at data relating to the Dashboard system for tracking how well brigades meet targets. A brigade is scored as zero, one or two (shown as green, amber or red lights on the Dashboard interface) on each of the targets. Brigades are followed throughout the year, but the assessments analysed here are from a single 'snapshot' at 27/11/2014.

A total of 15 measures are in general use. They are described below, with a capsule description of the goals or criteria against which brigades are judged. Seven measures are applicable to *all* units and marked in red, while the other eight are not applicable to Operational Support units.

Three come under the rubric of Personnel:

- *Operational Staffing* (comparing "Number of operational members against establishment")
- *Inactive Members* ("Number of fully operational members making 10% of incidents or less")
- *Training Attendance* ("Percentage of operational members attaining 50% of musters")

Four are under the heading of Qualifications:

- *Officers* ("20% of total membership or total establishment will be officers")
- *Operational Drivers* ("40% of operational membership will hold driver qualification")
- *BA Wearers* ("80% of operational membership will hold BA qualification")
- *Rescue Tender Operators*. ("70% of operational members will hold Rescue Tender Operator qualification"). This is unrecorded for about half the brigades, which do not operate rescue tenders

Two are Operational skill measures, signalling the need for individual volunteers to up-skill:

- *Critical Skills Status* ("Operational members with Critical Skills currently at Red status")
- *Core Skills Status* ("Percentage of operational members with Core Skills currently at Red status")

One measure is classified as Response:

- *Turnouts* ("First appliance will be K1 within five minutes 90% of the time")

Five come under the heading of SMS, tapping into the Station Management System:

- *Complete Incidents* ("Incomplete 'Complete Incident' tasks overdue")

- *Incident Response* ("Incomplete 'Incident Response' tasks overdue")

- *Operational Readiness* ("Incomplete 'Operational Readiness' tasks overdue")

- *Standard Testing* ("Incomplete 'Standard Testing' tasks overdue")

- *Outputs vs Plan* ("Difference between target and percentage of year elapsed")

There is one Audit Status:

- *Corrective Actions* ("Incomplete Corrective Actions overdue").

Finally, there are two measures, *Support Staffing* and *Support Drivers*, which only apply to Operational Support units, where they take the place of Operational Staffing and Operational Drivers flags (Personnel and Qualification respectively).

The spreadsheet includes a column (Avg Score) which is the *total* across all 18 measures. Its value is not entirely redundant because it includes the two *Support* measures, which are not otherwise examined here. We found it more useful to take the *average* of scores, averaged across the number of applicable measures, which varies across brigades.

In factor analysis, the first four factors accounted for 46% of total variance. Subsequent factors only provided small incremental improvements so the four-factor solution was retained. Table 1 below shows the 'factor loadings' for the 17 measures, i.e. how much each measure contributes to the aggregate score on each factor. Note that the labels characterizing the factors are only provisional. The loadings are also shown in Figure 21.

The SMS measures were all inter-correlated and coalesced into a single *Accordance with Processes* factor. 'Critical skills' and 'Core skills' were inter-correlated and formed a second factor, *Member Skills* (to which the Average also contributed). Five measures of personnel and qualifications formed a third *Qualification* factor, with the remaining personnel / qualification measures (including *member inactivity* and *training attendance*) coalescing into a fourth *Commitment* factor.

Turnout promptness contributes to all the factors except *Processes,* but marginally more to *Commitment*. It is also worth noting that the *Corrective Actions* measure contributes most to the *Qualifications* factor, but it also contributes negatively to *Commitment* (i.e. the presence of overdue corrective actions is empirically *less* common in brigades with numerous 'commitment' red flags).

Table 1. *Associations between 17 measures and four summary factors. Yellow highlighting indicates the strongest association for each measure*

Processes	SMS: Incident Response	.681	-.069	.228	.014
	SMS: Complete Incidents	.634	-.015	-.006	-.032
	SMS. Standard Tests	.594	-.103	-.175	.179
	SMS: Outputs vs. Plan	.544	.267	.289	-.026
	SMS: Operational Readiness	.478	.175	.067	.000
Qualification	Q. Operational Drivers	-.040	.709	-.080	.122
	Q. Breathing Apparatus	-.042	.673	-.196	.141
	A. Corrective	.186	.517	.299	-.446
	P. Operational Staffing	.057	.381	.084	.059
	Q: Rescue tender operators	.125	.252	.028	.161
Member skills	OMS. Core Skills	.113	.015	.808	-.052
	OMS. Critical Skills	.103	-.153	.737	.134
	Average score	.531	.503	.561	.352
Commitment	P. Inactive Members	.056	.050	.032	.692
	P. Training Attendance	-.139	.344	.218	.515
	Q. Officers	.167	.145	.000	.510
	R. Turnouts	-.134	.227	.344	.348

Comparing these indicators with those already described, there are significant negative correlations between *Qualification* and *Workload*, *Staffing* and *Shortfall* (r = -0.273, -0.357

and -0.272 respectively). *Qualification* is also correlated with "Proportional population" (r = 0.267), so in small communities where proportionally more of the population has volunteered, it is harder to ensure that everyone meets the training standards; and weakly correlated with 'turnover' (r = 0.145). Commitment has similar but smaller negative correlations with *Workload, Staffing* and *Shortfall,* and a positive correlation (r = 0.168) with 'turnover'.

Each of these indicators is uncorrelated with the other three across the brigades, because of the particular form of factor analysis used to obtain them. When a slightly different approach is used ("Oblimin rotation") which does not impose independence, they are still only weakly inter-related, the highest correlations being 0.192 between *Qualification* and *Commitment*, and 0.189 between *Qualification* and *Skills.*

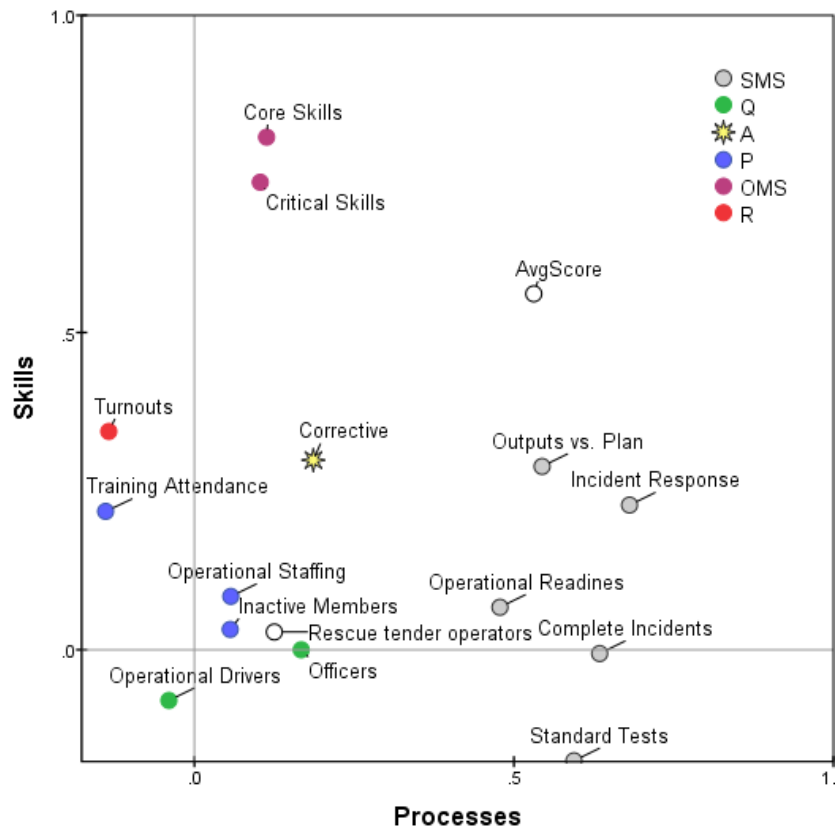**Figure 21.** *Skills against Processes loadings (variables colour-coded by type)*

Figure 22. *Commitment against Qualifications loadings for the measures*
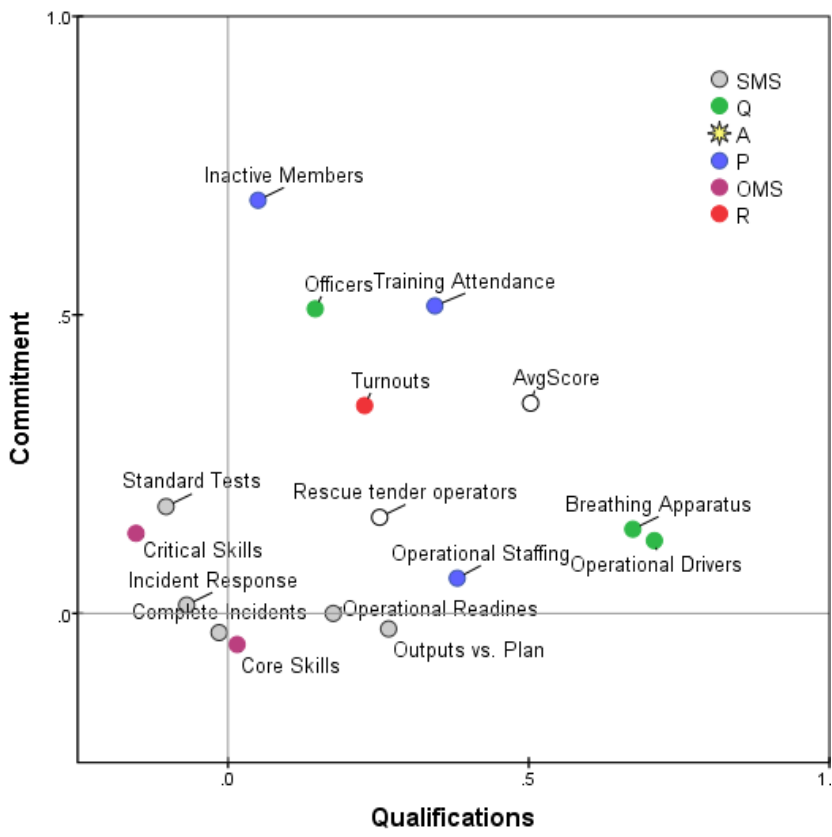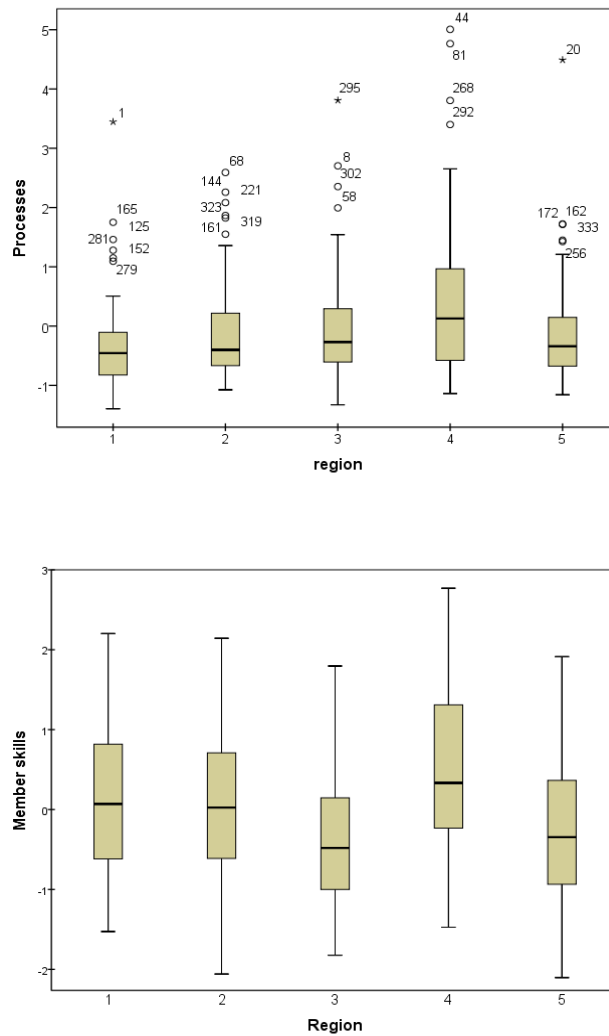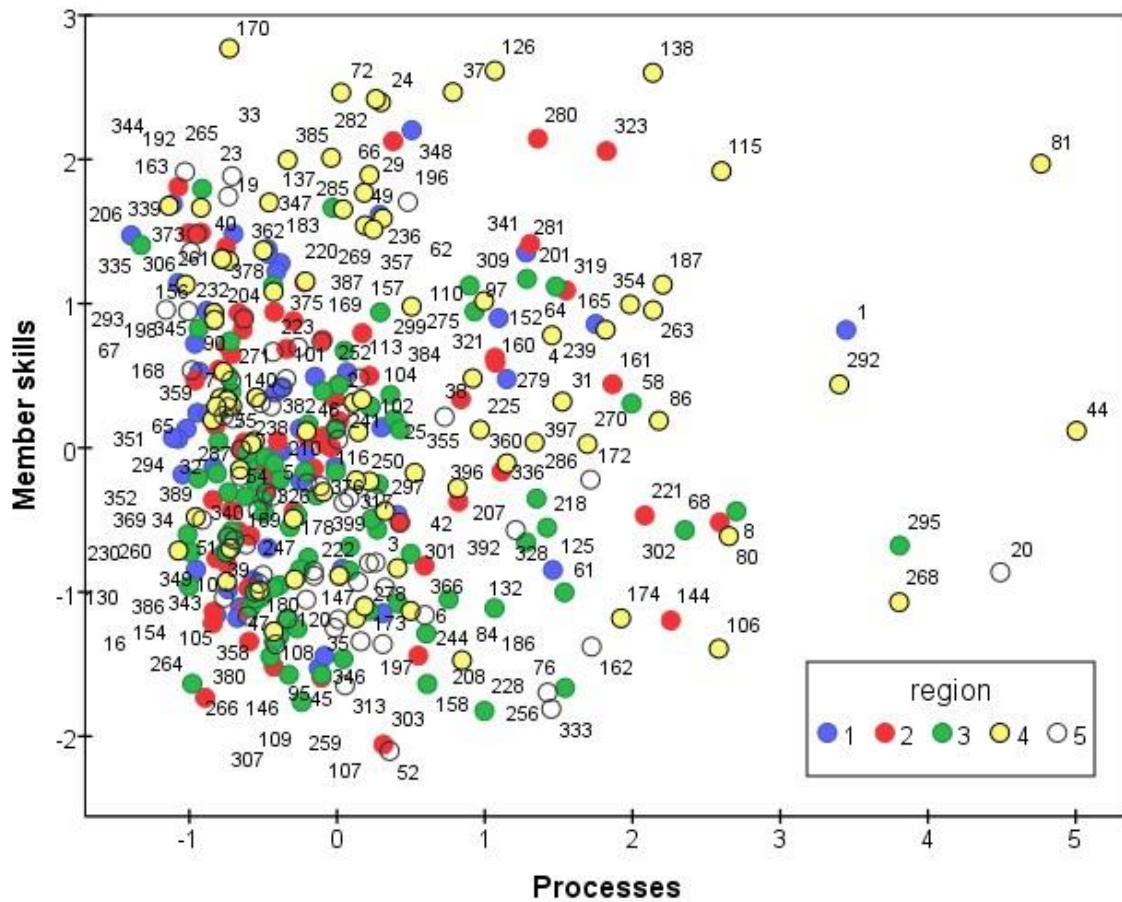
Figure 23. Distribution of Processes and Skills scores, grouped by brigade region
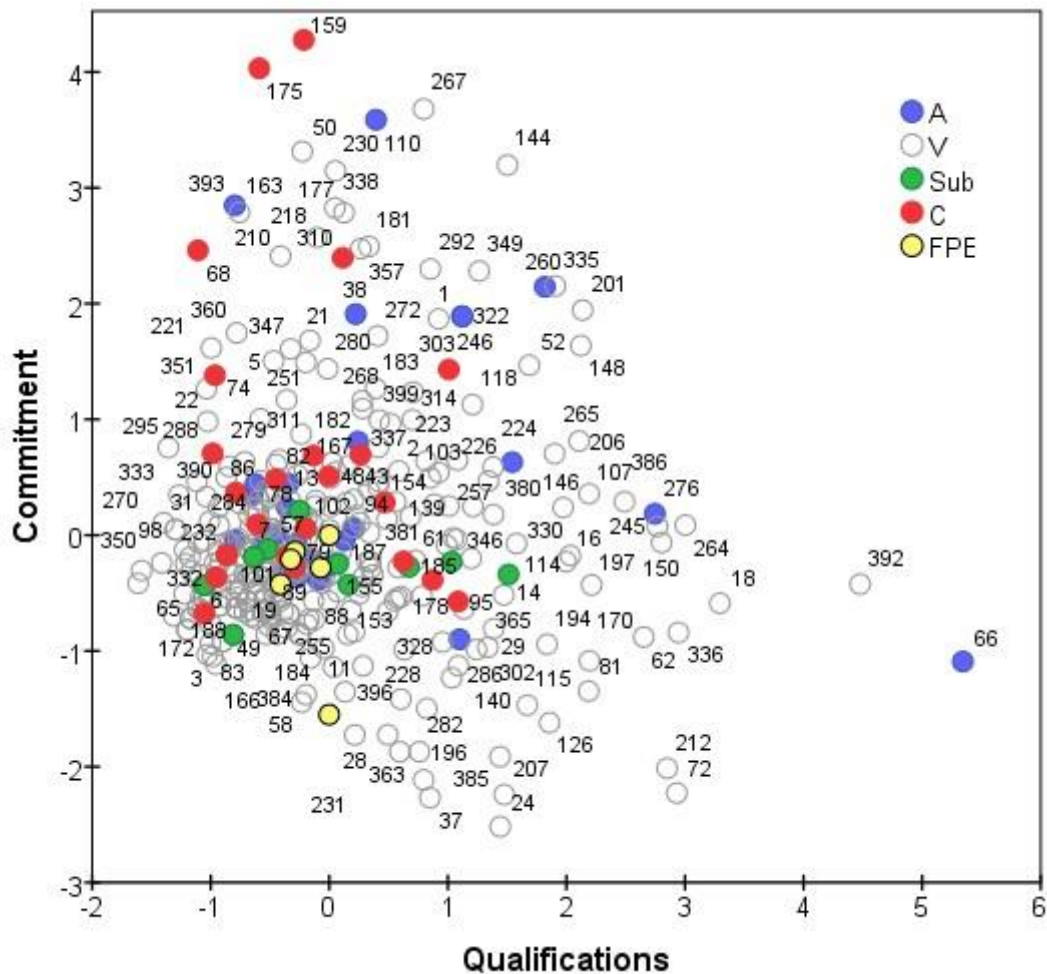

Looking first at *Processes* and *Member Skills*, both vary significantly across regions, with brigades in Region 4 (Upper South Island) tending to display more red flags (Figure 24). There are no significant variations between *types* of brigade.

Figure 24. *Processes against Skills scores (brigades colour-coded by region)*

The distribution of *Processes* is strongly skewed (Figure 24). The vast majority of brigades come close to meeting targets, with scores that are zero or negative (recall that the process of creating these aggregate scores normalizes and rescales them to have zero as their mean value). However, a minority seem to have abandoned tasks such as 'Complete Incidents' and 'Standard Testing' completely, resulting in scores ranging up to 5.01 (#44), 4.76 (#81) and (#20). The distribution of Skills is more symmetrical, ranging from -2.1 (#52) up to 2.80 (#170), 2.61 (#126) and 2.60 (#138).

Figure 25. Distribution of Commitment scores, grouped by brigade type

Turning to *Qualifications* and *Commitment*, again there are variations between the regions. Brigades in Region 3 tend to display more Qualification-related red lights, while those in Region 2 raise more *Commitment*-related concerns. What is perhaps more interesting is that *Commitment* varies between types of brigade – the only Dashboard factor to do so – with significantly more red lights among Auxiliary and Composite brigades (Figure 25).

Figure 26. *Commitment against Qualification (brigades colour-coded by type)*

Both factors display skewed distributions, with zero or negative scores for most brigades (Figure 16). Values for *Qualifications* range up to 5.43 for #66 and 4.48 for #392. Values for *Commitment* range up to 4.03 for #175 and 4.28 for #159.

Key points

- The red flags and causes for concern recorded in the Dashboard system fell into four factors: Skills, Processes, Qualifications, Commitment.

- Processes, Qualifications and Commitment scores show a notably skewed distribution, with a small scattering of brigades attracting any number of red flags.

- Commitment scores are the only ones to vary between types of brigade.

- Qualifications and Commitment scores are associated with the earlier measures of Staffing and Workload.

Summary

The available information from the Dashboard system for tracking brigade performance reduced down to four broad scales (factors): Processes, Skills, Qualification and Commitment. Each scale is a sum of a different combination of the Dashboard 'red lights', and provides a different way of comparing the membership of a given brigade against the FS expectations. In the same way, other information – recording the volunteer brigades' activities and complements – reduced to three broad scales: Staffing, Shortfall and Workload. There are meaningful correlations between these scales and meaningful variations across geographical regions and across the five categories of brigade. However, these summary values for a given brigade do not in themselves predict whether it is performing above expectations or is stretched beyond its capacity. Rather, they seem to provide a context for interpreting independent assessments or evaluations; or a baseline against which an assessment can be performed.

Key points

- Records of brigade staffing and function yielded three broad scales of *Staffing*, *Shortfall* and *Activity*. Levels of Staffing varied across the five regions of NZFS (as might be expected from historical population shifts), and between types of brigade.

- Measures of volunteer *Growth Trend* and *Turnover* were independent of these other staffing measures. They were not associated with the observational scale.

- Data from the Dashboard system – scoring how well brigades had met their performance / preparation goals and expectations – could be reduced to four broad factors which we identified as Processes; Skills; Qualifications; Commitment. Of these, only Commitment was predictive of a brigade's at-risk status. These scales come with the caveats that the Dashboard system was not intended for this purpose. Only one key relationship was found: small, quiet or under-staffed brigades are not necessarily struggling, but large brigades, and busy ones are never viewed as struggling.

- Values of *Staffing*, *Activity* and *Shortfall* were correlated with a brigade's position on the strong or struggling scales that emerged from phase one of this research.

- The culmination of data in phase one lead to the development of the on-line

questionnaire, the VBP, designed to distinguish between strong and struggling brigades and the nuances within each brigade. It was found that the information from the Volunteer Dashboard did not correlate well with the VBP apart from staffing numbers, as indicated in the previous bullet point. This is not surprising in that the focus of each measure was different. The Volunteer Dashboard focuses on measurable outcomes whereas the VBP maps key features within the brigade itself. The Volunteer Dashboard measures brigade performance against a set of criteria; the VBP measures the key features of a brigade that affects that performance. The use of both can provide a valuable insight to a brigade.

Considerations and Conclusions

Volunteer fire brigades play an essential role within NZ. They are unique in terms of the complexity of services they deliver and the expertise required in delivering those services well. While undertaking this research, we were constantly impressed by the commitment to excellence many brigades display and had to consciously remind ourselves it was *volunteers* being described to us, not paid professionals.

As with all large organisations we find variance and in this case, there was variance between volunteer brigades. The key focus of this research was to better understand what differentiates strong and struggling brigades, investigate the causes of these variations, map those features and provide a method of profiling them for on-going use and development.

In phase one the results indicated that there are thirty factors/themes that differentiate brigades, 14 of which were mapped as positive factors, which represented a range of features of strong brigades and 16 negative factors, representing the range of features of struggling brigades. It is important to note however that no single brigade had all of these features, either positive or negative. Strong brigades were not characterised by all 14 positive factors and no struggling brigades had all 16 negative factors. The overall analysis showed that all thirty factors could be related back to three key themes: **Leadership** (positive – negative), **Community/demographic** (positive – negative), **Brigade Culture** (positive – negative). Subsequent analysis of the comments section in the VBP reinforces these three core themes as being central to most differentiating features between brigades. In short, almost all descriptions of individual brigades and how they differ from each other stem from within these three core areas, though the factors that make up these core themes can vary a lot, for example the Leadership theme can vary from strong to toxic.

Leadership itself was found to be the most dominant theme across the research in both phases one and two. Whilst leadership didn't connect with every factor (for example low call-out rates, or members working out of town during day time were not related to leadership), it was connected to a wide range of other related factors. Leadership and who

held the chief's position had a considerable ripple effect.   No other factor featured as predominantly as to how a brigade operated. Chiefs were associated with influencing the brigade culture and professional operational standards, the development of others, the degree of wider community connectedness and whether or not people wanted to join as volunteer members. Good chief fire officers resemble good leaders and managers that are found across most occupational sectors. While the relationship between leadership capability and style related strongly to brigade functioning, the relationship was not 100%. Although not prominent, there were examples of brigades that were considered strong, despite the chief. This occurred within brigades where other members within the management team were suitably skilled to cover for any of the gaps or deficiencies the chief had. Similarly, though in the minority, there were good chiefs that simply worked in very difficult circumstances which resulted in the brigade being seen as struggling, in spite of their leadership ability.

A very heartening finding was the Recent (Brigade) Improvement factor. Some brigades that had been previously viewed as struggling were starting to turn around and move into the strong category. Leadership appeared to play a key role in this development of this, and it was often due to a new Chief being appointed to the position that was facilitating that positive transition. This also carried over to increasing membership in communities that had previously been struggling to attract people to join. Some chiefs, often with wider NZFS assistance, ran innovative recruitment drives resulting in increased memberships. A key feature of the analysis in phase three was the importance of a full staffing complement. Of the brigades viewed in this phase, there were no brigades with a full complement of staff that were seen as struggling, while conversely, a low complement of staffing was often identified as a feature of struggling brigades.

Overall, in terms of the Recent Improvement factor, the evidence suggests that *struggling brigades can potentially improve as long as the specific circumstances of what is causing them to struggle is clearly identified.* This is a very important consideration due to the finding from phase two of this research that across a wide spectrum of factors, each brigade's profile was unique whether strong or struggling. In terms of supporting brigades, a blanket approach to working with brigades or viewing brigades in the same way is not likely

to be effective. A full understanding of the situational, environmental, economic, demographic, group dynamics and leadership features unique to that particular brigade appears to be essential. A targeted, individual approach should guide any support, intervention or brigade development. The development of the VBP plays a valuable role here.

The VBP

Due to the unique nature of volunteer brigades, any measure or psychometric developed should, by nature of its content, reflect that uniqueness. Hence the items that make up VBP measure are direct quotes from the internal research participants when differentiating between strong and struggling brigades. As such, it is a bespoke metric, specific to and in the natural language of the NZFS volunteer brigades. It encompasses the thirty factors identified in phase one into a trilemma online questionnaire to produce both a positive and negative profile. The analysis subsequently showed that brigades that had been identified as strong in phase one scored predominantly on the positive indicator profile in phase two and less, if any on the negative indicator profile, while brigades identified as struggling in phase one scored more predominantly on the negative indicator profile and lower on the positive indicator profile.

Use of the VBP

From a Psychometric perspective, we are satisfied that the collection of 94 brigade profiles is a good starting point for the use and integration of the instrument, but it still only represents approximately a quarter of the number of volunteer brigades in NZ. Measures mature with ongoing use and reviews of data, so it is important to collect more brigade profiles from a variety of sources and to be prepared to make alterations if evidence would suggest changes are needed.

It is important to be clear that the VBP should *not* be used as part of a performance management system or used as part of a disciplinary process. It should be used as a

research and development tool. Its intention is to map the specific make up of a brigade and provide insights into areas of potential development and assistance if required.

We believe, however, the VBP has a genuine value in tracking changes within a brigade over time, for example profiling a brigade pre and post any developmental input. If, for example, a brigade has mapped as low on Lack of Succession Planning, and some assistance has been provided to address this, it can then be re- measured at a later date to see if any change in this area has occurred.

Future research using the VBP could focus on a number of important areas. For example, the use of the VBP could also assist in the early detection of negative changes within a brigade. Where a brigade profile has started to shift over time to the more negative indicators, the VBP would provide an early indicator of the problem and also specifically pinpoint where that negative shift is occurring.

It could also be applied to research how brigades could be profiled from different reviewers. For example, do different people see a brigade in similar or different ways? Does a VSO view and profile a specific brigade in the same way the Area Manager does when profiling the same brigade? If they view the brigade differently, on what particular factors do they differ on? What are the implications of such different perspectives for the brigade itself? If developmental assistance is provided to a brigade to help improve an aspect of their functioning, how far reaching are any changes seen? Did they have a ripple effect in terms of how the brigade was seen? Did for example the VSO note an improvement in succession planning and was that improvement also recorded by the Area Manager though the VBP? If not, why not? What was the disconnect? Where, if any, was the gap of knowledge or perception? It would be of potentially great benefit for observers to compare their profiles of a brigade and explore the areas of difference, if any, and discuss where and why their perception differs.

The VBP provides a common organizational language in which to understand the dynamic within a brigade and map its progress. When used as outlined, we believe the VBP will provide the NZFS with targeted, relevant, focused information on both the strengths and

struggles of volunteer brigades in an efficient way. Using combined information gleaned on the positive and negative indicators of a brigade's two profiles, any emerging potential risk or existing risk factors can be readily identified so as to enable the NZFS to implement brigade support and interventions as deemed appropriate to the brigade's individual situation.