Study report:

Predicting SAR response and operational requirements based on NZ population projections through to 2030

Volume 1: Baselines & trends, demand analysis and detailed projections

Prepared for:

Search & Rescue Institute New Zealand Ltd.

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Every effort was made to ensure the accuracy of this document; however, the uncertain nature of projected demographic data, forecasting and analysis means that the authors, SARINZ Ltd. and NZ Oil & Gas are unable to make any warranties in relation to the information contained herein. The authors, SARINZ Ltd. and NZ Oil & Gas disclaim liability for any loss or damage which may arise as a consequence of any person relying on the information contained in this document.

Executive summary

Important note to readers

The Executive Summary acts as a guide to finding more detailed content in the main body of the report, with references to relevant sections given where required. **Cross-references** to sections, pages, figures and tables (for both Volume 1 and Volume 2) are hyperlinked. Readers may use **control+click** to follow these in the electronic version of this report.

Readers seeking information about the projected future of incidents (and expected demands for SAR response) are directed to **Section 7**; the implications from factors influencing the changing future of SAR (drawn from content of the entire report) are found in **Section 8 -** for a summary see the last page of this executive summary.

This report aims to identify foreseeable patterns and trends in NZ SAR incidents and operational responses through to 2030. Methods included analysis of secondary data sources (primarily demographic projections, incident records) and a review of relevant literature, supported by primary data collection. The primary objectives of the research are to:

1. Assess how the structure (age, experience, skills and location etc.) of NZ's SAR volunteer response will be affected by projected population changes to 2030
2. Identify changes in the nature of SAR callouts (operations) over the next 20 years
3. Identify how these changes will impact on the training needs of the SAR sector

Background literature research

Background literature and information searches (summarised in Section 3), reveal clear gaps in the subject area of SAR supply and demand in general, and more specifically in relation to future projections of SAR incidents.

Supply and demand model

A conceptual model (Figure 1, refer p. 15) was developed for the purpose of addressing the implications of demographic change on SAR operations, based on a demand/supply framework. The interaction between the demand and supply factors project a pattern of incidents and responses which are either in equilibrium (meaning incidents are efficiently and effectively responded to) or out of balance (meaning operational performance issues may arise).

Baseline profiles

Baseline profiles were constructed as foundations to the development of future projections. Demographic data collation and analysis involved developing baselines of SAR 'supply' (volunteers – refer Volume 2) and 'demand' (call-out subjects – refer Section 5) groups, and applying these to long term projections based on NZ Census data. Demographic characteristics of both are examined at national and regional levels.

Incident profiles - Land-based *(refer Sections 5.2.1 & 5.2.2) &* ***Marine SAR incidents*** *(refer Sections 5.2.3 & 5.2.4)*

Data sourced from an edited summary subset of the NZ Police P130 SAR Operations Database for both Land (2819 incidents, 3805 individual subjects) and Marine (2968 incidents, 4546 subjects) SAR incidents for a 4 year period (2005-2009) included incident occurrence and descriptive information about incidents and subjects.

The distribution of **Land-based incidents** regionally contrasts with New Zealand's population distribution. Incidents are lowest in comparison to local resident population in Auckland region, and overrepresented in the total number of incidents in Southland, Otago, West Coast, Tasman and Marlborough. Overall, 80% of incidents involve NZ subjects and the remaining 20% involve overseas subjects. Most incidents originate

from the 'recreation' SAR behaviour type (73%), and the largest contributing activities are Tramping, Walking and Hunting. Specific profiles for each of these activity types are presented. Certain regions have high proportions of non-local subjects, such as Tasman, Southland and West Coast (all with high levels of tourist subjects). Analysis of Tourists' countries of origin reveals an overrepresentation of certain countries including Germany and Israel. NZ subjects tend to be overrepresented in the 15-39 year age group; so too are Males (71%) over females and Caucasian NZ subjects over other ethnicities.

Patterns of **Marine incidents** are also non-representative of the NZ population distribution, with an under-representation of incidents in Auckland and Canterbury, and over-representation in Wellington, Northland, Tasman and Marlborough Regions. Overall, 94% of marine incidents involve NZ subjects. Almost all marine incidents relate to 'Recreation' (90%) – of these, boating-general is the largest source. A large contributing activity is shore-based fishing/diving/gathering, for which a specific profile is presented. Marine SAR subjects are predominantly male (85%), with an over-representation of subjects in the 20-49yr groups. Compared with Land-based SAR subjects and the NZ population as a whole, Marine subjects tend to be more middle aged. For NZ subjects, most incidents occur in their home regions. Unlike the case with Land-based SAR subject, Marine subjects are largely representative of New Zealand population.

Specific SAR subject sub-profiles *(refer Section 5.3)*

Eight sub-profiles are presented (prefaced with a précis across all profiles) enabling high level comparisons to be made (e.g., against the NZ population as a whole and regionally, and across profiles). The specific profiles are: Alzheimer's/Dementia, 65+ year (aged), Despondent, Tramper, Walker, Hunter, Shore-based marine fishing/diving/gathering and Tourists.

Supply side profiles *(refer Vol. 2)*

Profiles of four SAR agencies (and SARINZ trainees) are presented from information derived from agency databases and, in the case of Amateur Radio Emergency Communications (AREC), from primary research. The profiles provide baseline data for comparisons with regional populations and the pattern of SAR demand incidents. The largest of the groups is *Surf Life Saving NZ* (15003 volunteers) followed by similarly sized *LandSAR NZ* (2806) and *Coastguard* NZ (2110), with *AREC* being the smallest group (1292).

There is considerable gender imbalance in three of the four SAR groups, with an extreme proportion of males being the typical characteristic. The main exception is Surf Life Saving were the proportions are almost 50:50, although the female proportion drops rapidly with age.

Each of the SAR groups shows an age profile quite different from that of the overall NZ population. Volunteers from Surf Life Saving are relatively much 'younger', those from AREC much 'older', and those from LandSAR and Coastguard much more 'middle-aged'. These findings have implications for volunteer succession-planning for each of the agencies concerned.

Volunteer numbers are also unevenly distributed around New Zealand relative to NZ population. Within each SAR group there is also considerable regional variation in the number of volunteers potentially available per incident. Overall, the volunteer profiles reinforce that SAR-sector volunteers and groups are diverse and different.

Expert predictions of trends for SAR

A qualitative assessment of expert SAR opinion is presented based on data collected from an online survey of a selected sample of SAR experts and practitioners. While the final sample size is small, the combined SAR experience of the group totalled in excess of 650 years. Opinions canvassed a number of issues potentially affecting SAR into the future (refer Section 0). Based on insights developed during the progress of the project, six major social trends likely to have impact on SAR into the future were identified – the three most important of these are (in order of importance):

i. Increased use of technology
ii. Increased tourism/recreation activities
iii. Aging overall population

Findings are presented identifying the relative importance and likelihood of these general trends, along with the likelihood of more specific change scenarios, revealing the significance of technology and aging population structures on the future of SAR.

Projections for key incident profiles

By drawing on the various source projection data (these sources are set out in Section 6), the SAR supply and demand model was applied to four incident profiles using data sources and projections customised to each (Section 7).

The future projection for Land-based incidents points towards an imbalance of demand over supply (with a growth in the number of incidents from of 25% from 2010 to 2030); whereas for the West Coast region, the outcome is one of greater imbalance of demand over supply (with both the number of incidents and the number of incidents per 10000 residents increasing 25% by 2030).

Alzheimer's/Dementia incident projections suggest very high rates of growth in incidents for Marlborough, Nelson, Taranaki, Bay of Plenty and Northland. Auckland has considerable growth as well, with a large increase in incidents (104% increase in number of incidents, and 53% growth when adjusted per head of resident populations). The projected outcome for Auckland region is an imbalance of demand over supply.

Marine incident projections point to a future increase in the number of incidents nationally. However, when adjusted for growth in population, the projection is for a slight reduction in the number of incidents per 10000 residents (with most regions showing static projections with the exception of Northland with a notable increase). At a national level, the projected outcome is a balance between supply and demand.

Marine shore-based incident projections suggest strong increases in both the number of incidents (43%) and incidents per 1000 residents (20%) nationally. The projected outcome is one of tension, particularly for those regions where non-European ethnicities are well represented (principally Auckland and Wellington).

The potential for applying projections to other incident profiles is discussed including an identified list of priority incident types.

Implications/recommendations *(refer Section 8)*

The **broad-brushed future** picture for SAR, distilled from the detail within the various patterns and projections outlined in this report, is generally one of **a changing context** (in accordance with the changing face of NZ's population) and **changing set of tensions** (manifest through imbalances of demand over supply). Certain SAR regions are predicted to experience these tensions more vividly than others – especially those for whom changes to both demand and supply factors will work in unison to generate greatest tensions. This is demonstrated mostly clearly with the projected future of Land SAR incidents on the West Coast - projected to experience a large growth in demand for SAR and increasing incidents, along with a reduction in SAR supply (due to a shrinking and rapidly aging population base). Tensions are expected in some regions and not others, varying depending on incident type. The projected future is one of greater extremes in terms of the tensions or gaps between supply and demand. Some regions are better placed to address pressures for increased SAR response than others, due primarily to the intractable dynamic of population growth (e.g., Auckland). Looking forward, there are opportunities for SAR to continue to adapt to its changing context – including greater focus on recruitment and retention of SAR capability/capacity in certain regions/SAR agencies, and across all regions/agencies in respect of the role and deployment of females, youth and a broader range of ethnic groups. Making SAR volunteering attractive to those particular groups will require a re-think of how SAR volunteers can be utilised, their motivations and expectations, and the changing demands for the mosaic of skills and expertise required to deliver the most relevant and effective SAR response for the future.

The more **detailed pictures** (by way of profiles) illustrate more specifically the contrasting future for SAR. These profiles were necessary given the diverse range of operational contexts and demands driving each of the main SAR agencies. The SAR supply and demand model (developed in this report) is instrumental for this purpose. The outcomes it predicts for SAR are robust and sufficient for the purpose of informing SAR strategic planning. Its application to specific incident types indicates that, on the basis of projections used, there will be tensions in terms of excess demand for SAR services in three of the four modelled incident types – i) Land-based incidents (due to recreation/tourism pressure); ii) Alzheimer's/Dementia (based on NZ's aging population); and iii) Marine shore-based incidents (based on ethnicity projections).

The supply and demand factors considered as part of the model have, in themselves, implications for SAR. The supply and demand profiles enable comparisons across the volunteer SAR sector, and highlight regional

differences within. Certain features stand out as having importance for SAR readiness in the medium to long term, particularly in relation to aging volunteer profiles. These are demonstrated most clearly with AREC, and also to a lesser extent with LandSAR and Coastguard.

Findings presented on the **amount of volunteers relative to the number of incidents** for each region help to identify those regions that are either above, or below average in terms of relative volunteer resourcing potential for SAR. Those regions where resourcing is below-average warrant closer examination in order to determine whether they require specific management interventions targeted at increasing retention and recruitment of volunteers. This should be done in light of the longer term projections identified for each region. Examples of relevance here for LandSAR include Wellington, Southland, Auckland, Tasman and Bay of Plenty regions; and for Coastguard/Marine: Wellington, Tasman, Otago and Nelson regions.

In general, the findings of this study point to the need for **SAR strategic planning** to take account of the projected changes in demand for SAR and SAR response capability/capacity. These changes are driven by long term demographic change resulting in an aging and ethnically more diverse population, with a greater number of more diverse activities (and likely demands for SAR). Implications include projections for less volunteer capacity/capability in certain regions (e.g., West Coast) or functions (e.g., Radios - AREC). Technology is a key variable anticipated to affect SAR at a number of levels, including both the potential for improving SAR efficiency and effectiveness, and at the same time creating further challenges in terms of changing incident demands and volunteer skill requirements – including increased expectations for immediate and successful SAR response. Challenges lay ahead in terms of greater resource competition for SAR (particularly in regions projected to age most rapidly).

Findings highlight opportunities for SAR agencies to **apply management responses** that best suit the specific contexts for each agency/region or incident type. Various potential initiatives are outlined including programmes to: i) improve volunteer recruitment and retention (including training); ii) grow roles for women & youth in SAR; iii) create 'OneSAR[2]' career paths and training opportunities; and, iv) evaluate regional and central resourcing (particularly in relation to pressures from greater professionalising of SAR). Other more detailed recommendations are presented in Section 8. Overall, the study demonstrates the importance of information sources as a key driver, or' fuel', for projecting out the future for SAR and the OneSAR approach.

[2] The term 'OneSAR' is used informally within the NZ SAR sector to describe the collective response for a common good from within the SAR sector.

1. Introduction

1.1. Background and purpose

This study was initiated by the Search and Rescue Institute New Zealand (SARINZ)[3] as part of its business of supporting SAR in New Zealand through (SARINZ 2009):

- Delivering training programmes and courses
- Undertaking and coordinate research and development
- Creating education programmes

By doing, this SARINZ is supporting the goals of the New Zealand Search and Rescue Council (NZSAR 2008), to:

- Enhance the effectiveness and efficiency of New Zealand's SAR sector
- Achieve the culture of "one SAR body"[4]
- Promote continuous improvement
- Maximise the potential of SAR people
- Support preventative strategies

As further noted by NZSAR (2008:1) *"It is imperative that the NZSAR sector is aligned, coherent and cohesive so we can quickly, effectively and economically respond to the needs of New Zealanders[5] in distress"*. To achieve this enhanced capability it is critical to understand the driving factors affecting key elements of SAR-sector business, how these may be changing, and what may be coming in the future. It is becoming increasingly understood that society is always changing, and that what has worked in the past may not be how things need to work in the future. As a consequence the SAR-sector is continually taking actions to improve its understanding of SAR demand and supply issues, and its capability to better proactively anticipate and deal with SAR challenges and opportunities. There is a range of actions that are currently been undertaken, including improving the data collected on volunteer membership by Coastguard NZ (Bruce Reid, pers. comm.), implementing the LandSAR Strategic Plan (LandSAR 2008), and the implementation of 'Project Ground Swell' by Surf Life Saving New Zealand (SLS 2009).

As part of this growing future focus, and the unifying-styled 'OneSAR' principle, this project undertakes analysis aimed at providing an information resource to support such current initiatives and inform those new ones to be developed in the future. It does this by scoping baseline information on SAR supply and demand factors, and then uses this information along with projections forward in time to identify some key future areas for strategic planning and research direction. While not all the future social changes that might be important to SAR can be predicted, there are some wider trends that can be identified, monitored and researched. Where made possible by the presence of useable data and information, this study addresses some of those trends.

1.2. Objectives

The primary objectives of the research request were to:

1. Assess how the structure (age, experience, skills and location etc.) of NZ's SAR volunteer response will be affected by projected population changes to 2030
2. Identify changes in the nature of SAR callouts (operations) over the next 20 years
3. Identify how these changes will impact on the training needs of the SAR sector

[3] With the funding support of New Zealand Oil and Gas.
[4] Increasingly being referred to as the "OneSAR" approach.
[5] And guests to New Zealand – including the wider official Search and Rescue Region.

The secondary objectives of the research request were to:

1. Map the current capabilities of SAR agencies (NZ Police, Maritime NZ (RCC), Coastguard NZ, Surf Life Saving, LandSAR) against the expected demands for their services with a specific focus on the training gaps to meet future demand.
2. Identify the longer-term research, capacity-building and educational initiatives which would enable SAR agencies to efficiently respond to a changed population structure.
3. Provide recommendations on potential solutions to gaps and / or needs identified
4. Identify areas for further investigation i.e., scope a way forward

These objectives were supplemented by 10 guiding questions made in the project specifications (see Appendix 1).

Recognising that this research was largely exploring new ground with variable quality of information sources to draw upon, and as discussed with the project management team[6], these objectives and guiding questions were viewed as key research themes for a baseline-scoping type of study rather than as a prescriptive or exclusive list of outputs. They aimed to guide how the project was developed and directed as it evolved. While striving to meet these ideal objectives as far as possible, in dealing with this diverse and incomplete information resource the researchers have applied the principle signalled in the words of Sir Tim Wallace, as quoted by past SARINZ Trust Chair Allan Gillespie (SARINZ 2008:3):

> ***"Never let the things you can't do get in the way of the things that you can"*.**

[6] Ross Gordon and Dave Shearer, SARINZ, pers. comm.

3. Review of Existing Information

3.1. Summary conclusions drawn from the literature

SAR demand factors

- Apart from some annual reporting of summary statistics collected about SAR incidents and subjects, there is very little other research or information on SAR demand.
- With the exception of lost person behaviour assessment (Koester, 2009), practically nothing has been done on the specific characteristics of the SAR subjects themselves and their activities, or in any baselines or trends related to these.
- A few area-specific studies have looked at changing outdoor recreation incident types over time, although these have generally been focussed primarily on the epidemiology of injuries from a medical emergency service perspective. Few examples have been found to date that also highlight who the SAR subjects are and how they are getting in to trouble.
- While there are many anecdotal perspectives, practically no research has been done on the impact of technology change other than to note reduced response times, and technical studies on hardware and system performance. The impact on demand (incidents and expectations) has not received research attention.

SAR supply factors

- There is very little direct research information on the types, needs and future of SAR volunteers or the likely impact of technology or demographic change on such volunteers in the future.
- Considerable useful inference can be drawn indirectly from work on Australian bush fire fighter volunteers in particular, and from the much more extensive range of general volunteer research.
- There is considerable opportunity for any new work undertaken in this area to make a wide and leading contribution to SAR volunteer management in New Zealand and overseas.

Overall

- The absence of research and information relating to future projections of SAR incidents (and demand and supply factors) illustrates a gap in knowledge underpinning projections about the future readiness of SAR.

3.2. Approach

This review section is designed to summarise the existing baseline research coverage of key issues outlined in developing the supply and demand model, and to identify any pre-existing material looking at the future of SAR. It is not designed to specifically review and summarise the content of the material, but to identify it and note the main points of coverage and gaps. Exploring specific elements of that material in-depth will be among the themes of research recommendations for the future.

The review involved searching internet reference and abstract websites, the websites of key stakeholder organisations, and follow-up searches from key references and sources found. The scope includes any New Zealand and international material that could provide significant contribution.

The review is structured in two parts. The first part is based on the demand-side of the SAR sector. This explores research and data on the types and characteristic of SAR incidents and SAR subjects, and of any patterns and trends in these. The second part is based on the supply-side of the SAR sector. This comprises research and data on the types and characteristics of SAR volunteers, and of some factors that may affect their roles and availability.

3.3. Demand-side research

3.3.1. Demand for SAR

The main finding from this review is that there appears to be practically no published research specifically targeted at SAR demand in New Zealand. This was also found to be the case overseas, with very little demand research specific to SAR. While some SAR-sector organisations may have conducted some internal assessments or monitoring of their specific demand variable (e.g. numbers of callouts, volunteer hours, training course attendance etc.) there is little that has been systematically analysed, reported and published further. Such basic information is typically summarised only partially in the annual reporting documents for the respective organisations.

Overall the only published information generally available on SAR demand issues is derived from Police records of Category 1 SAR incidents, and from RCCNZ records for Category 2 SAR incidents. Variables related to the Police SAR incidents are recorded in a 'P130' form, which is then entered on to either the Marine or Land SAR P130 databases. Variables related to the RCCNZ SAR incidents are recorded in databases managed at Maritime New Zealand. From these data bases NZ Police summarise some of their SAR demand data in annual statistics reports (NZ Police 2009), while NZSAR summarise from both the Police and RCCNZ data in their annual statistical analyses (NZSAR 2009). These are the only sources of SAR demand data for both incidents and subjects in New Zealand, and have rarely been used for any deeper research analyses or publications. The main example of significance to this project has been the use of the P130 land data as part of the data resource behind the book *Lost Person Behaviour* (Koester 2009). This book primarily summarises selected SAR demand data from a wide variety of international sources that is related to subject 'lost-person' behaviour patterns. This is very useful for assisting the predictive operation of SAR searches in particular. It includes some basic information about SAR subjects, their activity types and their behaviours when lost. But it is somewhat constrained in demand analysis capability by the limited range of information collected in the source databases used. For example, only around half the database sources used have any kind of demographic information about the SAR subjects. It demonstrates that there are hardly any international examples of SAR-specific demand analyses beyond its lost-person behaviour focus, which relates more to the improving the conduct of SAR operations than exploring the demand factors affecting SAR occurrences. Overall there appears to be a notable gap in SAR demand analysis.

One very notable exception is provided by an extensive survey conducted over 20 years ago by Canada's National Search and Rescue Secretariat (NSRS, 1999). This broad-ranging phone-based survey questioned samples of SAR providers, co-ordinators, and subjects, plus a sample of the general public, on a range of SAR issues. These included scoping public knowledge and perception of SAR; identifying activity-types and subject groups of risk; and identifying trends in demographics, technology and society which may affect SAR in the future. No SAR-specific work of this scope was identified either before or after this 1999 study. The only notable research found that related indirectly to understanding future SAR needs came from an Australian study of ambulance demand factors (AIPC 2007). Given that this research gap represents a 20 year period to date, it again reinforces the lack of in-depth SAR-specific demand research.

A few specific areas of SAR demand have received greater attention due to the identification of specific issues affecting them and priority be assigned to addressing these issues. The main example known is that of incidents related to drownings from shore-based fishing in the Auckland area. One stream of work used data from WaterSafe New Zealand's 'DrownBase' database to assess drowning incidents by water-based activity types (Purnell, 2008). Another stream of work built on a collaborative water-safety programme targeted at shore-fishermen to conduct a number of on-site surveys to identify key demographic and behaviour characteristics of shore-based fishers (Moran 2008, 2009). However these types of targeted research efforts on potential SAR subjects and risk activities are rare, and no other notable New Zealand or overseas examples were identified.

Some demand inference can be drawn from research on the prevalence and characteristics of outdoor recreation incidents and injuries. These studies are most often based upon local park-unit incident records; attendance and admission records from hospital emergency departments; and from data

collected other agencies with related responsibilities (e.g. Accident Compensation Corporation). Some studies of this type in New Zealand and overseas have recently been summarised by researchers at the New Zealand Mountain Safety Council (e.g. Cessford 2009, 2010; Dignan and Cessford 2009). Most of these have focussed on the nature of the injuries, accidents and medical service implications (e.g. Guly 1996; Malcolm 2001; Monasterio 2005; Stephens et al. 2005; Bentley et al. 2006; Flores et al. 2008). While covering the same topics, some also make greater reference to more SAR-specific demand components such as extraction method, subject characteristics and activity types. Examples here include Scottish mountaineering incidents (Sharp 2007a & b); New Zealand outdoor recreation incidents (Cessford 2009, 2010; Dignan & Cessford 2009); SAR trends associated with recreational travel in US National Parks (Heggie & Heggie 2009); and accidents in North American mountaineering (Williamson 2006). These studies and others similar to them indirectly contribute to an understanding of some aspects of SAR demand issues.

In terms of considering future SAR demand there has been very little research done. The Canadian survey done in 1999 (NSRS 1999) is an important early example of research involving some future perspectives on demand. However beyond that there is little known with any notable future focus on SAR and demand.

3.3.2. Demand for Recreation Activities

Demand for outdoor recreation has rarely been directly related to levels of SAR demand. As is shown above, the demand data for SAR is not extensive, and this is also the case for outdoor recreation demand. Older recreation research reviews in New Zealand identified a major research gap in recreation demand and trend information (e.g. Aukerman & Davison 1980; Booth & Peebles 1995). Along with the current study, recent reviews related to outdoor recreation incidents (Dignan & Cessford 2009) and to outdoor recreation research overall (Booth & MacKay 2007) also confirm that this major research gap is still present.

The only consistent source of longitudinal data which could indicate wider trends in outdoor recreation participation is the Active New Zealand Survey conducted by Sport and Recreation New Zealand (SPARC)[7]. While this tool is a robust measure for its purpose as a high level indicator, it has only been conducted three times since the late 1990s, which means that any changes in participation levels that might exist have not yet emerged clearly as identifiable trends. Based on current results it can only be concluded - from this source - that participation rates in most outdoor recreational activities are relatively stable in relation to wider population change.

There are no other systematic longitudinal measures or research results available which can clearly demonstrate clear trends of either increasing or decreasing participation levels in New Zealand outdoor recreation activities relative to national population). There are a number of indicative information sources which suggest some change is taking place, and Dignan & Cessford (2009) explored a number of these. However they concluded that they could only make a number of very general propositions about the likelihood of possible changes in hunting, tramping, fishing and mountain-biking participation. From all indications discussed in Dignan & Cessford (2009), the main conclusion that can be drawn is that there is no clear evidence of notable decline or increase in any major types of New Zealand outdoor recreation activity. For example, while some data they presented from the USA showed hunting participation was decreasing there over time, this could not be proposed as a trend for New Zealand. Here they found various data on hunting licences and NZ Deerstalker Association membership that was indicative of both decline and increase in hunting numbers, and concluded that participation rates were most likely to be relatively stable at present. Similarly ambiguous data for tramping, fishing and mountain-biking was also found.

Overall, the research and information available on outdoor recreation participation levels suggest that there are not any strong trends of change currently present. If such change is occurring there is no source

[7] See the Active New Zealand page on the SPARC website http://www.activenzsurvey.org.nz/ This assesses participation levels based on having done the activity in the last 12 months, so is only a broad level indicator.

of data currently available that is clearly demonstrating this. Based on SPARC's Active New Zealand Survey as the only overall longitudinal data source available, the overall picture appears to be one of participation stability relative to population growth for most outdoor recreational activities. However this is based on domestic recreation participation, and there is significant impact when tourism trends are taken in to account.

3.3.3. Demand for Tourism Activities

As with domestic outdoor recreation, demand for international tourist outdoor recreation activities has rarely been directly related to levels of SAR demand. Here it is important to note that in New Zealand it is common terminology to refer to domestic recreation participants as engaging in 'recreation', while overseas tourist participants are referred to as engaging in 'tourism'. This is a unique New Zealand distinction and international readers should consider the terms as being largely interchangeable. From a practical SAR operations perspective both effectively refer to whatever people are engaged in outdoor recreation activities.

However from a SAR demand perspective there are significant differences between the domestic and overseas outdoor recreation groups. In this respect the recreation activity of overseas tourists in New Zealand does represent a relatively unique SAR demand factor that is not present in most other international situations. While some recreation incident studies use the terms 'tourists' and 'tourism' (e.g. Heggie & Heggie 2009), the distinction between domestic tourists and overseas tourists is rarely if ever made. Overseas tourist numbers are not related to local socio-demographic trends, but to wider trends in international travel and destination/activity preference. As noted by Heggie & Heggie (2009), tourists in general are increasingly being attracted to more remote and adventurous activities in settings like National Parks. In many of New Zealand's outdoor recreation settings it has been repeatedly demonstrated in recreation user studies that there are often as many (if not more) overseas tourist participants as there are New Zealanders. Comparison of tourist proportions in such studies summarised in successive recreation research reviews over the years clearly indicates that this overseas proportion has been progressively increasing in numbers and in spread across New Zealand (e.g. Aukerman & Davison 1980; Booth & Peebles 1995; Booth & Mackay 2007). Reference to domestic demand factors and trends has no relevance for this distinct group of potential SAR subjects. However due to their high and continually growing proportions in many outdoor recreation settings they are a very important group to consider as a distinct subset of future New Zealand SAR demand.

In contrast to general outdoor recreation participation levels, there is more background demand information on overall tourism numbers and trends. Statistics New Zealand, Tourism New Zealand and the Ministry of Tourism cooperate to collect tourism visit data and to develop some demand and projection information on tourist numbers[8]. While this information collection is robust, it is primarily conducted at national and regional levels for wider tourism industry planning purposes. For more site-specific or sector-specific needs it is limited by its high-level context and its range of data category classifications. As a result it can only give summary data on overall tourism numbers and trends to a regional level around broad tourism profile types. The tourist type closest to the business of the SAR sector is the *Nature-Based Tourism Profile*[9], which generally involves activities such as tramping, walking, rafting and enjoying nature etc. While this profile provides only overall summary information, it does provide the basis for background demand exploration and projection, and complements the wider tourism forecasts[10] made into the future. All these more general tourism forecasts project ongoing growth in tourism visits to New Zealand, with a current estimate of an increase of around 37% by 2015. In the same period domestic tourism travel is estimated to have increased by around 21%. While the exact figures may vary the overall trend is for

[8] This information can be explored viewed from links at this site: http://www.newzealand.com/travel/trade/marketing-toolbox/tourism-research/tourism-research.cfm

[9] This profile can be viewed at: http://www.tourismresearch.govt.nz/Documents/Tourism%20Sector%20Profiles/NatureBasedTourism2009.pdf

[10] These forecasts can be viewed at: http://www.tourismresearch.govt.nz/Data--Analysis/Forecasts/

ongoing growth in the numbers of overseas tourists engaged in recreation activities related to SAR demand.

All this information provides good background for wider SAR demand trends, but there has been no notable analysis of the overseas tourist component of SAR demand in New Zealand or overseas. Closest reference is made in Police summaries of annual SAR statistics (NZ Police 2009) where the overall national % of tourist SAR subjects is stated. Beyond this note there was no specific information or research found related to tourist SAR demand. This suggests a specific gap exists in SAR demand research related to tourism.

3.3.4. Non-Recreation Demand for SAR

The non-recreation component of SAR demand relates to people who are lost or go missing for a variety of reasons relating largely to their mental state (e.g. Alzheimer's/Dementia, Despondent and Impaired etc.) or other factors beyond their control (e.g. Abduction, Other criminal acts, Accident, Entrapment, Work and Missing child etc.). The only comprehensive overview of these non-recreation SAR demand types is provided by the book *Lost Person Behaviour* (Koester 2009). This is a highly diverse group of SAR subjects with a range of demographic, incident and locational characteristics that can be quite different from those of recreation-based SAR subjects.

Overall there is little research apparent on non-recreation SAR demand. Koester (2009) comprehensively summarised the state of knowledge on a variety of non-recreation SAR subject types[11], and noted that there was generally very limited research or data available for each. While there was sufficient data for Koester to develop initial behavioural profiles for guiding SAR operations, there appears to be little that contributes to determining key factors in non-recreation SAR demand and trends. There is also no apparent research related to non-recreation SAR incidents in New Zealand. This reflects a wider research gap, and even when considering the status of Dementia overall in New Zealand, Alzheimers New Zealand (2008) noted that until their 2008 study there had been no definitive or reliable data available to determine the actual number of people with Dementia. Furthermore they noted that on a per capita basis the research spending on Dementia in New Zealand was actually lowest among OECD nations. This demonstrates that even with an issue as significant as Dementia, which was the largest non-recreation subject category reported for New Zealand in 2009 (NZ Police 2009), the amount of research information related to SAR demand is virtually non-existent. In this context it is perhaps no surprise that there was virtually no SAR related demand research found for any other less common types of non-recreation SAR subjects (e.g. Despondent, Suicide, Impaired, Missing child and Work etc.).

It is also apparent that a clear distinction between recreation and non-recreation SAR subject types is not clearly made in most cases. In examples of SAR subject categorisation illustrated by Koester (2009) and from the reporting approach of SAR subject data in New Zealand (e.g. NZ Police 2009; NZSAR 2009) the various categories of non-recreation and recreation based SAR subjects are usually reported together. Where such data is reported it is not uncommon to see situations where SAR cases arising from Dementia might be reported alongside those from Diving (e.g. NZ Police 2009). It is not immediately clear the overall distinction between the proportions of recreation and non-recreation-based SAR subjects, but using figures from NZ Police (2009) it was apparent that only around 8.5% of the SAR incidents reported in 2008-09 related to non-recreation SAR subjects (including 4% being Dementia) – and over 90% of SAR incidents were recreation related. However while these non-recreation subjects only accounted for less than 10% of SAR incidents reported, it is likely that in some regional locations with less frequency of recreation-incidents they may be locally much more significant. This could not be determined as data from the NZ Police 2008-09 statistics (NZ Police 2009) did not have regional breakdowns by subject activity. This illustrates another research gap in addressing some of the more specific elements of SAR demand.

[11]Some key insights on a range of non-recreation SAR subject types studied by Koester for his book (Koester 2009) are summarised at: http://www.dbs-sar.com/SAR_Research/alzheimer_research.htm

3.4. Supply-side research

This comprises research and data on the types and characteristics of SAR volunteers. SAR volunteers are defined here as those engaged in activities supporting SAR through a range of organisations including LandSAR New Zealand, Coastguard New Zealand, Surf Life Saving New Zealand and the Amateur Radio Emergency Communications (AREC) network. While there are other elements of SAR supply such as funding systems, none are specifically related to the 'socio-demographic future' context of this project. Future technological change is considered likely to impact on the nature of future volunteer roles and is therefore included here as a key supply element. Research was selected by its relevance to the topic area, firstly being NZ SAR-specific volunteer research, then related emergency service sector work, and then general volunteer overviews in NZ. As the main purpose of this review is to identify and describe material more directly relevant to understanding SAR volunteer supply, and highlight the presence of any notable gaps, it was beyond the scope of the current study to look into all generic volunteer research material.

3.4.1. National level volunteer data

While national level data on various types of unpaid work is collected by Statistics New Zealand as part of the New Zealand Census, the National Time Use Study and other sources of official statistics, the classification of specific activity types used is not refined enough to allow specific identification of SAR-specific volunteer numbers or trends[12]. The New Zealand Census categorises emergency service volunteer activities as a type of '*Unpaid activity*' under a sub-heading *'Other helping or voluntary work for or through any organisation, group or marae'* (Statistics New Zealand 2006). The National Time Use Study categorises emergency service volunteer activities in the '*Other unpaid work*' category under the sub-heading *'Providing Emergency Services'* (Statistics New Zealand 2001). And official description of the New Zealand community sector categorises emergency service organisations under the sub-heading '*Emergency and Relief*' within a wider *Social Services* activity group (OCVS 2010). None of these provides any further categorisation that would allow identification of SAR-specific volunteer data in official statistics. Similarly, an otherwise comprehensive review of social service volunteering in New Zealand (Wilson 2001, Wilson et al. 2001) made no mention of any emergency service volunteers or context. Terms such as rescue, emergency services, SAR, fire service, ambulance (etc.) were completely absent from the text.

The range of volunteer information possible is best summarised by Volunteering New Zealand which outlines useful general information about volunteering levels, effort and types (Volunteering New Zealand 2009). However this is simply a summary of general descriptive information about volunteering and it depends on whatever data is collected elsewhere from sources such annual reports and web-pages. It is clear from this that there are currently no national levels sources of descriptive information about SAR-specific volunteers.

3.4.2. SAR-Specific Volunteer Research

When considering research studies on SAR-specific volunteers the most relevant research found was that related to the training needs of the wider emergency service volunteer sector (NZIER 2008a & b)[13]. This is an important study which explored training issues and needs by interviewing 52 emergency service volunteers, including some representatives of LandSAR NZ and Coastguard NZ. It provided good general directions for guiding the provision of training services into the future. One key finding was that there were many different profiles and segments of volunteer types across the emergency service sector and within specific organisations, and that training initiatives should be developed and matched to key segments (NZEIR 2008a&b). However it acknowledged that the sample from each emergency service was small, and that the findings could only be seen as indicative.

[12] SAR-types of volunteer work activities are classified in under the Social Services.

[13] This is complemented by a study of training motivators and barriers among fire service volunteers (Corydon Consultants 2008),

Exploring such segments generally, and particularly in relation to SAR volunteers, was beyond the scope of this important baseline study. It was found that no other research had been conducted which directly investigated the types, characteristics and needs of SAR-specific volunteers in New Zealand. This was also the case in overseas research, with only a few isolated examples being found of high level overviews of supply issues only somewhat related to SAR volunteers themselves. In the USA Denver et al. (2006, 2007) reviewed basic descriptive information about over 1000 SAR teams using information found on SAR group web pages and through email contacts. This information was very basic and collection was found to be highly constrained by inconsistent data coverage and consistency. They noted that calls were made almost 30 years previously (1981) for a comprehensive SAR database, and it was clear from their experience that such an information resource was still not present. Similarly, a major SAR volunteering review in Canada (NSS 2007) highlighted the lack of available and accessible SAR volunteer data as a constraint. While limited data coverage and consistency is also an issue here, the researchers were also constrained by some SAR sector groups not allowing data to be used while others did not wish to participate at all. In this case only high-level land-based SAR volunteer information was available. Overall, none of the studies viewed provided any useful insight in to the types and characteristics of SAR-specific volunteers, and it appears that little if any specific research has addressed these information needs in any useful detail.

Some parts of the New Zealand SAR sector are beginning to look more directly at future planning for the supply elements of their services, with the prime example to date being the *Project GroundSwell* initiative of Surf Life Saving New Zealand (SLS 2009). However this is only a recent initiative and it does not yet appear to have reached the point of analysing and segmenting its volunteer resource, although the likelihood of such work has been indicated and a research programme is being developed[14].

3.4.3. Emergency Service Volunteer Research

While little useful research information was found on SAR-specific volunteer supply, some areas of the wider emergency service sector do provide a greater range of useful material. This material is largely comprised of a very extensive programme of volunteer firefighter research conducted by the Bushfire Cooperative Research Centre (CRC) in Australia[15], complemented by a few similar New Zealand examples (UMR 2001. 2003; Johnstone 2002). While not directly related to the SAR-sector, the issues of supply related to future volunteer availability and capability in a changing socio-demographic context are very similar. In the absence of SAR-specific volunteer analyses these bush firefighter studies provide important indicative sources. This is particularly relevant since these studies were undertaken as part of a specific planned programme of work established to address similar deficiencies in these same volunteer supply information areas[16]. The range of topics addressed in the Bushfire CRC volunteer research programme is broad, and many themes overlap across different publications at times. But general coverage is summarised below, and unless otherwise stated the research relates to Australian volunteer bush firefighters.

Baseline volunteer data and profiles

The content and coverage of volunteer databases was reviewed early in the research programme by McLennan (2004a) across Australian rural fire service agencies. While all had collected some information about their volunteers, the scope accuracy of this information was found to vary considerably across different organisations and within them. Where such information was collected it was usually only the bare minimum required for administrative purposes such as basic contact information and membership status. The ability to easily extract and analyse any information on volunteers was also found to be highly variable. While McLennan (2004a) concluded that few fire agencies gathered sufficient information for strategic future planning related to volunteer numbers and capabilities, they did note some indicated intention to improve the range and quality of demographic information. While such baseline review of

[14] Refer to the research site on the Surf Life Saving NZ web page
http://www.slsnz.org.nz/Article.aspx?ID=11412
[15] Selected Bushfire CRC publications available at
http://www.bushfirecrc.com/search/?q=volunteer&x=9&y=2
[16] Note that this programme has recently been completed (J McLennan, pers. comm.).

volunteer databases has not yet been addressed in New Zealand, it has been noted in some studies (e.g. UMR 2001, 2003) that like Australia, there is no overall database of firefighter volunteers.

Subject to these acknowledged data limitations, McLennan (2004b) used the information available from these databases to summarise basic supply profiles of volunteer firefighters around volunteer numbers, age, gender, length of service and annual attrition rates. While the findings were viewed as indicative-only due to the data limitations, the report (McLennan 2004b) did represent a state-of-knowledge summary, an insight into how such information could contribute to future planning and an analysis of gaps in research and information on volunteer firefighters. On the basis of both reports (McLennan 2002a & b) a programme of further work was established which looked at addressing some of these gaps with respect to the target volunteer firefighter group. This is briefly outlined below.

Literature Review

A very extensive literature review was conducted on volunteer recruitment and retention issues (McLennan 2004c), with specific reference to a wide range of themes including general trends in volunteers, age implications, youth needs, rural volunteering, ethnic needs, economic aspects, motivations and barriers, gender issues and many others. This was produced as a resource document which aimed to provide insights from the most relevant and accessible research and information sources, and it is a key resource in that respect. One key point emphasised was that while there was considerable information on volunteer supply issues generally in Australia and elsewhere, there was little anywhere focussed specifically on volunteer recruitment and retention in emergency services. This reflects the situation identified previously for SAR-specific volunteer information and research.

It is not possible to outline all findings from the McLennan (2004c) review in the current report, but readers are referred to it as a key source. What it does highlight is that more specific information was required about emergency service volunteers from improved baseline descriptive databases through to specific research projects aimed at better understanding issues and providing for targeted volunteer segments (e.g. women, ethnic groups and volunteer managers etc.). Based on these findings an additional literature review was conducted which focussed on female volunteer firefighters (Beatson 2005), and an annotated bibliography compiled on volunteer firefighters from different ethnic backgrounds (Suss 2007). Also based on these findings McLennan & Birch (2005a) summarised the state of knowledge about volunteer fire-fighter issues to that time, and from that proposed a potential crisis in future emergency response capability.

Specific research

Based on the combined directions developed from McLennan (2004 a, b & c) and the issues highlighted in summary papers such as McLennan & Birch (2005a), a number of follow up studies and re-analyses of existing data sources in collaboration with a range of fire agencies were conducted. In an early project update McLennan & Birch (2005a) listed several specific projects across 4 different fire agencies. These had a particular focus on improving the understanding and information available about a range of identified gaps.

Among examples of such studies was a survey of recruitment and retention issues affecting rural women firefighters, which was conducted with the Country Fire Service in South Australia and the Australian Capital Territory Rural Fire Service (McLennan & Birch 2006a & b; Beatson et al. 2008). By coincidence a similar profile and assessment of recruitment and retention issues for women volunteers in the NZ Fire Service had been undertaken not long before (UMR 2003). As mentioned above an annotated bibliography of ethnic volunteering issues related to firefighting was also done (Suss 2007). Such work on ethnic volunteering has not been replicated in New Zealand and only very brief overview studies have been done (NZFEC 2004). The '*New Volunteer Member Tracking Project*' was established between the Bushfire CRC and the Victorian Country Fire Authority to regularly survey and monitor the profiles, motivations and satisfactions of new volunteers (Birch et al. 2007; O'Loghlin et al. 2007). This programme was used to explore issues related to youth recruitment (O'Loghlin et al. 2007), age and motivations (McLennan & Birch 2008) and relationships between motivations and experiences that affected decisions to remain or resign form volunteer roles (McLennan et al. 2008a, b & c). In the latter study by McLennan

et al. (2008b), it was also apparent that there were other useful information sources which were being incorporated in analyses such as the exit survey on volunteers who ceased participation run by the South Australian Country Fire Service.

Overall this demonstrates that in the absence of research specific to SAR volunteers and their issues, there is a wide range of specific research from the closely related emergency service field of volunteer fire-fighting. Most of this material is Australian, although as noted previously there are a few notable examples of New Zealand projects which address volunteer firefighter profiles and development (UMR 2001); rural volunteer profiles and communities (Johnstone 2002); female recruitment and retention (UMR 2003); and, the motivators and impediments for training (Corydon Consultants 2008). However beyond this specific firefighting component of the wider emergency services sector, there appears to be little other research and information material there which is relevant to the SAR-volunteer sector.

3.4.4. Other useful volunteer research

It is important to acknowledge that there is a large amount of useful volunteer supply research outside of the emergency service sector. Much of that present in New Zealand has been summarised in overviews such as Wilson (2001) and Wilson et al. (2001), while the international examples are extensive. While it is beyond the scope of this study to review that material here, this type of more generic volunteer information can be drawn on when specific volunteer issues are being explored at depth.

It is worthwhile to note that some particular areas of New Zealand volunteer research overlaps more readily with elements of the SAR sector, with the most obvious example being the similarities with sport and recreation volunteering. It is likely that most SAR volunteers have developed their interests and experience from previous involvement in outdoor recreation activities and organisations. In the case of surf life saving in particular there is also a close similarity to some aspects of sports involvement. It is likely that a healthy sport and recreation volunteer sector would support a more sustainable SAR volunteer sector. While research on sport and recreation volunteer issues is not widespread in New Zealand, given the paucity of SAR-specific work the presence of any relevant research is important. Many or the key motivation, recruitment and retention issues affecting sport and recreation have been summarised (SPARC 2006, 2008).

3.4.5. Technology impact research (on Volunteer Supply)

Many anecdotal references are made to the impact of technology on the future role of volunteers in SAR operations, with a general contention that improved locating, signalling and communications technology will substitute for much of the volunteer search effort required in many SAR operations. Such anecdotal comments are often also accompanied by warnings of increased SAR demand overall through over-use of beacons or phones in inappropriate situations; increased risk behaviour due to misplaced faith in the technology; and unrealistic expectations of SAR response (e.g. Chronister 2008)[17]. However despite the prevalence of such statements, no accessible research studies were found that related to this potential issue. The only SAR-related contexts with notable amounts of research undertaken within them on the impact of new technology were found in the area of Dementia management. Here the bulk of research related to the ethical issues around the electronic tagging and tracking of subjects (Hughes & Louw 2002; Welsh et al. 2003; Plastow 2006). Other studies addressed the efficacy of different systems in different contexts, such as the use of GPS tracking technology in mobile phones to find Dementia patients in urban areas (Miskelly 2005). Many websites for tracking technology companies have similar trials or demonstrations presented as examples of product capability[18]. However there appears to be no research yet conducted which looks specifically at the impact of such new technologies on the conduct of SAR operations.

More recently a significant change has been observed in the number of false alarms for SAR operations in

[17] There are numerous other websites which contain anecdotal accounts of such unreasonable beacon/cellphone use to get unnecessary rescues (e.g. a 'Yuppie 911' effect is referred to).
[18] For example, the new 'Spidertracks' system http://www.spidertracks.co.nz/Home.mvc.

New Zealand. The transition to the new 406Mhz beacon technology in 2009, along with development of systems for calling registered owners when beacons are activated has already resulted in decreased numbers of incident alerts from the RCCNZ and reduced SAR operation times (NZ SAR 2009). This clear example of technological impact clearly represents a saving in SAR sector time and cost. However the impact on volunteer roles has been relatively low since most such beacon-prompted SAR operations occurred in situations where volunteers would have rarely been involved previously.

However, the nature of beacon uptake and their use may also be changing with increasing numbers of beacons most probably being purchased for general land-based activity. Until recently most beacon-prompted operations would have been largely confined to aircraft and boats. The probable growth in land-based activity-types involving beacon use may represent a new type of SAR demand. Again, there is no research yet apparent which explores the emergence of such a change or its implications for SAR supply and demand. Many research issues arise in relation to what impacts there might be on user expectations of rescue; potentially misplaced sense of security; increased risk behaviours (e.g. from risk homeostasis) and how beacon use might substitute for some current volunteer search roles in SAR. While some of these expectations and behaviours have been referred to anecdotally, there appear to be notable research gaps around all these areas, and little sign of relevant research was seen. This is especially relevant given the speed at which the beacon change process has taken place and the high levels of beacon uptake by New Zealanders in general[19].

Many of these issues relate to changes in demand due to potential changes in subject behaviour. In terms of impacts on SAR volunteer supply the main issues revolve around any change in the likelihood that people will get lost, and if they do got lost how they will be found. Given the effectiveness of technology in aiding search for boats and aircraft, it could be anticipated that there would be an impact on the need for ground-based search should beacon-type technology extend to regular land-based activity applications. There is already precedent in the use of medical alarms for elderly in homes, tagging and tracking of Dementia patients and increasing uptake of cellphone and beacon use in land based SAR incidents. This topic area suggests a need for improved analysis and monitoring of SAR incidents, and appears to represent a particularly important research gap.

3.5. Supply and Demand – looking forward

A particular focus was placed on identifying and research or information on potential future changes in SAR demand and supply. This commenced in the background scoping process behind this information summary, and was maintained throughout the project as a whole. Overall there are few references found that looked at future changes related to SAR supply and demand issues, and none specific to SAR in New Zealand. The few studies, reviews and commentaries available overseas raised a similar range of key issues and trends they considered likely to have an effect on SAR and volunteering into the future (NSRS 1999; Wilson 2001; Wilson et al. 2001; NSS 2007; McLennan & Birch 2005a; Howard 2009, Esmond 2010).

In summary these suggested trends and changes such as:

- reducing availability of free time for volunteering
- aging population affecting volunteer availability and the nature of SAR call-outs
- increasing urbanisation
- changing work patterns
- increasing legal issues
- increasing community and political expectations of performance
- increasing cost of volunteering `
- increasing technological capacity for way-finding, determining location, signalling and communicating
- new volunteer skill requirements and some degree of 'professionalisation'
- changing recreation patterns

[19] Gordon, R. (pers. comm.) indicated that over 20,000 beacons are currently held by New Zealanders. This number exceeds the numbers held by Canadians.

Here it is important to recognise that these listed changes are only examples of some potential issues. There was no specific research found which specifically investigated the scale or importance of any of these. In fact no studies with a SAR context were found that undertook projections of any current conditions into the future. The only projections found that were even slightly related to a SAR context were a simple projection of expected numbers of elderly volunteers in the USA (NCS, undated); an exploration of factors affecting future ambulance service demand in Australia (AIPC 2007); and a more comprehensive projection of supply and demand issues for hospital services in Manukau City, New Zealand (NZIER 2006). Of these, the ambulance and hospital service demand studies represented good examples of what projection-based studies can deliver where good baseline data is available and study scope is focussed. Unfortunately as has been demonstrated earlier, such a solid data baseline is not currently available in the SAR sector.

In a review of Canadian SAR volunteers almost 25 years ago (NSS 1996) the first recommendation made was that SAR organisations should strengthen their ability to understand and respond to societal trends. This review of research and information to date suggests that such a strengthening has not yet taken place. As noted by Wilson et al. (2001), there appears to be a sense that some parts of the voluntary sector are at a "crossroads", with traditional approaches changing and some new challenges and opportunities arising. It would appear that the SAR sector in general may also be a similar crossroads. The current project represents a first step.

4. Methods

4.1. Methodological framework and approach

General approach

Six inter-related research themes were identified as methodological foundations for this research:

1. Literature review of NZ (and international) research in a range of key subjects including SAR call-out subjects/activity types; the roles and features of SAR volunteers; the inhibiting/enabling factors influencing volunteer motivations/interest; and variables in SAR operational effectiveness
2. Development of current demographic profiles for different SAR call-out subjects/activity types to identify 'SAR *demand*' population segments of key future interest
3. Development of current demographic profiles for different SAR volunteer types to identify 'SAR *supply*' population segments of key future interest
4. Analysis and summary of patterns and trends in outdoor recreation/tourism activities, and non-recreation behaviours influencing SAR call-outs
5. Analysis of Statistics NZ Census data and projections nationally, regionally and where necessary targeted at specific population segments of key priority interest
6. Analysis of SAR volunteer status – summarising recruitment, retention and training issues

These six themes were identified to provide the best possible baseline data for maximising the value from the demographic trend and implication analyses. The interacting relationships between these study themes and the objectives/guiding questions for the project are summarised in Appendix 1.

4.2. Conceptual model of demographic factors influencing SAR incidents

A conceptual model is proposed for the purpose of addressing implications of demographic change on SAR operations based on a demand/supply framework (Figure 1).

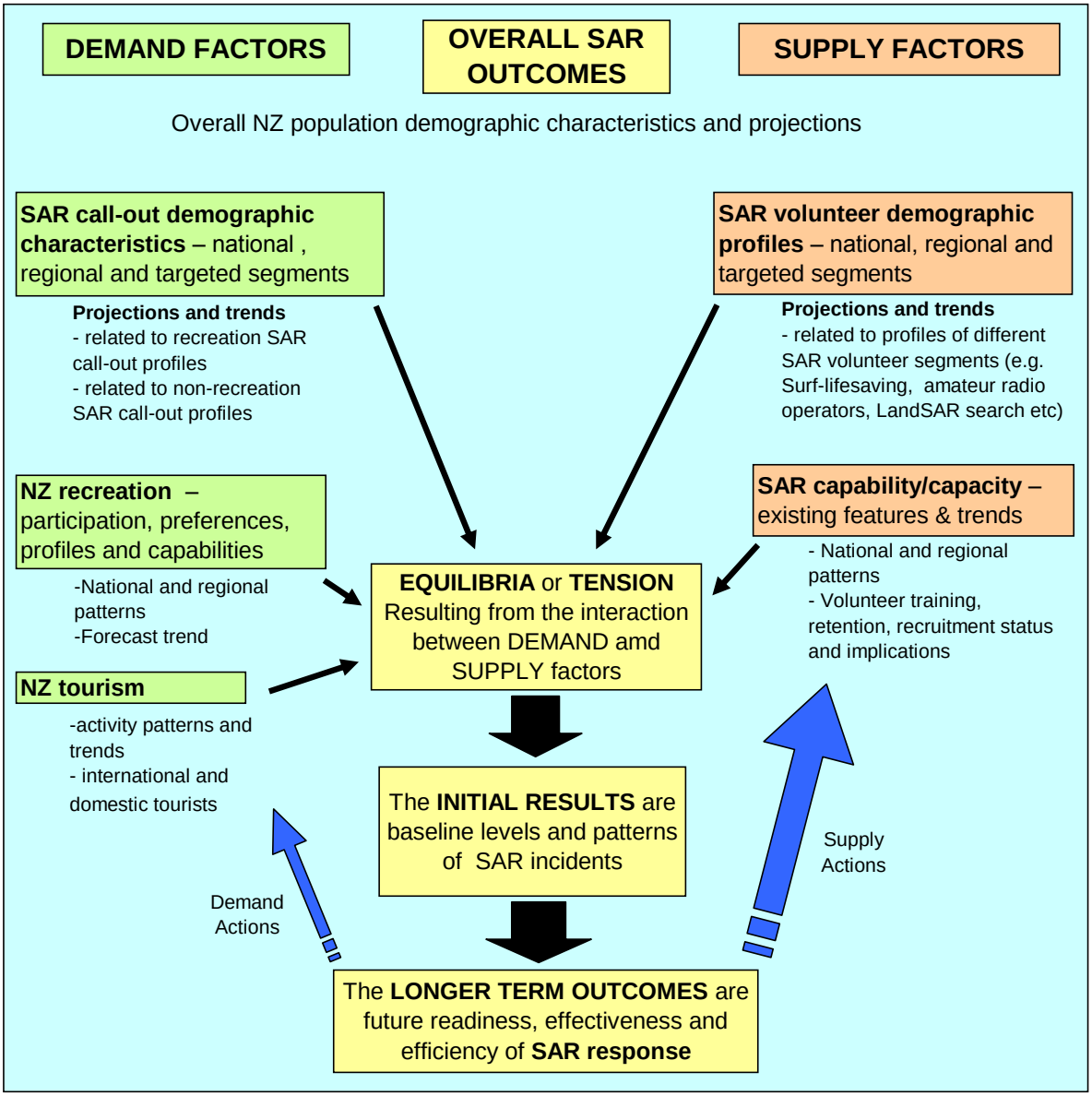


Figure 1. A demand and supply framework for modelling SAR response outcomes

The SAR 'demand' factors are those influencing the occurrence and type of incidents and call outs to which SAR agencies respond. These include the demographic characteristics and geographic distribution of the NZ population, its corresponding recreation SAR subject/activity profiles, non-recreation/urban SAR subject/behaviour profiles and patterns in both. The SAR supply factors are aspects that influence the SAR response operational capability including, in particular, the SAR volunteer base. Together, the current status and characteristics of these specific SAR demand and supply factors represent the reference baselines for projecting future changes. Key to managing for future SAR operations will be an understanding the implications of trends in these specific factors.

Under this framework the interplay between these demand and supply factors results in a pattern of incidents and responses which are either in equilibrium (meaning incidents are efficiently and effectively responded to) or alternatively out of balance (meaning operational performance issues arise around incidents). In the case of any excess SAR demand - where there is insufficient response capability within a region to deal with an increased number or type of incidents - the potential negative performance issues could result in demands for increased capacity and capability. Conversely, in the case of reduced demand or an excess SAR supply the potential surplus performance issues could result in opportunities to redirect resources more effectively elsewhere. Either of the two scenarios could play out at the same time in different regions throughout the country. For example in regions projecting low or negative

population/outdoor recreation growth in the future, these could be areas of reduced or changed demand for SAR services, whereas in regions with strong projected population growth the reverse might be expected.

The methods applied (refer Section 7.2 for applications of the model) identify the likely scenarios at a national and regional level, using existing demographic data from a range of sources.

4.3. Regional focus – regional boundary concordances

This enables New Zealand Regional Population and territorial Authority Population data to be directly matched to SAR organisation regions as required. These concordances were key foundations for enabling the integration of data from various sources for this study.

1. LandSAR NZ Regions - match to NZ Regional Boundaries

LandSAR Area	Base Regional Areas	*Extra Territorial Areas*
NORTHERN	Northland	
	Auckland	
		Plus Franklin (from Waikato)
MIDLAND	Waikato	
	Bay of Plenty	
		Minus Franklin (to NORTHERN)
EASTERN	Gisborne	
	Hawkes Bay	
CENTRAL	Taranaki	
	Manawatu-Wanganui	
	Wellington	
TASMAN	Nelson	
	Tasman	
LANDSAR	Marlborough	
	West Coast	
CANTERBURY	Canterbury	
SOUTHERN	Otago	
	Southland	

2. Coastguard NZ Regions - match to NZ Regional Boundaries

Coastguard Area	**Base Regional Areas**		***Extra Territorial Areas***
NORTHERN	Northland		
	Auckland		
	Waikato		
		Minus	*Otorohanga (to CENTRAL)*
			Waitomo (to CENTRAL)
			Matamata Plains (To EASTERN)
			South Waikato (to EASTERN)
			Taupo (to EASTERN)
CENTRAL	Taranaki		
	Manawatu-Wanganui		
	Wellington		
	Tasman		
	Nelson		
	Marlborough		
		Plus	*Otorohanga (from Waikato)*
			Waitomo (from Waikato)
EASTERN	Bay of Plenty		
	Gisborne		
	Hawkes Bay		
		Plus	*Matamata Piako (from Waikato)*
			South Waikato (from Waikato)
			Taupo (from Waikato)
SOUTHERN	Canterbury		
	West Coast		
	Otago		
	Southland		

3. Surf Life Saving NZ Regions - match to NZ Regional Boundaries

Coastguard Area	Base Regional Areas		*Extra Territorial Areas (from Region)*
REGION 1	Northland		
	Auckland		
		Plus	*Franklin (from REGION 2)*
REGION 2	Waikato		
	Bay of Plenty		
	Gisborne		
		Minus	*Franklin (to REGION 1N)*
			Taupo (to REGION 3)
		Plus	*Wairoa (from REGION 3)*
REGION 3	Taranaki		
	Gisborne		
	Hawkes Bay		
	Manawatu-Wanganui		
	Wellington		
		Plus	*Taupo (from REGION 2)*
		Minus	*Wairoa (to REGION 3)*
REGION 4	Canterbury		
	West Coast		
	Otago		
	Southland		

4. Tourism Regions (Regional Tourism Organisations) - match to NZ Regional Boundaries

Destination RTO	Base regional areas
Northland RTO	Northland
Auckland RTO	Auckland
Coromandel RTO	Waikato
Waikato RTO	Waikato
Lake Taupo RTO	Waikato
Bay of Plenty RTO	Bay of Plenty
Rotorua RTO	Bay of Plenty
Eastland RTO	Gisborne
Hawke's Bay RTO	Hawke's Bay
Taranaki RTO	Taranaki
Ruapehu RTO	Manawatu-Wanganui
Manawatu RTO	Manawatu-Wanganui
Wanganui RTO	Manawatu-Wanganui
Wairarapa RTO	Wellington
Kapiti-Horowhenua RTO	Wellington
Wellington RTO	Wellington
Nelson RTO	Tasman
Marlborough RTO	Marlborough
West Coast RTO	West Coast
Canterbury RTO	Canterbury
Hurunui RTO	Canterbury
Central South Island RTO	Canterbury
Mackenzie RTO	Canterbury
Waitaki RTO	Canterbury
Central Otago RTO	Otago
Lake Wanaka RTO	Otago
Queenstown RTO	Otago
Dunedin RTO	Otago
Fiordland RTO	Southland
Southland RTO	Southland

4.4. Principle data sources and limitations

4.4.1. Methodological considerations

The information needs for this research are well suited to the application of secondary analysis as a principle method of enquiry. Secondary analysis has been defined as:

> 'a form of research in which the data collected and processed by one research are reanalysed – often for a different purpose – by another' (Babbie 1998:G7).

Data archives (which include census data) are the major source of information under this method. The key strengths of the secondary analysis method are described by Babbie (1998) as 'obvious and enormous … it is cheaper and faster than doing original surveys, and, depending on who did the original survey, you may benefit from the work of top-flight professionals'.

The benefits are further elaborated on by Devine (2003), including:

- Savings – in terms of time, money and personnel
- Increased data quality – by using data sets that have previously been analysed, obvious errors and biases should have been noted and rectified

- Larger sample size – by accessing larger samples, the researcher can make more straightforward statistical inferences
- Enabling access to data or topics that the researcher may not otherwise have access to
- Intellectual development – secondary analysis builds upon previous work, and thereby creates new knowledge, creating possibilities of revealing unexpected relationships between variables by looking at data from different perspectives of theoretical frameworks.

However, the secondary analysis method is not without its drawbacks – the main being that of the question of validity (i.e., a term describing a measure that accurately reflects the concept it is intended to measure (Babbie 1998:G7)). Other considerations raised by Devine (2003) include:

- Location and accessibility of data – the main issue here being the difficulty in getting access to certain data
- Understanding the dataset – there is a process of familiarisation required before the researcher can effectively utilise the data. This is less of a consideration where data are well documented
- Different purposes of data collection – which can mean that certain variables may be missing, or available only at a disaggregated level
- Sample issues – for some data sets, the design or size of the sample may constrain further analysis
- Data quality – any errors in base data sets are magnified when data are used in different ways.

Stewart and Kamins (1993, cited in Devine 2003) identified several key questions to address when considering using secondary data; these are:

- What is the purpose of the study?
- Who is responsible for collecting the information – qualifications, resources, and any potential bias in conduct of the study?
- What the information was actually collected?
- How was the information obtained?
- How consistent is the information obtained from one source with information from other sources?

While these are very real considerations for secondary analysis, they do not unduly constrain the analysis of standardised data sets (as is the case with population census data).

National population census data are a common source of secondary analysis (ibid), although the main purpose of this type of data collection is primarily for public policy (meaning that the data may be limited based on the limited number or range of questions asked). The main strength of census data is in terms of its scale (nationwide), and, in terms of secondary analysis, the cost savings involved in using these types of large-scale data sets. In the New Zealand context, much of the census data are freely available, including population projections at regional and national levels. Publicly available data are scrutinised by Statistics NZ to ensure quality standards are met.

Census population projections data are subject to certain limitations. Within the context of this study, the main constraint is that the projections are limited to only a narrow range of variables, particularly for regional data series (e.g., population size, birth, deaths, net migration and median age). Given these limitations, it is more appropriate to identify the directions of change for the supply and demand factors, and predict the net result at an appropriate level of precision (either in terms of likely equilibrium or future tensions). This approach recognises the limitations of the data, and provides an acceptable level of validity and the required level of quality assurance. Where tension is predicted, key instrumental factors may be identified for SAR agencies to apply in order to achieve future equilibrium. Such factors would include prevention initiatives, which aim to indirectly influence demand aspects, and response capability and capacity initiatives (for example, volunteer training and initiatives aiming to increase recruitment and retention of SAR volunteers).

By adopting this baseline-first approach using repeatable methods, the framework enables the information sources to be refreshed, as new and more up to date data become available in the future (e.g., from future census, or demographic data about the SAR volunteer base). In this way, the model will

assist SAR develop a long-term process of ongoing supply/demand prediction and operational monitoring (in support of SAR's cycle of continuous improvement).

4.4.2. Research approach

For each of the six themes underlying this approach, three broad steps were proposed to address the respective information needs:

1. Assess and identify useful **existing data sources** for secondary data analysis through literature search and discussions with SARINZ and any other SAR stakeholders or other holders of useful information resources and opportunities.
2. Identify what, if any, **primary research** would be required to fill key information gaps and propose to SARINZ options for conducting any such research within the timeline and resources available (or through some other means).
3. **Evaluate and interpret** data – reporting detailed findings and emerging recommendations to SARINZ and discussing implications with them.

These steps provided the basis for the research design that structured the research into five key phases:

1: Background research

This was the process of clarifying access to key information sources, commencing literature and key informant search, and developing detailed task assignments in discussion with the SARINZ oversight group. This stage was based primarily on secondary data and literature sources.

2: Demographic data collation and analysis

This involved developing demographic data baselines of SAR 'supply' (volunteers) and 'demand' (call-out subjects) groups, and applying these to long-term demographic profile projections based on NZ Census data. Initial stages of investigation indicated there was limited specific demographic information across some specific SAR volunteer sectors, and that targeted primary research was required.

3: Assessing features and trends in other key supply and demand variables

This involved literature review and key informant advice on respective recreation features and trends, and volunteer capability features and trends. This stage was anticipated as not requiring primary research; during the course of the project, however, it became apparent that specific and targeted primary research was needed (focusing on SAR expert opinions on key trends affecting the future of SAR).

4: Construct demand/supply model and assess implications

This involved a synthesis of preceding key results towards best answering the 10 guiding questions provided in the RFP project specifications. This was based around enhancing the supply/demand model for SAR capacity and capability features and trends. The implications considered as part of this work assisted in the production of a cost benefit analysis for any major recommendations.

5: Research report

The overall summary report was prepared (this document and subsequent reports).

4.4.3. Census data

SAR boundaries and their concordance with Statistics NZ regional boundaries

Statistics New Zealand's Regional boundaries used for this report differ from the SAR Regions. Boundary alignment between Statistics regions and SAR regions is adequate for the purpose of this report, and their concordances are described in more detail in Section 4.3 (p. 16).

Census data sources and reporting conventions

Data presented in this report were sourced from the Statistics New Zealand website (including, for example, regional summary tables and the mesh block data set). Projections were sourced from Statistics NZ's 'Table-builder' pages. Graphs have been used to provide a general profile of national population characteristics, and where needed to illustrate regional or temporal contrasts.

Unless otherwise stated, data were derived from the 2006 census series for regions' usual resident population. Projections used (for national and regional population sizes and age) are the 2010 updated projection. Ethnicity projections were sourced from the most recent series available at this time (2006 series).

Statistics NZ's data are subject to a random rounding process that aims to protect confidentiality. Therefore, individual figures may not sum precisely to totals.

4.4.4. SAR expert opinions on key trends

A qualitative assessment of expert opinion was included in the study. A survey was circulated to an expert group of SAR specialists to assess their informed professional perspectives on a number of issues potentially affecting SAR into the future.

Based on insights developed during the progress of the project, six major social trends likely to have impact on SAR into the future were identified. Several simple change scenarios were developed under each of these six major trend areas, and these scenarios represented some of the more SAR-specific issues within.

These scenarios were designed to provide high-level coverage of the main issues without necessarily providing all the in-depth detail within each of them. In that respect, additional themes were expected to be identified from the survey itself. The main purpose was to provide a basis for assessing expert opinion about the relative importance of these coming trends and some of the main SAR changes that may occur with them. The scenarios were summarised into a series of proposed changes in a summary questionnaire, where the expert group was requested to view them online and give scores to indicate the likelihood of those changes occurring, and their possible importance.

An online questionnaire survey was developed and circulated by email to a list of SAR authorities (46 people) compiled by SARINZ which included a cross section of New Zealand and International SAR experts and practitioners. It was not designed to be a fully comprehensive quantitative measure, but to be an indicative qualitative guide on the major points of consensus or difference among leaders in the SAR sector. The issues presented for their judgement were those emerging themes derived for the project. The survey aimed to test the relative significance of those themes and to encourage contribution of any other key issues or interpretations not already raised.

The six trends were:

Trend 1 - Travel cost (increased cost of travel/transport)

Trend 2 - Tourism growth (growth in tourism and recreation activities)

Trend 3 - Aging population (aging overall population structures)

Trend 4 - Increased technology (increased use of technology)

Trend 5 - Increased urban (increased population and urbanisation)

Trend 6 - Different funding (different funding/resourcing arrangements)

As mentioned earlier, each trend was accompanied by a number of simple change scenarios. Respondents rated the likelihood for each change scenario and trend overall. They were asked to also rate the importance of each trend in terms of its impact on the future of SAR.

Results (including a brief profile of respondents and the survey response rate) are presented in Section 0. These are presented firstly in summary form, followed by more in-depth analysis.

All results are presented as mean scores from the 1 - 5 point scale for each of the overall trends and the component change scenarios/issues. Mean scores, standard errors (SE) and 95% confidence intervals (CI) are used to aid interpretation.

The following points are provided here to guide interpretation of results:

- higher mean scores for scenarios (over 4) indicate that the expert group opinions favoured higher likelihood/importance, while lower mean scores (below 3) indicate opinions favouring lower likelihood/importance
- the level of agreement across the respondent group can be derived from the variability of responses (which is represented as the Standard Error of the Mean - SEM). Responses with high degree of consensus from respondents show SEM results in the low range, whereas those cases where there is divergence of opinion show up with SEM in the high range.

In addition, respondents from the expert group were able to make specific comment points throughout, and indicated a number of additional change scenarios that could also be considered in future. These added to those identified consequently by the research team in assessing these survey findings, and those drawn from the wider study.

4.5. Application of the model for specific incident types

4.5.1. Assumptions underpinning projections

Of the projection data available at the time, the measure/s considered to be the most reliable for future projections for the types of incident assessed were adopted.

The methods applied (and the derived results) rely heavily on the quality of historical data (i.e., either in relation to demand, supply or incident data). Any improvements made in the future to the recording and reporting of source data (including forecast projections) will have an impact on projections and the expected outcomes for SAR (therefore data should be updated periodically). For example, any systematic under-reporting by a region will have a flow on effect in terms of the projected results/outcomes.

The forecast rates of change adopted were assumed to be reliable and of sufficient precision to enable high-level magnitudes of change to be derived, at a level appropriate for the purpose of this study. Any extrapolations applied were done so at the most simplified level (i.e., assuming the same rate of change although over a longer period of time).

Standard *ceteris paribus* assumptions were used when undertaking projections (i.e., assuming all else remains constant). The implication here is that when other predictive variables change, there would be a different predicted result.

The research undertaken on expert opinion about trends is important in terms of understanding the likely effects of other variables. Those trends that are considered to have the greatest likelihood and implication for SAR are considered to be the greatest source of external change that would impact on projected results and outcomes for SAR. For example, improvements and/or greater uptake of location finding and/or communication technologies can be expected to have a significant impact on the number and type of incidents. Similarly, changes in tourism demand, flows and/or NZ's destination marketing can be expected to have an impact on numbers and types of incidents involving tourists.

4.5.2. Notes on interpreting projections

While the number of incidents have been projected forward (i.e., resulting in a specific amount of incidents), these figures are reported for the purpose of making comparisons regionally, or between incident types, or to assess rates of change. The exact amounts are extremely sensitive to changes in projections (and should be considered **volatile**). Any absolute numerical values should not be used or reported without making reference to the underlying assumptions, and the reliability of the data. However, the **rates of change and/or magnitudes of change** are considered here to be both **more accurate and more reliable levels** of measurement. The authors would encourage others to use the reported rates of change and/or magnitudes of change instead of specific reported numerical values for incidents.

5. Baselines & trends

5.1. Population demographics (for consideration with both Demand and Supply sides)

5.1.1. Regional population

A total of 4.03 million people were resident in New Zealand in 2006 (Table 1). The national population has grown by 10% over the 10 year period 1996-2006. Auckland region is the largest region by population size (32% of the national population resided in Auckland in 2006). This region also shows the highest rate of growth over the 10 year period 1996-2006: 32% (Figure 2). Only two other regions grew faster than the national rate – these were Canterbury (13%) and Wellington (11%) (Table 1). All other regions grew at a lower rate, although five decreased in size during that period: Gisborne, Taranaki, Manawatu-Wanganui, West Coast and Southland (which had the largest reduction of 6%).

Table 1. Population breakdown and changes 1996-2006 by region

Regional Council	1996	2001	2006	Population change 1996-2006	Regional population as a percentage of NZ overall population (2006)
Northland Region	137052	140130	148470	8.33%	3.69%
Auckland Region	1068645	1158891	1303068	21.94%	32.35%
Waikato Region	350124	357726	382713	9.31%	9.50%
Bay of Plenty Region	224367	239415	257379	14.71%	6.39%
Gisborne Region	45786	43974	44499	-2.81%	1.10%
Hawke's Bay Region	142788	142950	147783	3.50%	3.67%
Taranaki Region	106587	102858	104124	-2.31%	2.59%
Manawatu-Wanganui Region	228768	220089	222423	-2.77%	5.52%
Wellington Region	414048	423765	448956	8.43%	11.15%
West Coast Region	32514	30303	31329	-3.64%	0.78%
Canterbury Region	468039	481431	521832	11.49%	12.96%
Otago Region	185082	181542	193800	4.71%	4.81%
Southland Region	97101	91005	90873	-6.41%	2.26%
Tasman Region	37971	41352	44625	17.52%	1.11%
Nelson Region	40278	41568	42888	6.48%	1.06%
Marlborough Region	38397	39561	42558	10.84%	1.06%
Area Outside Region	750	723	621	-17.20%	0.02%
New Zealand	**3,618,303**	**3,737,277**	**4,027,947**	**10.17%**	**100.00%**

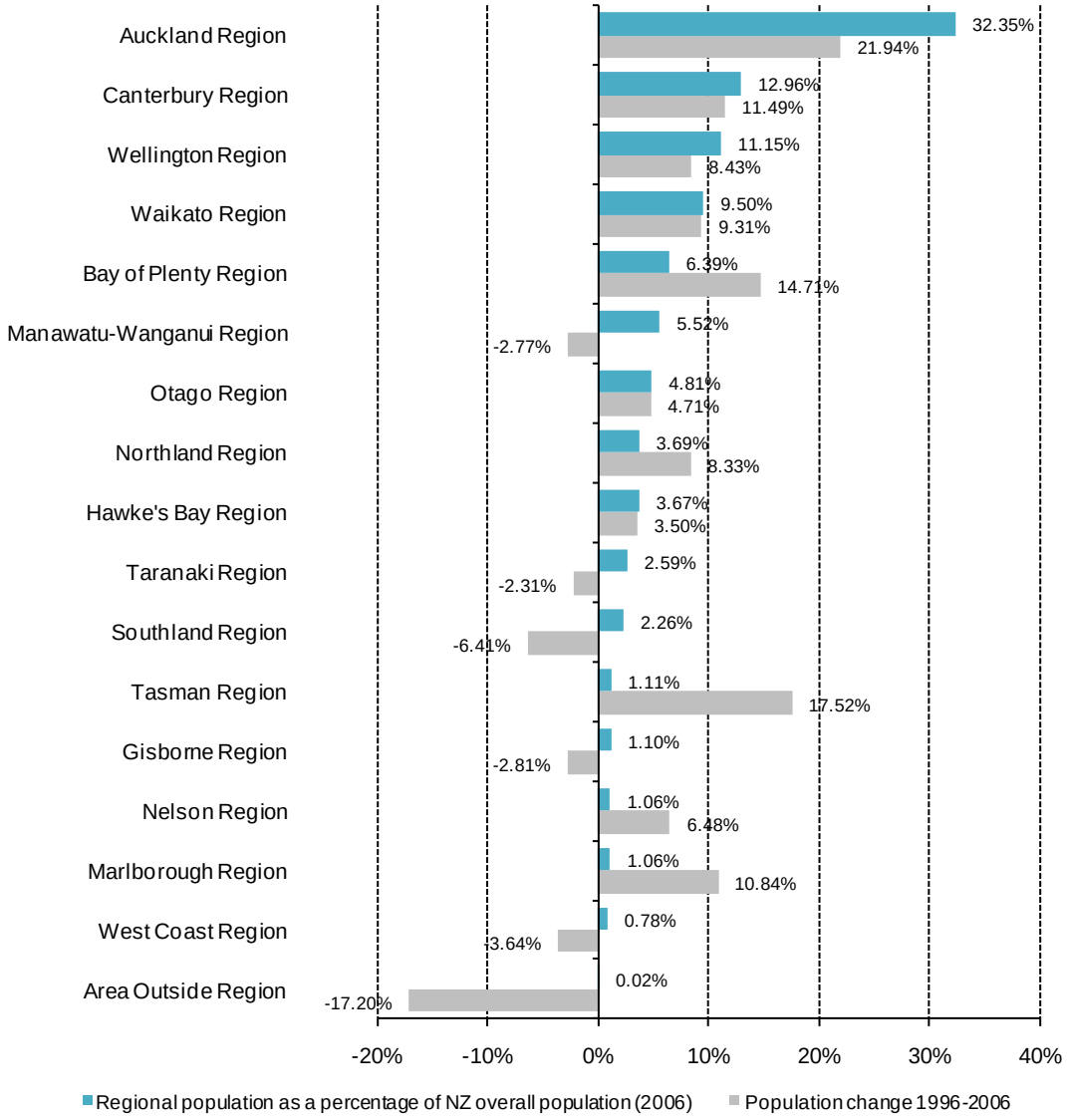


Figure 2. Regional populations and rates of change (1996-2006)*

* Ordered by percentage of the NZ population.

The population can be broken down into sex, age, ethnicity and regional profiles. These are presented later (refer Section 6.1) as baseline data along with projections to 2031 (where available based on Statistics New Zealand's 'medium series' scenario).

5.1.2. Sex

The New Zealand population was made up of 2,062,329 females and 1,965,618 males. The national sex[20] ratio (51 percent female, 49 percent male) is reflected in most regions – with the exception of six:

- Bay of Plenty and Wellington regions (52 percent female)
- Southland, Tasman and Marlborough regions (50 percent female)
- West Coast (49 percent female)

5.1.3. Age

New Zealand's age composition is displayed below alongside each of the three largest regions (by population size – Figure 3). Auckland's population is noticeably younger than the national population overall. The median age of the New Zealand population was 35.9 years, which contrasts with that of Auckland (the youngest nationally - 33.9 years), and Marlborough (the oldest nationally - 40.7 years, Figure 4).

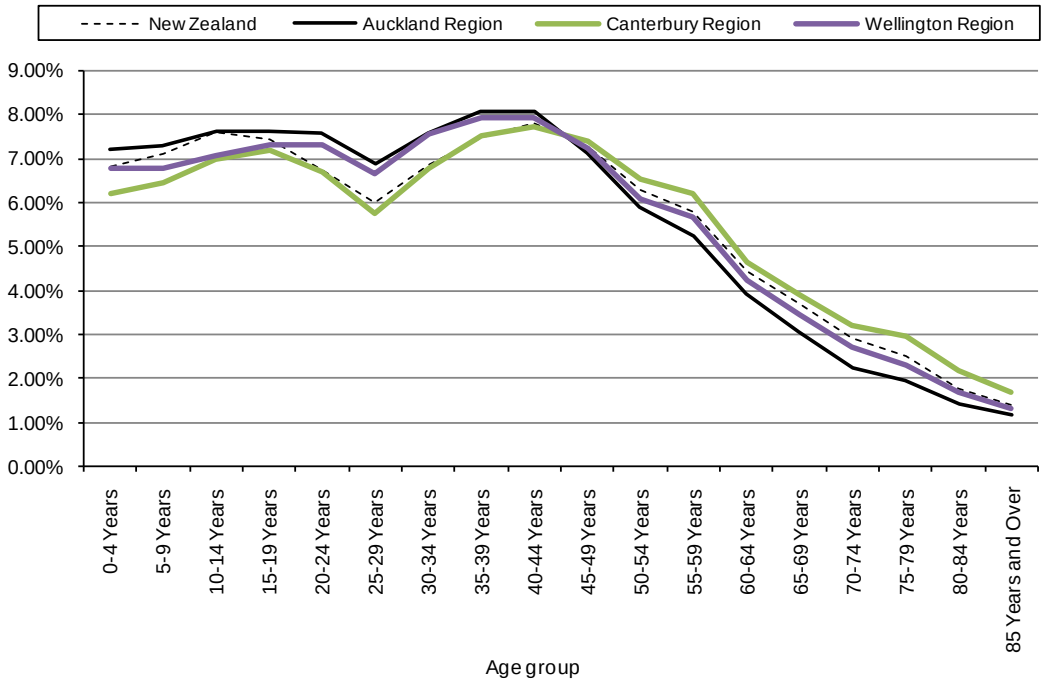


Figure 3. Age composition for NZ and the three largest regions

[20] For the census, 'Sex' is defined as the distinction between males and females based on the biological differences in sexual characteristics.

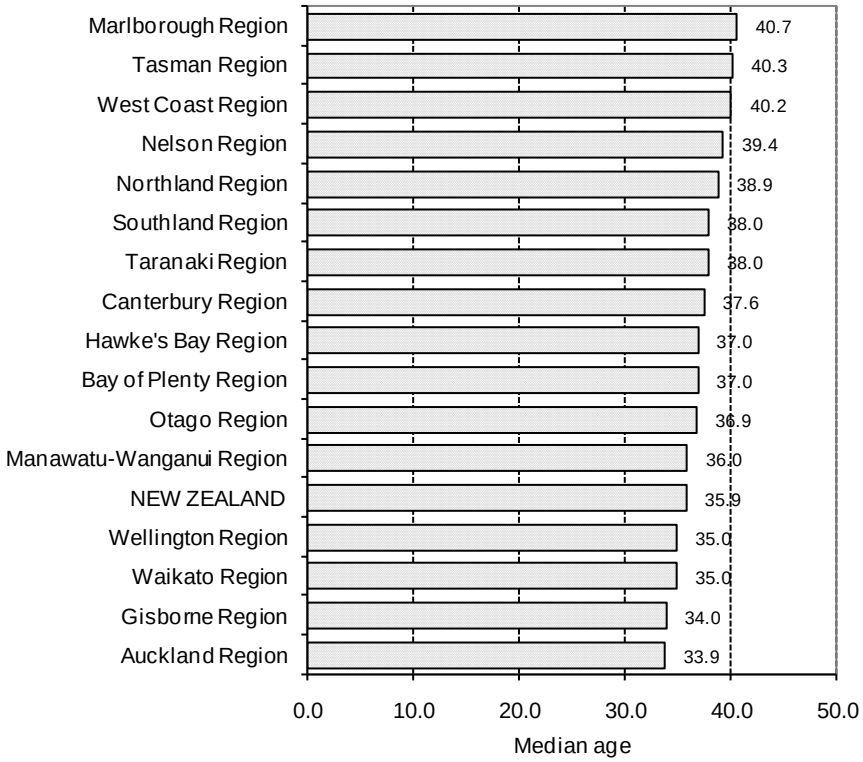


Figure 4. Median age by region

5.1.4. Ethnicity

Approximately two-thirds of the New Zealand population consider themselves 'European' (Figure 5). Those of Mäori descent (15 percent) are more numerous than the 'Other' group (11 percent, Figure 6), which contains a range of ethnicities including 'New Zealander'. Smaller proportions are of Asian (nine percent) and Pacific Peoples (nine percent nationally) ethnicity.

There are pronounced regional ethnicity differences amongst regional populations. The Auckland population alone has quite a distinctive make up (showing the highest level of diversity), whereas South Island regions tended to share a relatively homogenous ethnicity profile. The only region with a proportion of Asian or Pacific Peoples above the national level was Auckland – both of these groups are found in the largest number numerically in this region alone.

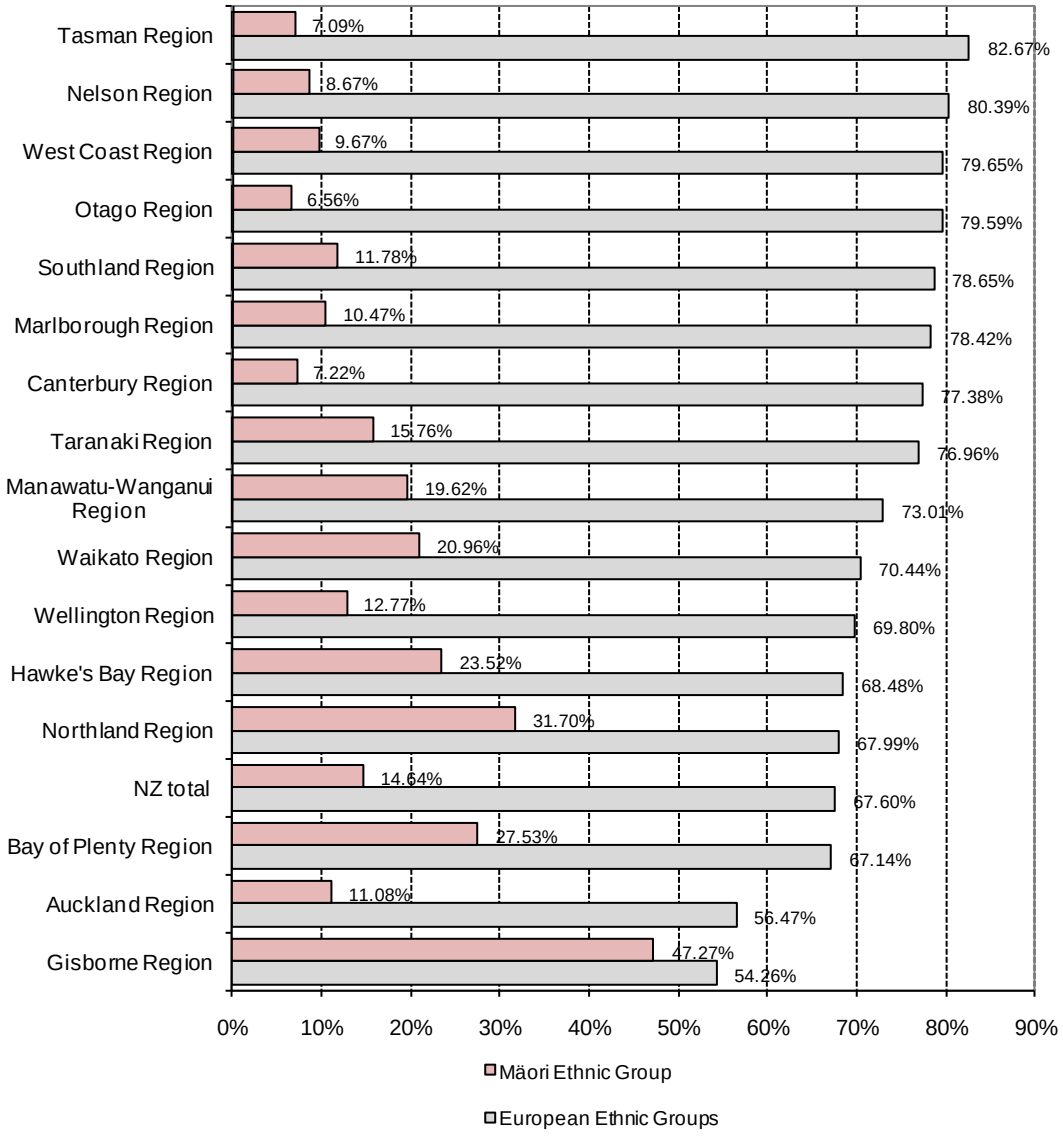


Figure 5. Mäori and European ethnicities as a proportion of regional populations

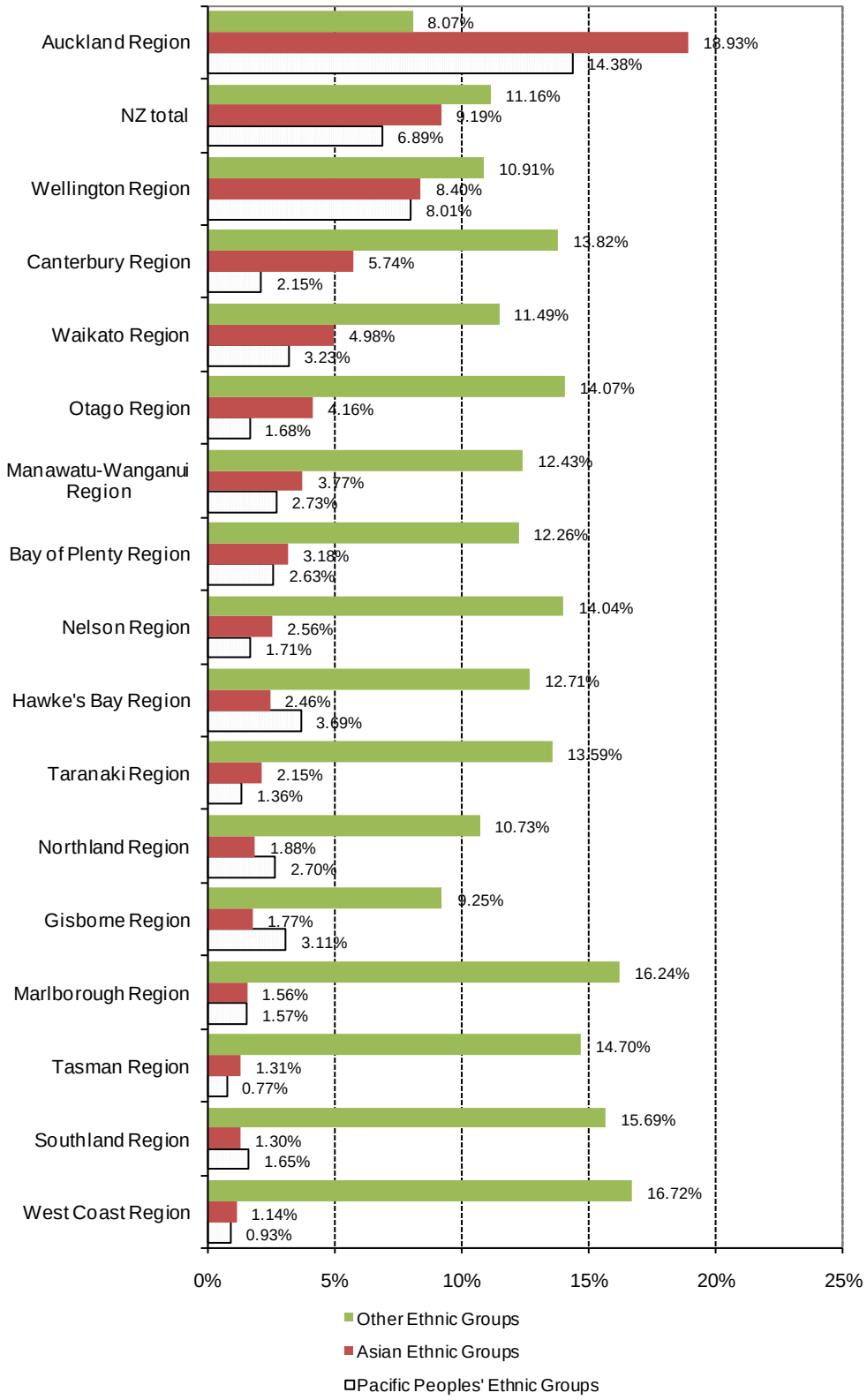


Figure 6. Asian, Pacific and 'Other' ethnicities as a proportion of regional populations

5.1.5. Birthplace

New Zealand's population is largely made up of people born in New Zealand (73 percent, Figure 7). Auckland region stands out as the only region with a lower proportion (60 percent), reflecting its diverse ethnic make-up; whereas, Southland (89 percent) and West Coast (87 percent) have the largest proportion of residents born in New Zealand.

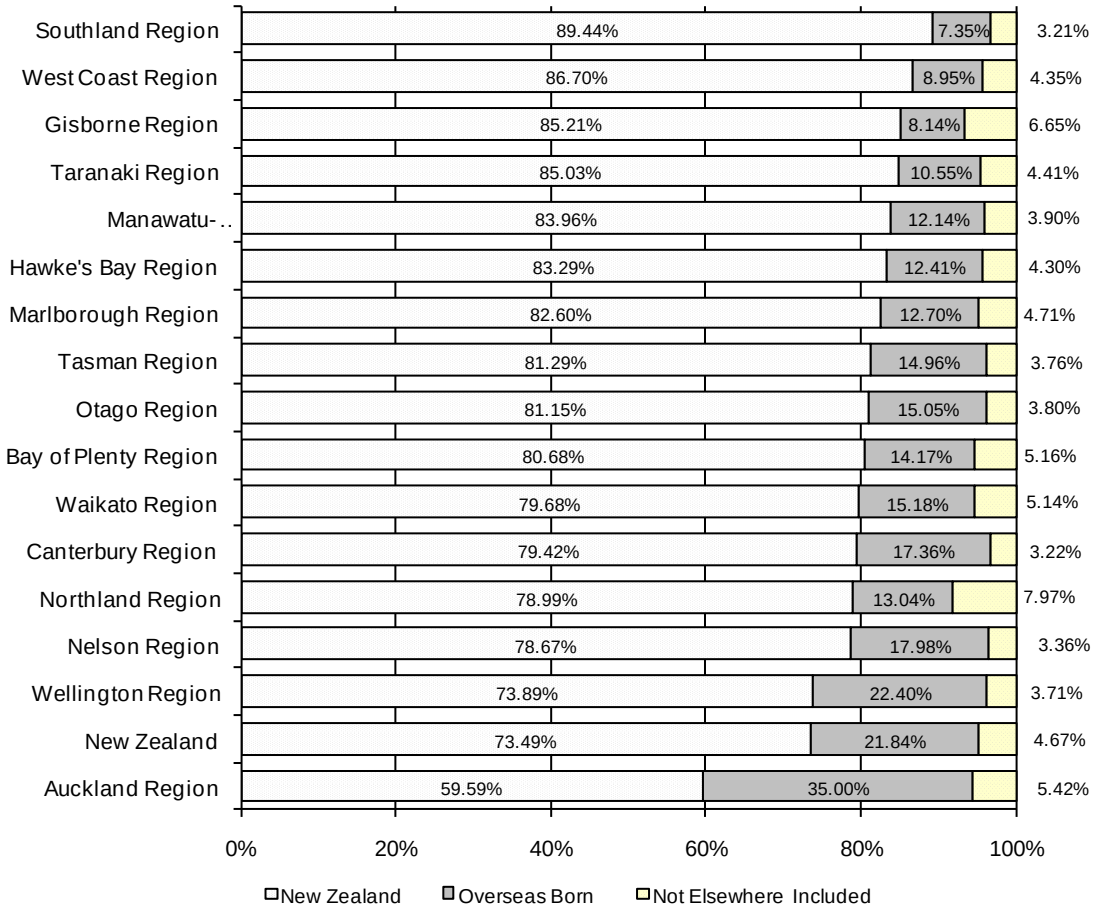


Figure 7. Country of birth by region

5.1.6. Access to telecommunications systems

Over 90 percent of New Zealand households have access to a telephone (92 percent, Figure 8), with the highest levels found in Canterbury region (94 percent), and the lowest in Gisborne region (86 percent). For the NZ population, the telephone remains the most common form of telecommunication system, followed by mobile phone (74 percent) and the internet (61 percent). Access to mobile phones is highest in the main metropolitan regions (Auckland and Wellington have over 76 percent access); whereas the West Coast, Gisborne and Tasman regions have the lowest access (less than 70%).

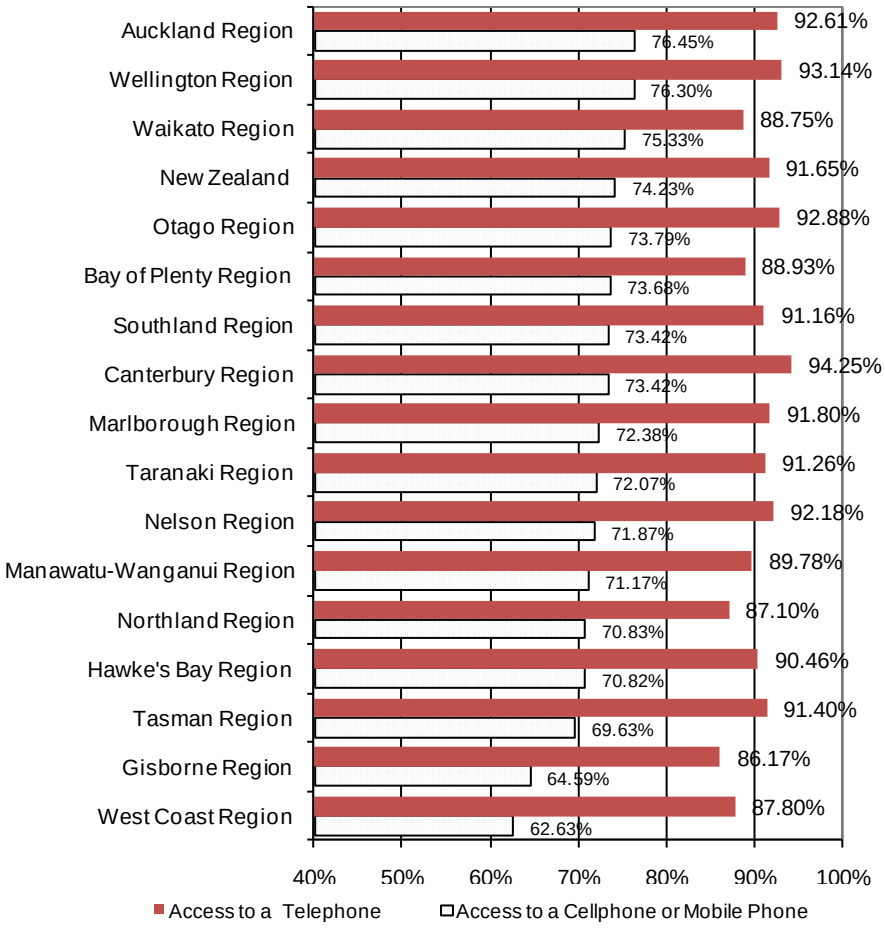


Figure 8. Access to household telephones and cell/mobile phones for households in private occupied dwellings

The implications in respect of population access to cellphone/mobile phone can be important in terms of raising calls for SAR assistance. Current and future technological developments are anticipated to impact the future pattern of incidents (and likely SAR response). These include: improving both location finding (to assist in re-orienting people and avoiding the need for SAR response) and transmission of location (to assist SAR in locating the subject). Uptake and use of cell phones is therefore one key statistic that should be tracked over time. As 2006 was the first census in which cell phone access was recorded, census trends cannot be identified.

However, other sources point to continuing strong growth in the rates of cell phone ownership in New Zealand (refer Figure 9 and Table 2), increasing 570 per 1000 people in 2000 to 1031 in 2007 (an increase of from 81 percent over this period, Table 2). There are more cell phones than people in New Zealand. New Zealand's rate of increase in cell phone ownership is not dissimilar to those of other countries (Figure 9). New Zealand's ownership rate has consistently been within the top 25% of all surveyed countries (Table 2), and is well above the rate for all countries. In 2007, New Zealand's rate of cell phone ownership was 59% larger than for the average of all countries surveyed.

In 2007, New Zealand's rate of cell phone ownership (ranking 44th with 1031 per 1000 people) was comparatively higher than the United States (ranking 72nd, 847), but is well below United Arab Emirates (1st, 1709) and Hong Kong (4th, 1511), and slightly below that of Sweden (27th, 1148) and Australia (42nd, 1040).

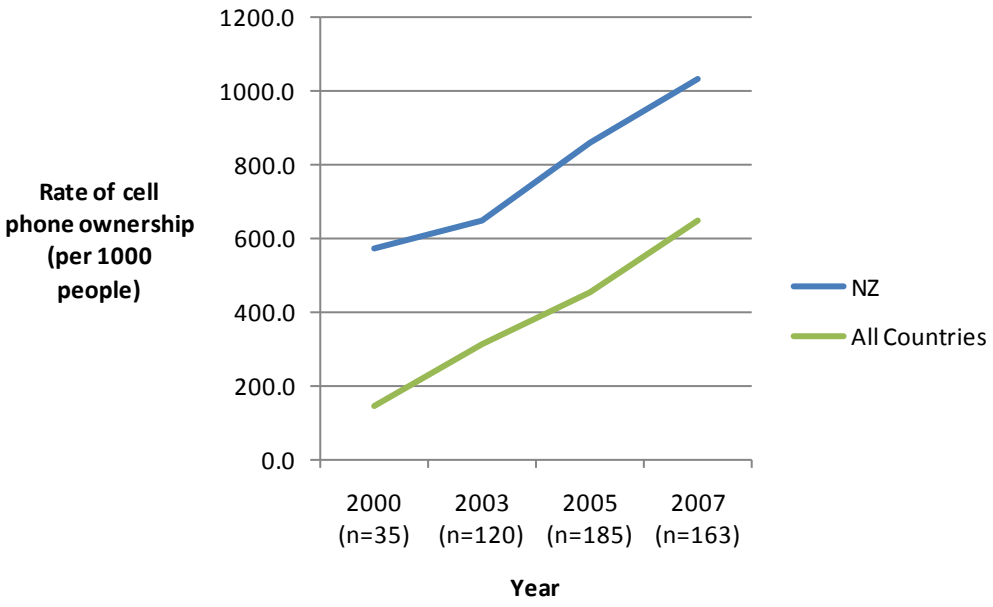


Figure 9. Rates of cell phone ownership (per 1000 people) for New Zealand and 'All Countries'*.
Parentheses denote the number of countries from which 'All Countries' data were drawn.
* Refer Table 2 for sources. Weighted average used.

Table 2. Rates of cell phone ownership for New Zealand against other countries

Year	NZ's rate of cell phone ownership per 1000 people	# Rank	Total number of countries surveyed	NZ's percentile ranking against all countries surveyed*	All Countries rate of cell phone ownership per 1000 people (weighted average)
2000 (n=35)	570.3	3	35	9%	146.5
2003 (n=120)	648.3	27	120	23%	314.7
2005 (n=185)	861.2	38	185	21%	451.1
2007 (n=163)	1031.4	44	163	23%	648.7
Rate of increase in per capita cell phone ownership for NZ (2000-07)		81%			

* Interpretation: this figure denotes NZ's location within the top n^{th} percentage group including all countries surveyed.

Source: http://www.nationmaster.com/graph/med_tel_mob_cel_percap-telephones-mobile-cellular-per-capita (viewed 14 May 2010, derived from original source: CIA World Factbooks 18 Dec 2003 to 18 Dec 2008).

5.1.7. Access to motor-vehicles

88 percent of New Zealand households have access to one or more motor vehicles (Figure 10). Vehicle access is highest in Tasman region (92 percent) and Canterbury (90 percent), and least in Wellington (85 percent) and Gisborne regions (85 percent).

A more detailed pattern of vehicle access is presented in Figure 11, including separate proportions for households with access to one, two, and three or more vehicles. Tasman region has the highest proportion of households accessing three or more vehicles.

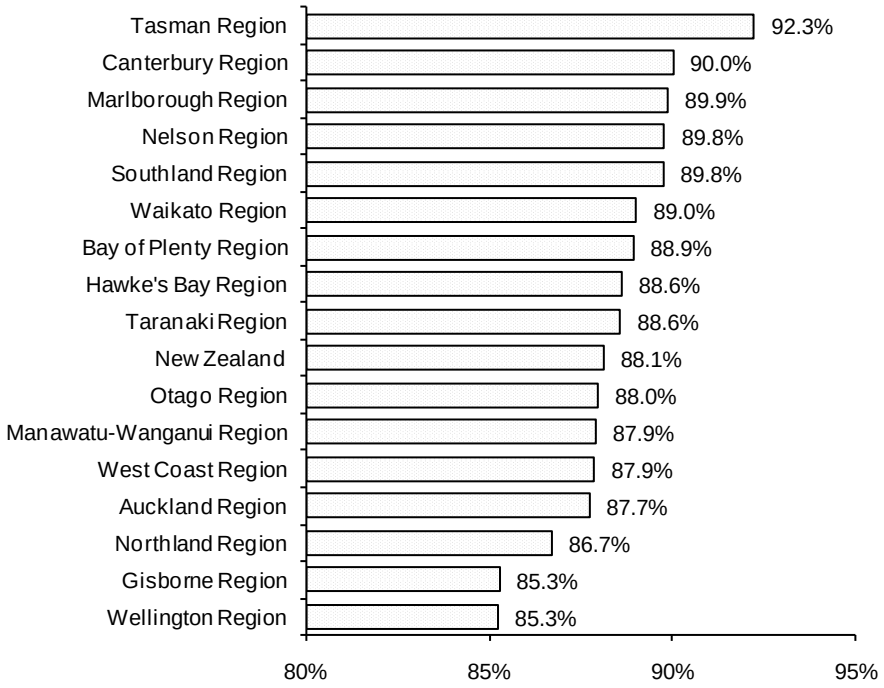


Figure 10. Access to one or more vehicles for households in private occupied dwellings

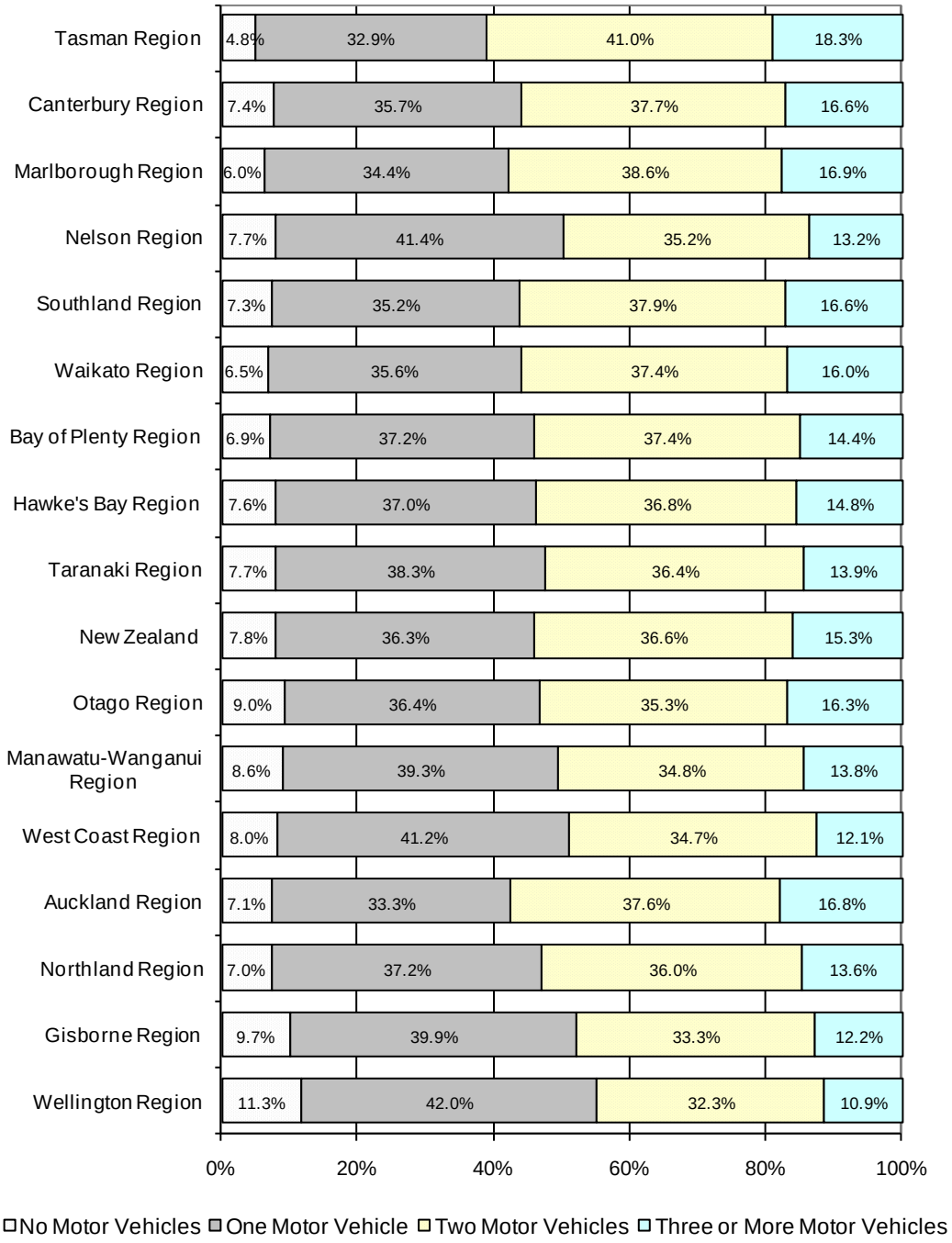


Figure 11. Access to motor vehicles for households in private occupied dwellings

New Zealand's rate of motor vehicle ownership per 1000 people (560) ranks 8th of 133 countries surveyed (averaging 164 per 1000 people)*. In comparison, United States has the most (765), Australia 4th (619) and Canada 7th (563), while Norway ranks 13th (494).

*Source: http://www.nationmaster.com/graph/tra_mot_veh-transportation-motor-vehicles (viewed 14 May 2010 – derived from original source: United Nations World Statistics Pocketbook and Statistical Yearbook).

5.1.8. Labour force status

The employment status of the New Zealand population shows some regional variation. Nationally, most over the age of 15 years are in full time employment (48 percent) or are not in the labour force (30 percent – Figure 12). The highest rates of full time employment are found in Southland and Wellington regions (52 and 51 percent respectively). The lowest rate of full time employment is found in Northland (43 percent, which also has the highest rate of people not in the labour force - 33 percent).

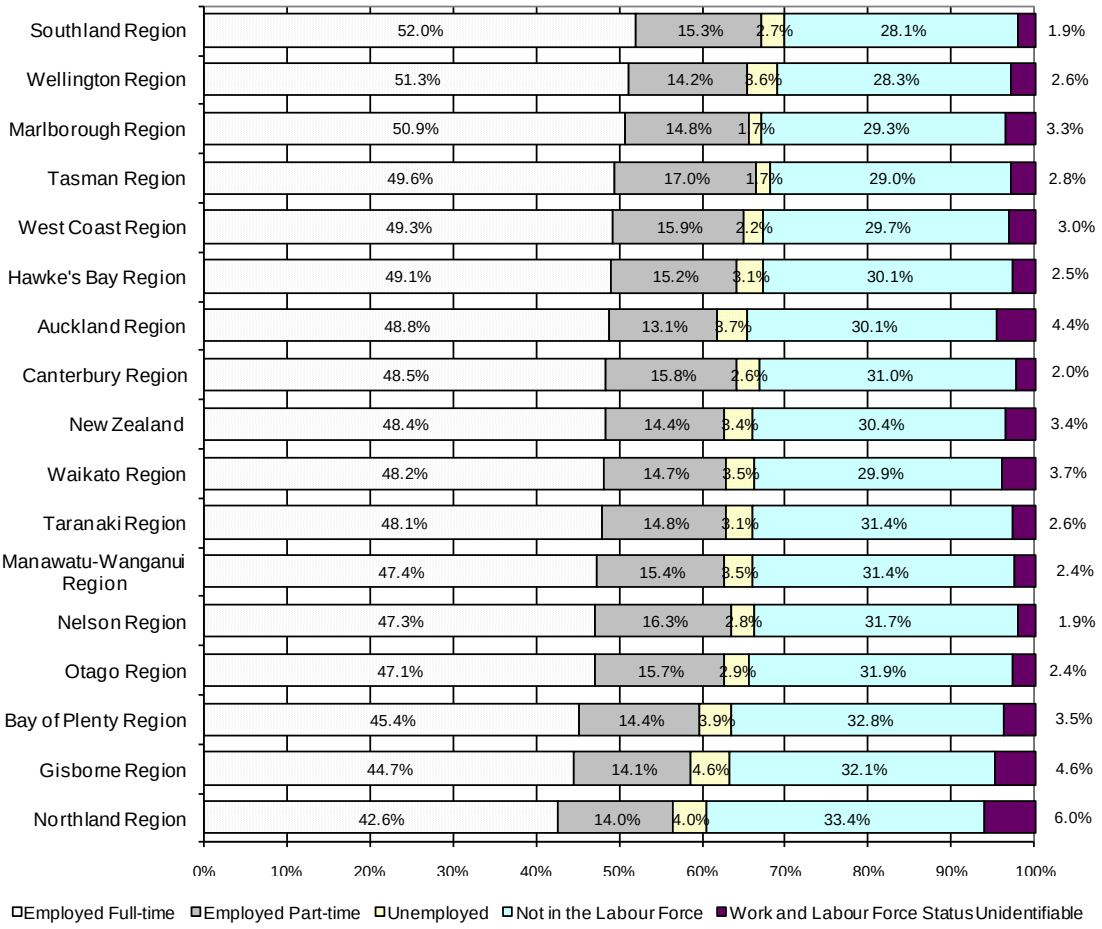


Figure 12. Labour force status for usually resident population aged 15 year and over

Labour force status has implications for SAR supply in terms of time availability affecting both recreation participation levels, and SAR volunteers' discretionary time.

5.1.9. Occupation

Occupational patterns too show regional variation (Figure 13), best demonstrated by the occupation categories managers and labourers (see Figure 14), and professionals. The largest occupation nationally is the 'professional' category (18 percent). Taranaki and Northland have the largest proportions employed as managers (20 percent). The proportion employed as labourers is noticeably smaller than those employed as managers in a number of regions (including Auckland). The reverse pattern is found in Tasman region, where the proportion of those in labouring roles (20 percent) is almost double the national level (11 percent).

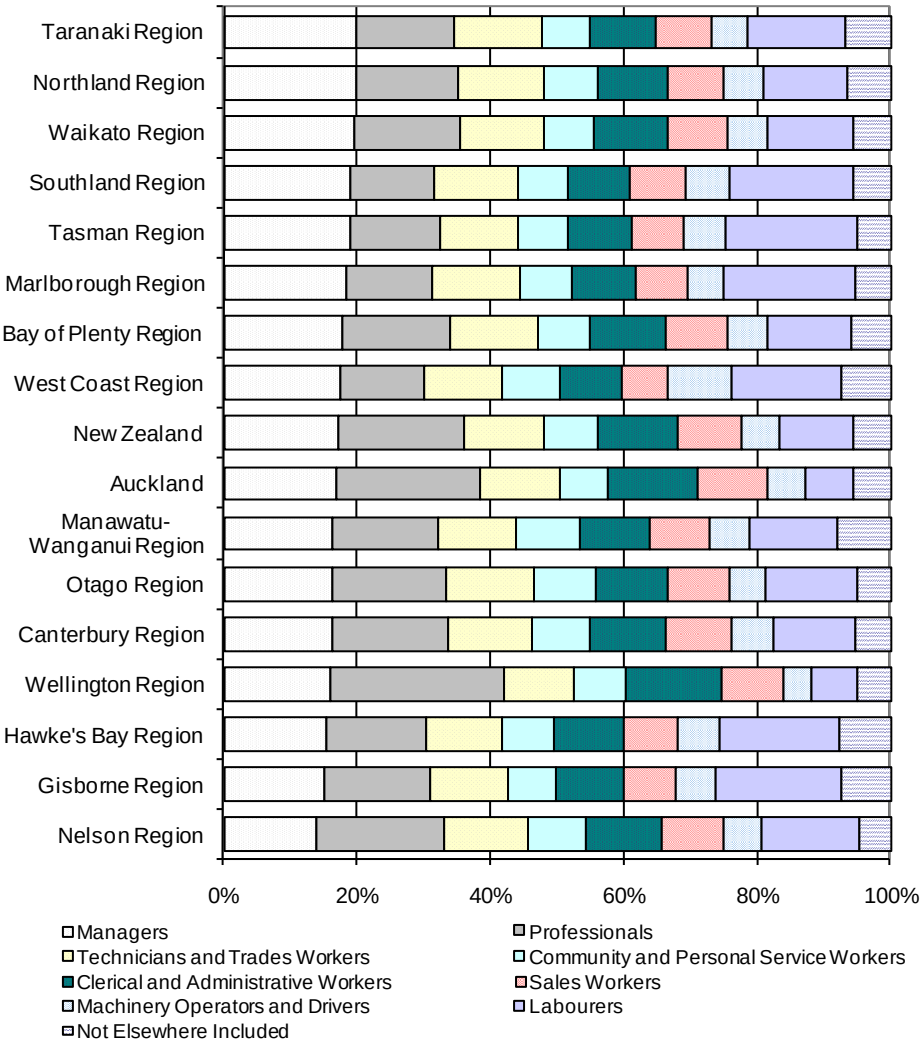


Figure 13. Occupation by region

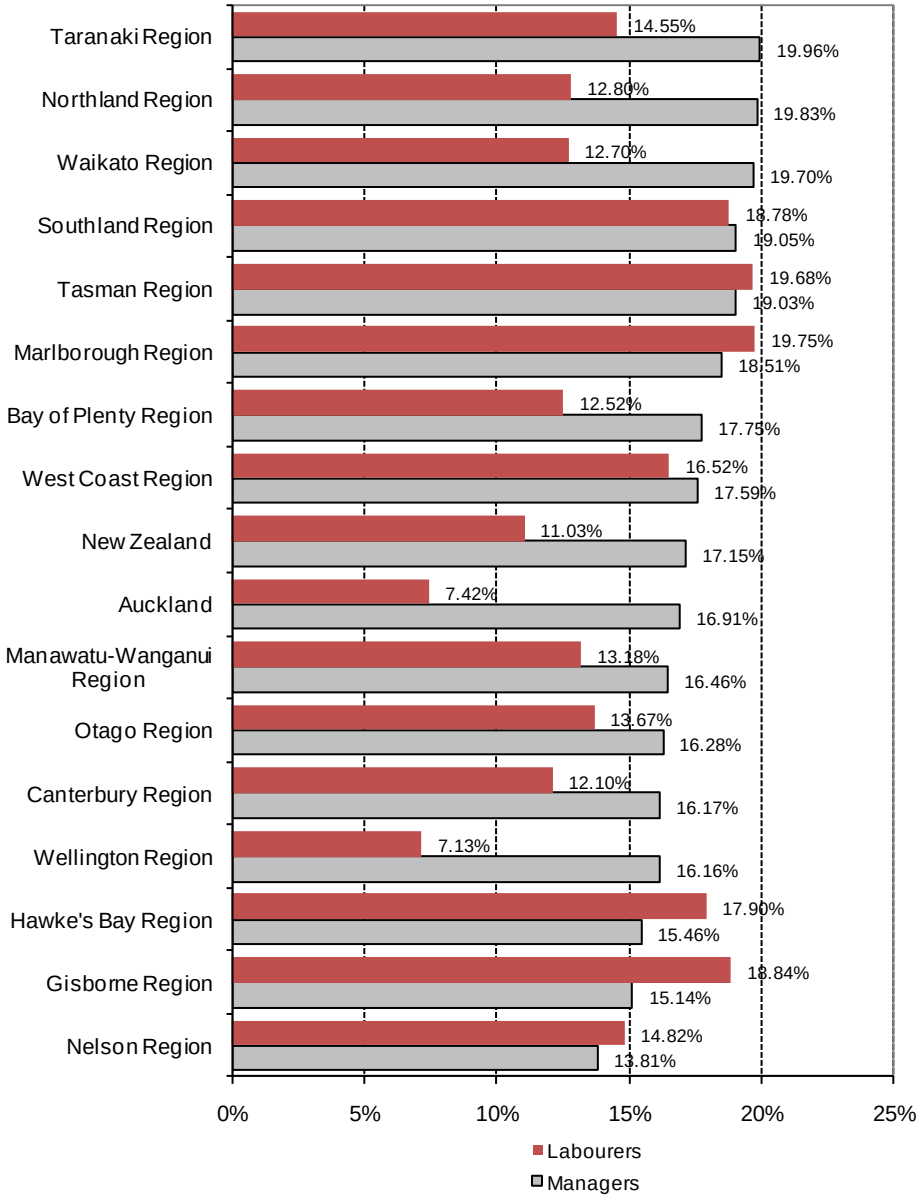


Figure 14. Percentage of workers in labouring or managerial occupations

The principle implication of regional occupational patterns is in relation to the relative skill base from which to draw volunteer skills.

5.1.10. Family type

The predominant family type of the New Zealand population is 'couple without children' (42 percent), which is marginally higher than 'couple with child(ren)' (40 percent, Figure 15).

Auckland region has the highest relative proportion of couples with child(ren) (46 percent), whereas Marlborough has the largest proportion of 'couples without children' (50 percent).

Gisborne region has the highest proportion of 'one parent with children' families (27 percent).

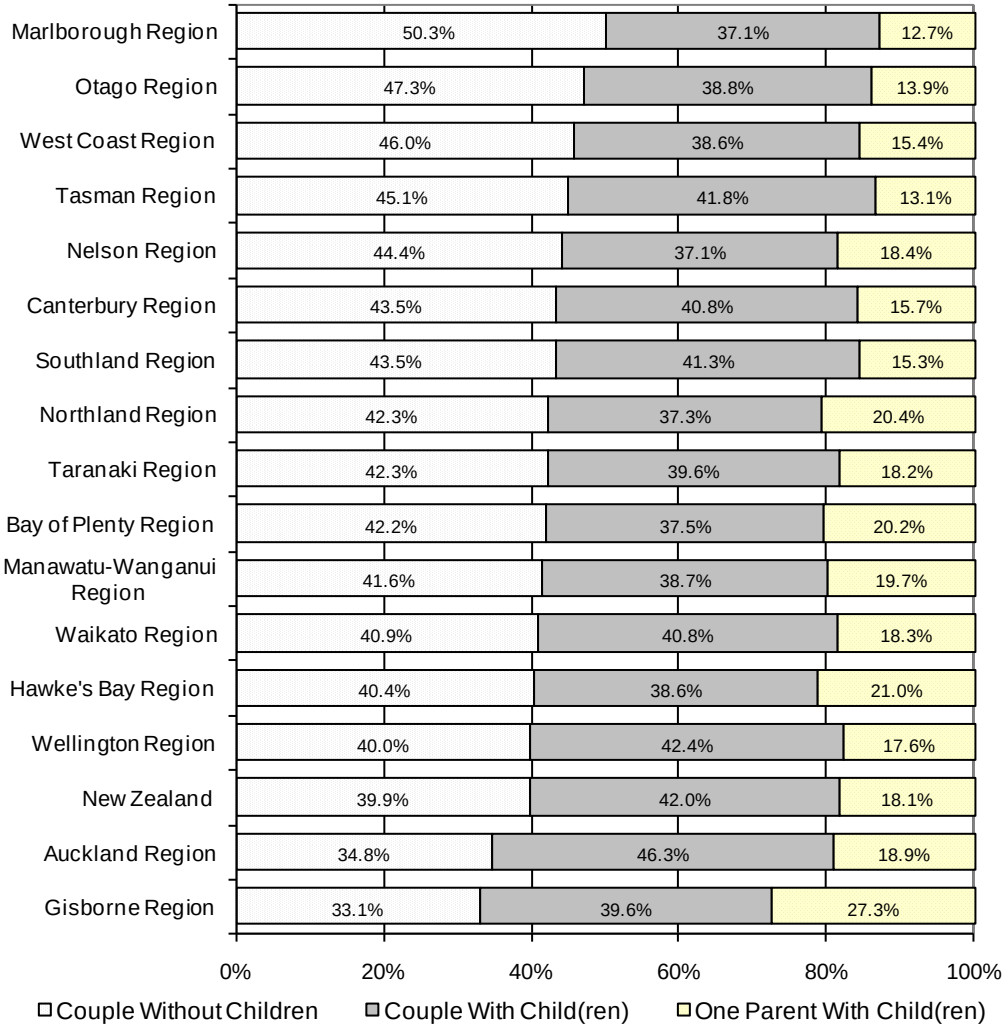


Figure 15. Family type for families in private occupied dwellings

The implication of family type for SAR includes availability of time for volunteering, and possibly discretionary time for more remote challenging activities would be greater for households without children. One parent with children households are expected to have very little in the way of discretionary time.

5.2. Incident patterns

5.2.1. P130 Police Profile – Land-based SAR Incidents

Land-based SAR incidents summary

- Data comprised 2819 incident records. In total there were 3805 individual SAR subjects.
- Patterns of Land-based SAR incidents regionally contrast with New Zealand's population distribution. Incidents were lowest in comparison to local resident population in Auckland region, and overrepresented in the total number of incidents are Southland, Otago, West Coast, Tasman & Marlborough.
- The pattern of Land-based incidents is also non-representative of LandSAR volunteer capacity, with an over-representation of incidents in Wellington, Southland, Auckland, Tasman and Bay of Plenty regions.
- Overall, 80% of incidents involve NZ subjects and the remaining 20% involved overseas subjects.
- There is a high proportion of incidents overall (31%) in urban settings. The vast bulk of the rural incidents overall (69%) occur in remote natural areas/parks (52%) and rural natural areas (16%).
- Most incidents originated from the 'recreation' SAR behaviour type (73%), and the largest contributing activities were tramping, walking and hunting. Specific profiles were prepared for each of these activity types (these are found in later sections of this report).
- There was regional variation in SAR behaviour types, with certain regions having very high rates of recreation based incidents (such as Southland, West Coast, Tasman and Canterbury). In contrast, other regions had proportionately higher levels of other incidents (e.g., psychological incidents in Auckland and Northland).
- Certain regions had high proportions of non-local subjects, such as Tasman, Southland and West Coast (all with high levels of tourist subjects).
- Analysis of tourists' countries of origin revealed an overrepresentation of certain countries including Germany and Israel.
- Subjects tended to be overrepresented in the 15-39 year age group. Males were overrepresented, particularly in NZ subjects (71%).
- Caucasian NZ subjects are over-represented relative to NZ population, with all other ethnicities under-represented.

Description of data source:

Data were sourced from an edited summary subset of the NZ Police P130 Land SAR Operations Database. Source data records incident occurrence, including summary descriptive information about the incident and the Land-based SAR subjects (e.g. those individuals who were lost or missing). Data records were collected and combined from 4 years from 2005 to 2009 (July-June).

In deriving the profile dataset, all variables were removed that were in any way related to any individual subject's personal information. As a result no individual could ever be identified from these data and results derived from such data were only presented in a summarised form.

The profile dataset includes data on both incident and subject characteristics. These were integrated in the data fields but were separated where required to allow separate incident and subject descriptions/profiles. In some cases new variables were created from the original dataset to improve analysis range and capability.

Main Information Areas:

Land-based SAR Incident variables included:

- Type of incident
- Incident location – general area
- Time and date
- Duration
- Causes
- Subject preparation and capability
- SAR techniques applied

Land-based SAR Individual Subject summary variables included:

- Age
- Gender
- Activity type – recreation, non-recreation
- Ethnicity
- NZ vs. Overseas residents
- Home location – general area

The following analysis (including tables and charts) are based on these variables.

Number of Land-based Incidents and Subjects

The final database subset used for the analyses comprised 2819 incident records (Table 3) relating to 2819 independent incidents. In some cases these 2819 incidents involved more than one SAR subject, and in total there were 3805 individual SAR subjects (Table 4) specified within those incidents[21]. Actual numbers in affected groups may have been higher, but the figures specified here represent those that were lost or missing in each incident, and noted in the data.

Table 3. Land-based SAR Incident numbers

Land SAR year	freq	%
2005-06	434	15
2006-07	857	30
2007-08	797	28
2008-09	731	26
n=	2819	100

[21] Note that entry protocols have evolved over time and that there is considerable inconsistency. Figures should be seen as indicative only.

Table 4. Number of Subjects per incident

Subjects per Incident	Occurrences		
1	2234	*2234*	*SAROPS with 1 subject*
2	723	*362*	*SAROPS with 2 subjects*
3	314	*105*	*SAROPS with 3 subjects*
4	250	*63*	*SAROPS with 3 subjects*
5	111	*22*	*SAROPS with 5 subjects*
6	61	*10*	*SAROPS with 6 subjects*
7	112	*16*	*SAROPS with 7+ subjects*
All	3805		*(e.g. occurrences/victim)*

Overall, 79% of incidents involved only one subject. Only 8% involved more than 2 subjects. These proportions were very similar between subjects who were NZ residents (80%) and those from overseas (75%).

In comparing land-based incidents against marine incidents, it is clear that marine incidents typically involved larger numbers of subjects than Land (Table 5).Note that the subject data with demographic information may have been a general underestimate of numbers.

Table 5. Number of individual SAR subjects needing help

	freq	% LAND Incidents	freq	% MARINE Incidents
1	1722	77	820	40
2	321	14	607	30
3	96	4	265	13
4	39	2	163	8
5	25	1	80	4
6	9	0	42	2
7	9	0	23	1
8	6	0	12	1
9	4	0	4	0
10	2	0	4	0
10+	12	1	13	1
	2245		2033	

Subject numbers per incident by NZ Region

There is regional variation in the number of subjects per incident (Table 6), with the highest proportion of single person incidents in Auckland region (Figure 16).

Table 6. Land-based SAR Subject numbers per incident - by NZ Region

Incident Regions	1 Subject	2 Subjects	3+ Subjects	n=
Hawkes Bay	41	35	25	69
Gisborne	46	8	46	24
West Coast	48	25	27	292
Taranaki	50	18	32	175
Otago	50	20	30	404
Canterbury	51	20	29	391
Manawatu Wanganui	53	15	33	289
Waikato	56	21	22	401
Wellington	58	15	27	454
Tasman	59	25	16	241
Southland	62	15	23	350
Marlborough	64	24	13	143
BOP	68	23	8	205
Nelson	69	22	8	36
Northland	80	10	11	83
Auckland	86	8	5	241
All Incidents	58	19	23	3798

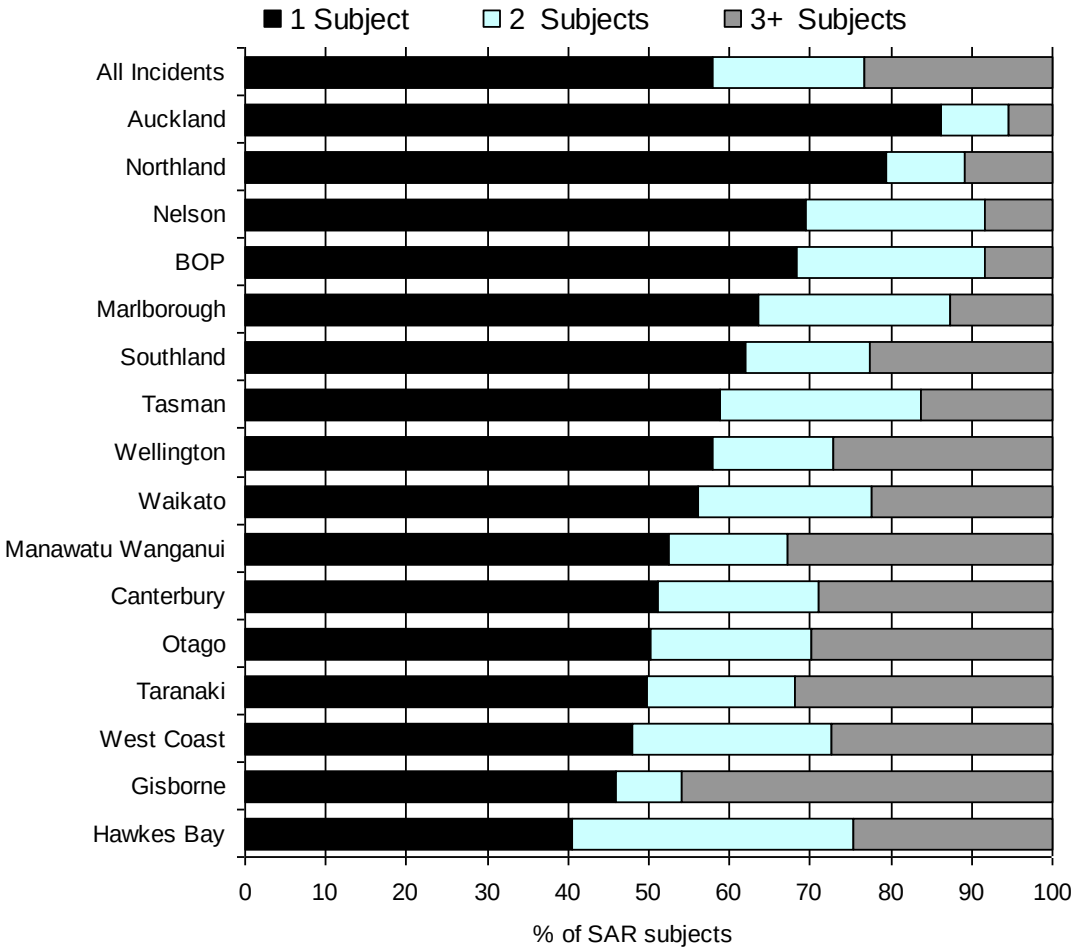


Figure 16. Land-based SAR Subject numbers per incident - by NZ Region

Locations of Land-based SAR Incidents

The regional pattern of Land-based SAR incidents (Table 7) is not representative of New Zealand's population distribution. Incidents were lowest in comparison to local resident population in Auckland region (Figure 17). Regions that were overrepresented in the total number of incidents are Southland, Otago, West Coast, Tasman & Marlborough (each of these regions had high proportions of recreation/tourism related incidents – refer Table 13, p. 51).

Table 7. Land-based SAR Incidents by NZ Region (vs. NZ Population)

Incident Regions	Land SAR Incidents freq	Land SAR Incident %	Regional Pop %
Wellington	326	12	11
Waikato	290	10	9
Otago	273	10	5
Canterbury	270	10	13
Southland	263	10	2
Auckland	222	8	32
ManawatuWanganui	195	7	6
West Coast	198	7	1
Tasman	181	7	1
Bay of Plenty	169	6	6
Taranaki	118	4	3
Marlborough	112	4	1
Northland	72	3	4
Hawke's Bay	44	2	4
Nelson	30	1	1
Gisborne	15	1	1
n=	2778	100	100

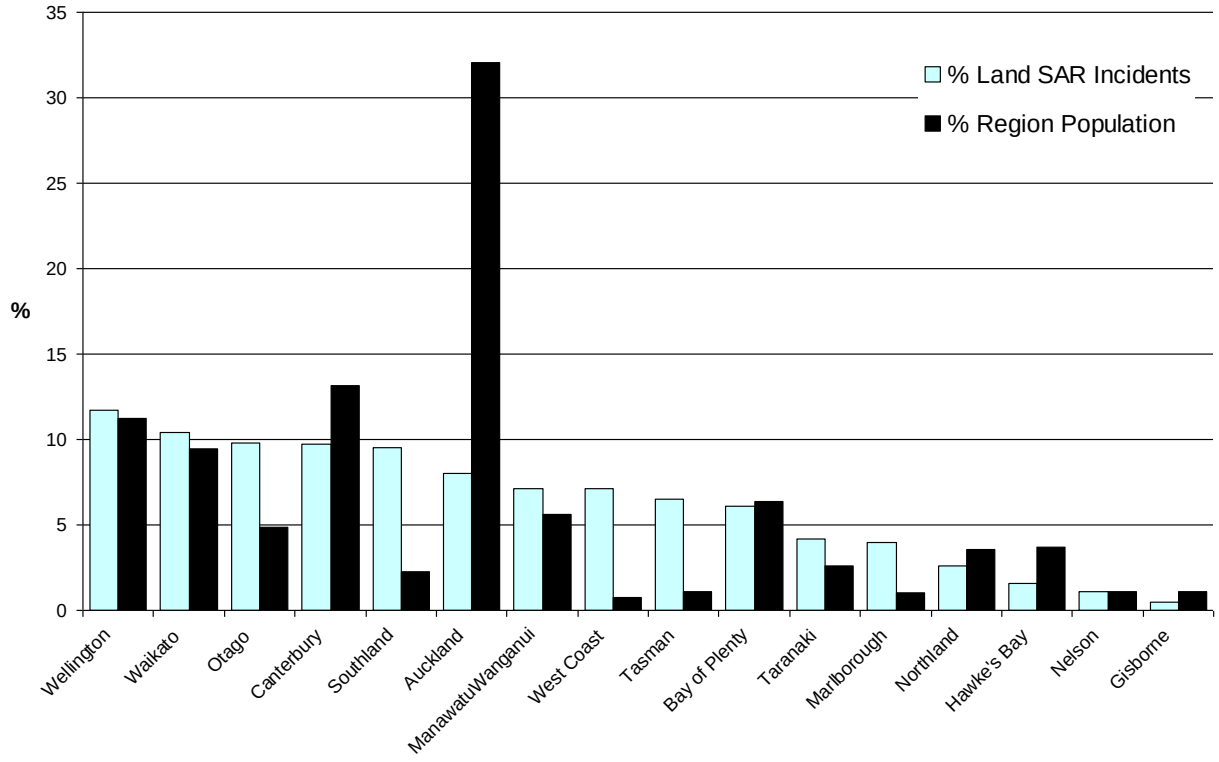


Figure 17. Land-based SAR Callouts by NZ Region (vs. NZ Population)

Land-based SAR Incidents by NZ Region – NZ vs. Overseas Subjects

Overall, 80% of incidents involve NZ subjects and the remaining 20% involved overseas subjects (Table 8). Large urban and North Island regions have proportionately fewer incidents involving overseas subjects; whereas South Island overall and Otago, Southland and West Coast have highest proportions (Figure 18).

Table 8. Land-based SAR Incidents by NZ Region – NZ vs. Overseas Subjects

Region	*NZ Subjects freq*	NZ Subjects %	*Overseas Subjects freq*	Overseas Subjects %
Gisborne	*12*	100	*0*	0
Wellington	*250*	97	*7*	3
Auckland	*147*	95	*7*	5
HawkesBay	*39*	95	*2*	5
BOP	*150*	94	*9*	6
Nelson	*27*	93	*2*	7
Northland	*42*	89	*5*	11
Marlborough	*83*	86	*13*	14
Waikato	*225*	85	*40*	15
ManawatuWanganui	*145*	84	*28*	16
Tasman	*124*	78	*36*	23
Canterbury	*177*	76	*55*	24
Taranaki	*80*	74	*28*	26
WestCoast	*108*	68	*52*	33
Otago	*153*	65	*83*	35
Southland	*139*	58	*100*	42
All NZ	*1921*	80	*478*	20

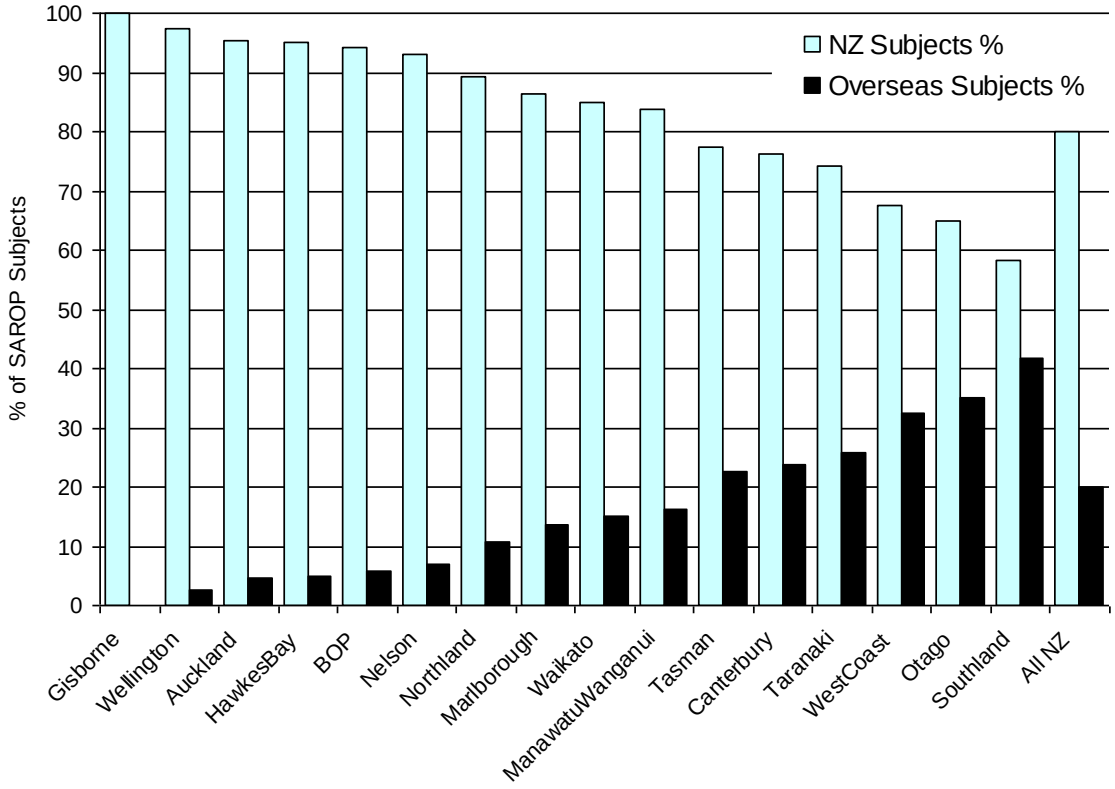


Figure 18. Land-based SAR Incidents by NZ Region – NZ vs. Overseas Subjects

Land-based SAR Incidents – Location Types

There is a high proportion of Land-based SAR incidents overall (31%) in urban settings (Table 9). The number of urban incidents is believed to be even higher than reported in Table 9 because many of these are dealt with by the NZ Police in-house (and may not appear in the P130 database).

Looking more specifically at setting types (i.e., a more detailed classification of settings for each area), the vast bulk of the rural incidents overall (69%) occur in remote natural areas/parks (52%) and rural natural areas (16% - Table 10). These proportions vary according to different subject-incident contexts and subject activity types (assessed in the section following).

Table 9. Land-based SAR Incidents by area type – Basic Rural/Urban split

	Land SAR Incidents	Land SAR Incidents %
Rural	1943	69
Urban	861	31
n=	2819	100

Table 10. Land-based SAR Incidents by area

	Land SAR Incidents	Land SAR Incidents %
Remote Natural Areas/Parks	1468	52
Urban Areas	444	16
Rural Natural Areas	442	16
Urban Fringe	273	10
Rural Town	151	5
Rural Farmland	27	1
n=	2805	100

Land-based SAR Subject Behaviour Type

General Behaviour types

Most incidents related to the 'recreation' activity type (73%, Table 11, Figure 19). Tramping, Walking and Hunting (of all types) were the most common (Table 11). Psychological incidents comprise less than 20% of all Land-based SAR incidents. Proportions for Dementia and Despondent were similar.

Table 11. Land-based SAR Subject Behaviour Type

Activity_Type	Total	%	Notes
Recreation	1957	73	Includes 799 Tramping, 342 Walking, 162 Hunting (deer), 109 Climbing, 89 Mountain biking, 85 Hunting (pig), 55 Fishing, 38 Motorbiking, 36 Hunting (0ther), 32 Kayaking, 28 Running, 26 Hunting (chamois/thar), 26 Rafting, and 183 various others (less than 25). Some included Psychological and BadBehaviour isuses.
Psychological	420	16	Includes 201 Dementia, 166 Despondent and 65 Impaired cases. Note some of these occurred as part of recreation activities also - hence exceed total.
Working	103	4	
MissingChild	95	4	Includes run aways
Bad Behaviour	54	2	Includes 15 Drunk, 15 Crime, 12 Thoughtless/hoax and 11 Domestic incidents
Travel	34	1	Travelling to or from an activity - sometimes but not always associated with recreation. Teneded to classify as recreation where possible
Other	13	0	
BeaconCall	9	0	Accidental beacon activation
School	7	0	Usually in activities related to recreation
n=	2692	100	

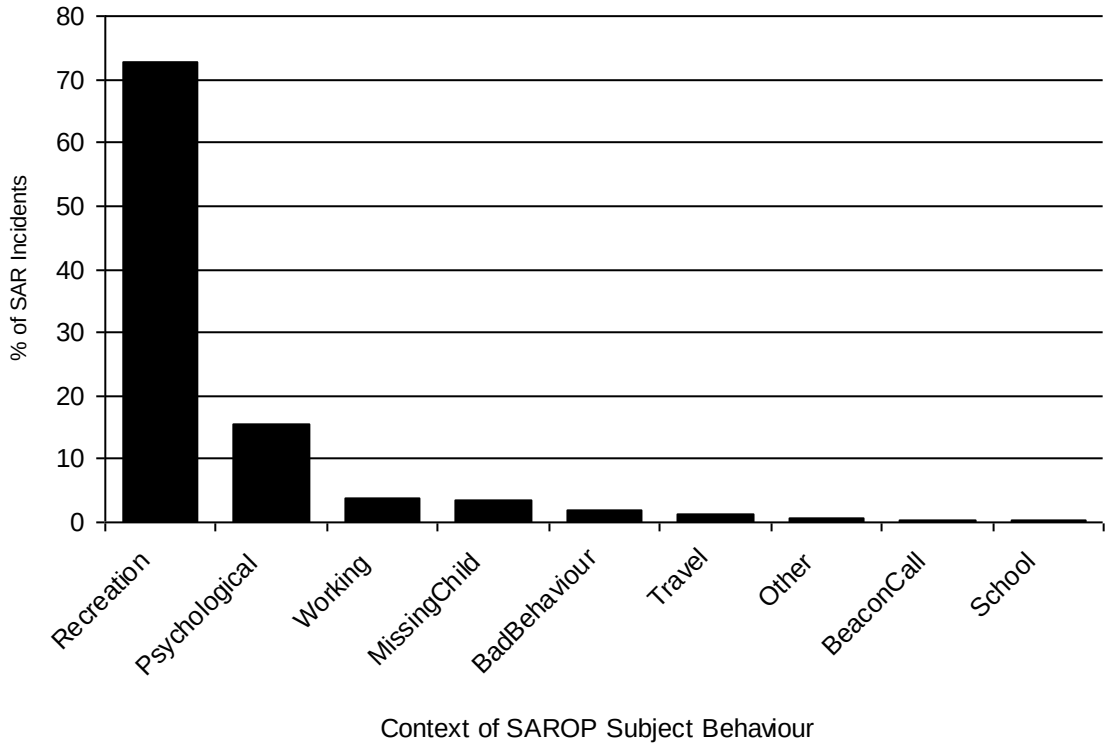


Figure 19. Land-based SAR Subject Behaviour Type

Recreation Activity Types

The number of recreation incidents was 2043 (Table 12)[22]. A total of 776 incidents were not included either because they were cases relating to non-recreation incidents or had missing values. Tramping was the largest proportion (39% of all recreation incidents) followed by Walking (17%). While listed in Table 12 by different hunting type, Hunting combined accounts for 309 incidents, representing 15% of all recreation incidents.

Table 12. Land-based SAR Subject Recreation Activities

Recreation Activity	Freq	%
Tramping	799	39
Walking	342	17
Hunting - Deer	162	8
Climbing	109	5
Mountain Biking	89	4
Hunting - Pig	85	4
Fishing	55	3
Motorbiking	38	2
Hunting - Other	36	2
Driving	33	2
Kayaking	32	2
Running	28	1
Hunting - Thar/Chamois	26	1
Rafting	26	1
Other	25	1
4WD	23	1
Flying - Plane	18	1
Skiing/Boarding	18	1
Flying - Glider/parapente	17	1
Extreme Sports	13	1
Caving	10	0
Motorboating	10	0
Gathering	9	0
Horseriding	9	0
Flying - Helicopter	8	0
Swimming	8	0
Canyoning	3	0
Diving	3	0
Sailing	2	0
Cyclist	1	0
Other/Unknown	6	0
	2043	100

[22] Note that this differs from the total of 1957 in Table 11, where those incidents which also involved some other issue such as Dementia or Despondent behaviour were coded as such.

Land-based SAR Behaviour Type by NZ Region

The patterns of incident activity types varied in different areas of New Zealand (Table 13). This variable pattern was consistent also for NZ only subjects (Table 14).

Regions with higher proportions of Recreation incidents include Southland, West Coast, and other South Island provincial areas (perhaps reflecting the overall pattern of outdoor recreation/tourism activity).

The regions with higher than average Psychological incidents include Auckland, Northland, BOP and Wellington. In Auckland the Psychological incidents are at the same level as Recreation incidents. Missing Child incidents appear disproportionately higher in Northland and Wellington. Note: Gisborne and Nelson data have low response.

Certain contrasts are evident when activity type data are compared between all subjects and NZ only subjects. Proportions of all Recreation Incidents are lower for NZ only subjects (as would be expected as tourists are a large proportion of overseas subjects). The proportion of psychological cases in Auckland is lower for all subjects (42%) than for NZ only subjects (51%). Other non-recreation incident proportions are present in larger proportions for NZ only subjects (e.g. Missing Child and Working).

Table 13. Land-based SAR Subject Activity Type by NZ Region (All Subjects)

	Recreation	Psychological	Working	Missing Child	Bad Behaviour	Travel	Beacon Call	School	Other	*n*=
Southland	94	1	4	0	0	0	0	0	0	248
West Coast	88	3	5	0	1	3	0	0	0	185
Tasman	83	4	4	2	3	2	0	1	1	172
Canterbury	82	11	2	1	2	1	0	0	0	260
Taranaki	82	9	4	0	3	1	0	0	2	111
Otago	82	11	4	2	0	0	0	0	0	259
Waikato	77	9	4	4	2	1	1	0	0	283
Manawatu Wanganui	73	13	6	3	3	2	1	0	0	185
Gisborne	71	7	7	14	0	0	0	0	0	14
Marlborough	71	15	5	3	2	4	0	0	1	110
Hawkes Bay	70	18	7	2	0	0	0	2	0	44
Wellington	59	25	2	10	2	2	0	0	1	317
BOP	55	30	7	7	1	0	0	0	1	163
Northland	45	36	2	14	3	0	0	0	0	66
Auckland	42	42	1	5	6	1	1	1	0	216
Nelson	32	56	4	4	0	4	0	0	0	25
All NZ	73	16	4	4	2	1	0	0	0	2658

Table 14. Land-based SAR Subject Activity Type by NZ Region (NZ-Only Subjects)

	Recreation	Psychological	Working	Missing Child	Bad Behaviour	Travel	Beacon Call	School	Other	n=
Southland	90	1	6	0	1	0	0	0	1	143
West Coast	80	5	6	0	1	4	0	0	0	119
Waikato	78	10	4	4	3	1	0	0	0	240
Canterbury	75	15	2	1	2	2	0	1	0	184
Tasman	75	5	5	2	3	2	0	2	1	128
Hawkes Bay	73	18	5	3	0	0	0	3	0	40
Otago	72	16	5	2	1	1	0	0	0	164
Taranaki	72	13	5	0	3	1	0	0	3	78
Marlborough	68	18	5	2	2	4	0	0	0	85
Manawatu Wanganui	66	17	8	3	3	2	0	0	0	143
Gisborne	64	9	9	18	0	0	0	0	0	11
Wellington	55	27	2	10	2	1	0	0	2	263
BOP	52	30	7	7	1	0	0	0	0	148
Auckland	32	51	1	5	4	1	0	1	1	150
Northland	30	44	2	16	2	0	0	0	0	43
Nelson	21	50	4	7	0	4	0	0	0	28
All NZ	66	19	4	4	2	1	0	0	1	1987

5.2.2. Land-based SAR Subject profiles

A subset database was derived in order to analyse subject profiles. The derived database comprised 2819 independent incident records. In some cases these 2819 incidents involved more than one SAR subject. In total there were 3805 individual SAR subjects involved in the 2819 incidents, and their data are profiled in this section.

Origin

New Zealand subjects comprised 78% of the sample (the rest were overseas subjects - Table 15). There is a slight difference in proportion of overseas subjects here compared with that reported earlier in Table 8 (e.g. 20%) because in those tables missing values associated with the comparative variables of 'region' have had a small effect.

Table 15. Land-based SAR Subjects – NZ vs. Overseas Subjects

	Land SAR Subjects	Land SAR Subject %
NZ Subjects	*2571*	78
Overseas Subjects	*710*	22
n=	*3281*	100

Land-based SAR Subjects - Overseas Subject Nationality

When the proportion of incidents for each nationality (Table 16) is compared against the proportion of all international visitors for each nationality, certain nationalities are more highly represented in LandSAR incidents. For example, both Germany and Israel account for relatively high proportions of incidents (12% and 8% respectively of total overseas subjects, refer Figure 20) compared to their proportion of all arrivals to New Zealand overall (2.5% and 1% respectively – source data are provided later in the report - refer Table 126, p. 162).

Table 16. Overseas Subject – nationality

Overseas Nationality	Freq	%
North America	104	18
Australia	97	17
UK	92	16
Other Europe	74	13
Germany	69	12
Israel	44	8
Asia	40	7
Netherlands	23	4
South America	11	2
Other	9	2
n=	563	100

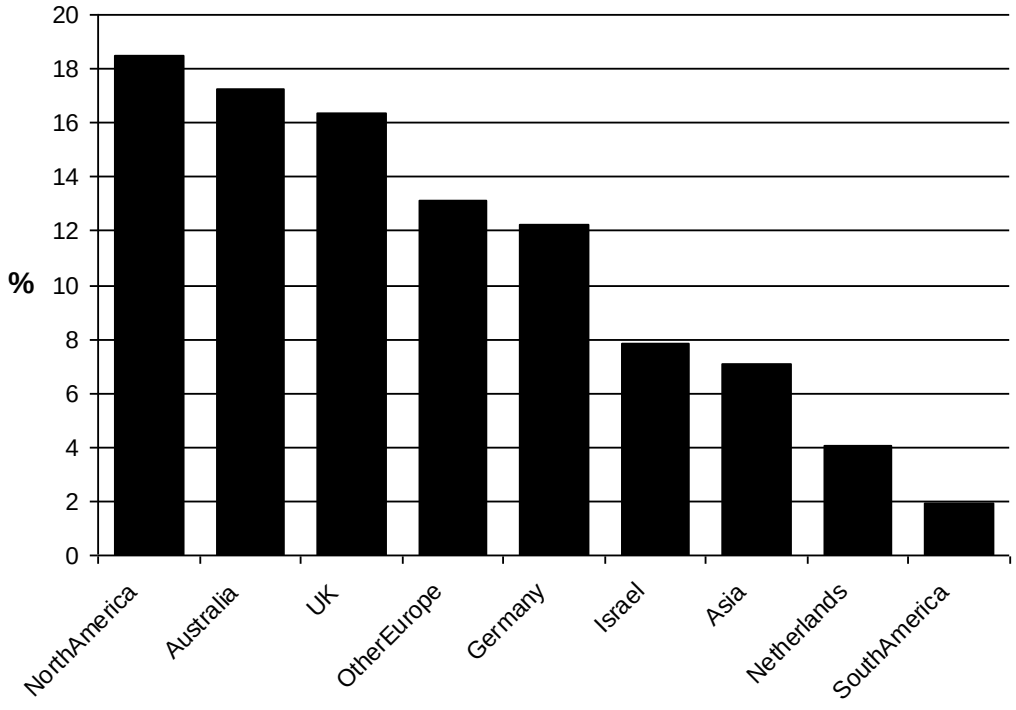


Figure 20. Overseas Subject – nationality

Land-based SAR Subjects – Distribution

Land SAR Subjects are notably over-represented in Otago, Southland, West Coast, Tasman, Marlborough relative to regional population size (Table 17). This is a similar pattern as shown with Land-based SAR incidents (refer Table 7, p. 45). Land-based SAR subjects are most under-represented in Auckland, with Canterbury a distant second (refer Figure 21).

Table 17. Land-based SAR Subjects (by region) vs. NZ population

Regions	Land SAR Subjects	Land SAR Subjects %	NZ Population %
Wellington	455	12	11
Waikato	402	11	9
Otago	404	11	5
Canterbury	387	10	13
Southland	352	9	2
West Coast	292	8	1
Manawatu Wanganui	280	7	6
Auckland	241	6	32
Tasman	240	6	1
Bay of Plenty	201	5	6
Taranaki	156	4	3
Marlborough	139	4	1
Northland	83	2	4
Hawkes Bay	69	2	4
Nelson	36	1	1
Gisborne	24	1	1
n=	3761	100	100

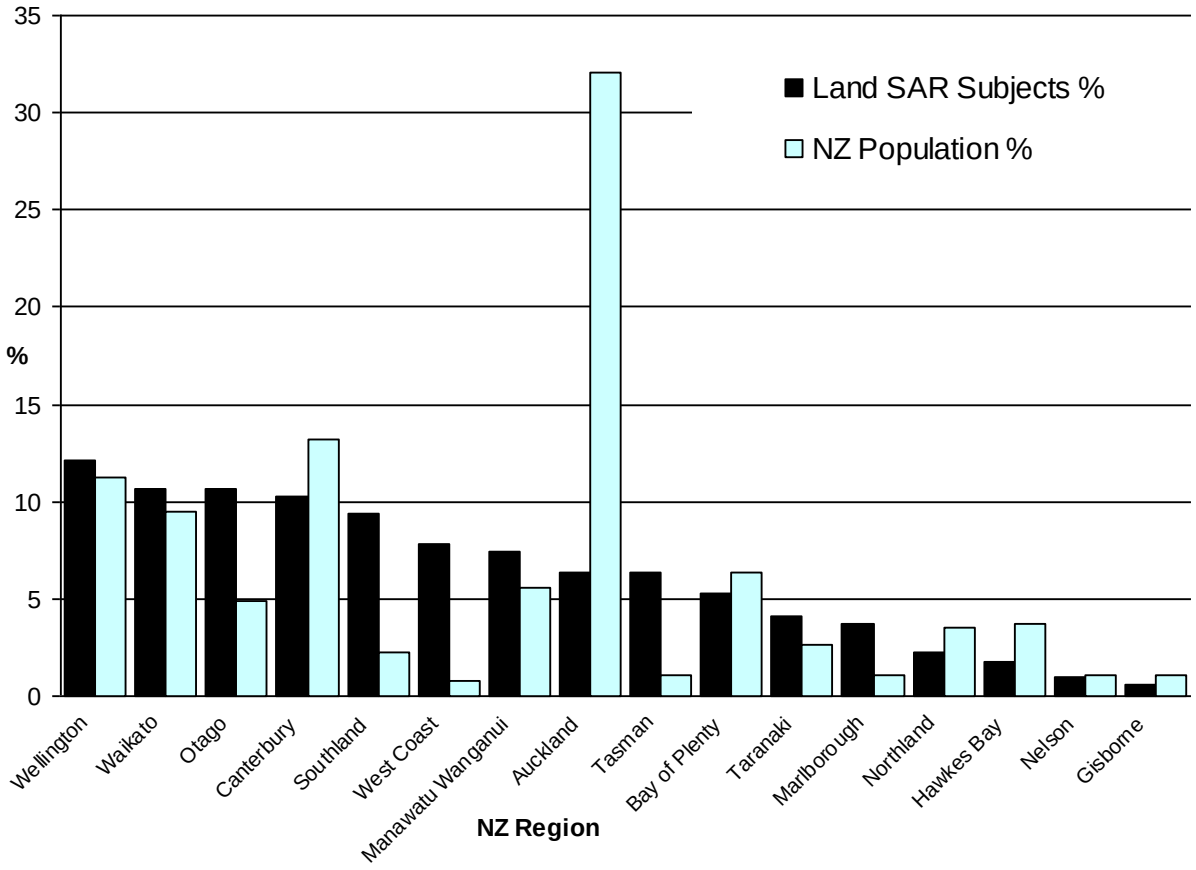


Figure 21. Land-based SAR subjects (regions) vs. NZ population

SAROP Callouts by NZ Region (vs. LandSAR membership)

The pattern of Land-based SAROP incidents is also non-representative of LandSAR volunteer capacity[23] (Figure 22). The pattern shows an over-representation of Land-based SAR incidents in Wellington, Southland, Auckland, Tasman and Bay of Plenty regions. In contrast, some other regions show the reverse (e.g., Waikato, Otago, Canterbury and West Coast) indicating that these regions may have slightly better volunteer resourcing.

[23]Data on LandSAR capacity are sourced from LandSAR Profile in Volume 2 of this report.

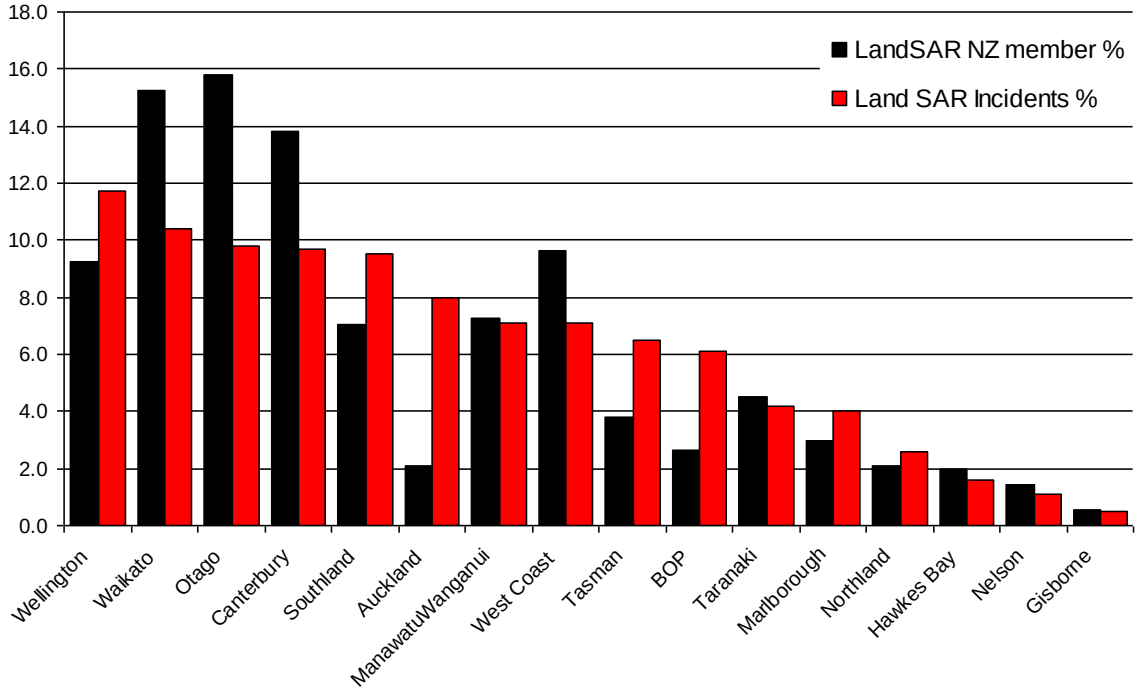


Figure 22. LandSAR Members vs. Land-based SAR Incidents (percentage of national totals)

Home Regions of Land-based SAR Subjects

The region of origin of Land-based SAR subjects is shown in Table 18. This table should be read for each column heading down. Four examples are noted below to illustrate how this table may be used reading columns down – starting with Auckland:

- Auckland Region - 6% of Land-based SAR subjects in Auckland Region came from overseas, 89% were local Auckland residents. 2% were from Waikato
- BOP Region – 7% from overseas, 64% local BOP Residents, 21% from Waikato, 3% from Wellington
- Canterbury Region – 25% from overseas, 61% local Canterbury residents, 5% from Otago, 2% from Auckland, Southland and Wellington
- Southland Region – 39% from overseas, 24% local Southland residents, 18% from Otago and 5% from Canterbury

Table 18. Home Regions of Land-based SAR Subjects

Subject Home Region (Row)	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All Victims
Overseas	6	7	25	5	3	14	15	15	12	39	39	26	25	17	5	37	22
Auckland	89	4	2	0	2	2	5	0	2	4	4	9	4	15	1	4	9
BOP	0	64	0	0	0	0	0	0	0	0	0	2	0	8	0	1	5
Canterbury	1	0	61	5	0	0	10	3	0	7	5	0	8	0	1	17	10
Gisborne	0	0	0	33	5	0	0	0	0	0	1	0	0	0	0	0	0
Hawkes Bay	0	0	0	19	68	2	2	0	0	0	1	0	0	2	0	0	2
Manawatu Wanganui	0	2	1	5	9	50	1	0	0	1	0	3	0	1	1	0	5
Marlborough	0	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	2
Nelson	1	0	0	0	0	0	17	76	0	0	0	0	36	1	0	1	4
Northland	1	0	0	5	0	0	2	0	85	0	1	1	0	5	0	0	2
Otago	0	0	5	0	0	0	2	0	0	41	18	1	0	1	0	8	8
Southland	1	0	2	0	0	0	1	0	0	4	24	0	0	0	0	0	3
Taranaki	0	0	0	0	0	0	0	0	0	0	1	52	0	1	0	0	3
Tasman	0	0	0	0	0	0	2	6	0	0	1	1	20	0	0	1	2
Waikato	2	21	1	29	2	2	2	0	2	0	3	3	1	43	1	0	7
Wellington	0	3	2	0	12	30	2	0	0	3	2	3	4	6	91	2	15
West Coast	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	28	2
Total column %	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
n=	162	191	334	21	66	254	121	34	52	359	315	145	208	366	356	248	3232

Columns with low numbers in the last row (n=) - which represents the number of SAR subjects recorded in each region - should be treated with greater caution as the percentage figures represent even smaller numbers. Reliability will be increased as a greater record of incidents accumulates.

Incident Locations for Land-based SAR Subjects coming from respective Home Regions

Table 19 identifies where SAR subjects coming from a particular region had their SAR incidents. Three examples are noted below to illustrate how this table may be used reading rows across - starting with overseas subjects, then Auckland:

- Subjects from Overseas – 1% had their incidents in Auckland region, 2% in BOP, 12% Canterbury, 20% Otago, 18% Southland and 13% West Coast
- Subjects from Auckland – 50% had their incidents in Auckland, 20% in Waikato
- Subjects from Nelson – 20% had their incidents in Nelson, 58% in Tasman

Table 19. Incident Regions for number of subjects from each Home Region

Subject Home Region (Row)	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	n=
Overseas	1	2	12	0	0	5	3	1	1	20	18	5	7	9	2	13	697
Auckland	50	2	2	0	0	1	2	0	0	5	5	5	3	20	1	3	286
BOP	0	77	1	0	0	0	0	0	0	0	1	2	0	19	0	1	159
Canterbury	0	0	63	0	0	0	4	0	0	8	5	0	5	0	1	13	323
Gisborne	0	0	0	58	25	0	0	0	0	0	17	0	0	0	0	0	12
Hawkes Bay	0	0	0	6	68	6	3	0	0	0	3	0	0	14	0	0	66
Manawatu Wanganui	0	3	1	1	4	80	1	0	0	1	1	3	0	3	3	1	160
Marlborough	0	0	0	0	0	0	96	0	0	0	0	0	2	0	0	2	53
Nelson	1	0	0	0	0	1	16	20	0	1	0	0	58	2	0	2	128
Northland	3	0	0	1	0	0	3	0	63	1	3	1	0	24	0	0	70
Otago	0	0	7	0	0	0	1	0	0	59	22	1	0	1	0	8	249
Southland	1	0	6	0	0	0	1	0	0	14	77	0	0	0	0	1	100
Taranaki	0	0	1	0	0	0	0	0	0	0	2	90	1	4	1	0	83
Tasman	0	0	2	0	0	0	4	4	0	0	4	2	81	0	0	4	52
Waikato	1	17	1	3	0	3	1	0	0	0	3	2	1	65	2	0	239
Wellington	0	1	1	0	2	16	0	0	0	2	1	1	2	4	68	1	475
West Coast	0	0	1	0	0	0	0	0	0	5	4	0	3	0	0	88	80
All Subjects	5	6	10	1	2	8	4	1	2	11	10	4	6	11	11	8	3232

Rows with low numbers in the last row (n=) - which represents the number of SAR subjects coming from this region - should be treated with greater caution as the percentage figures represent even smaller numbers. Reliability will be increased as a greater record of incidents accumulates.

Non-local Land-based SAR subjects in Regions

The origin of Land-based SAR subjects can be categorised into two broad types: local (from within the home region) and non-local. Regions with high proportions of non-local SAR subjects tended to be those regions with relatively high tourism activity (e.g., Tasman, Southland, West Coast – refer Table 20 and Figure 23).

Table 20. Land-based SAR subjects – locals vs. non-locals by Region

	Region locals %	Other Regions %	Tourists %
Tasman	20	55	25
Southland	24	47	39
West Coast	28	35	37
Gisborne*	33	62	5
Otago	41	20	39
Marlborough	42	43	15
Waikato	43	40	17
Manawatu Wanganui	50	36	14
Taranaki	52	22	26
Canterbury	61	14	25
BOP	64	29	7
Hawkes Bay	68	29	3
Nelson*	76	9	15
Northland	85	3	12
Auckland	89	5	6
Wellington	91	4	5

* Low response

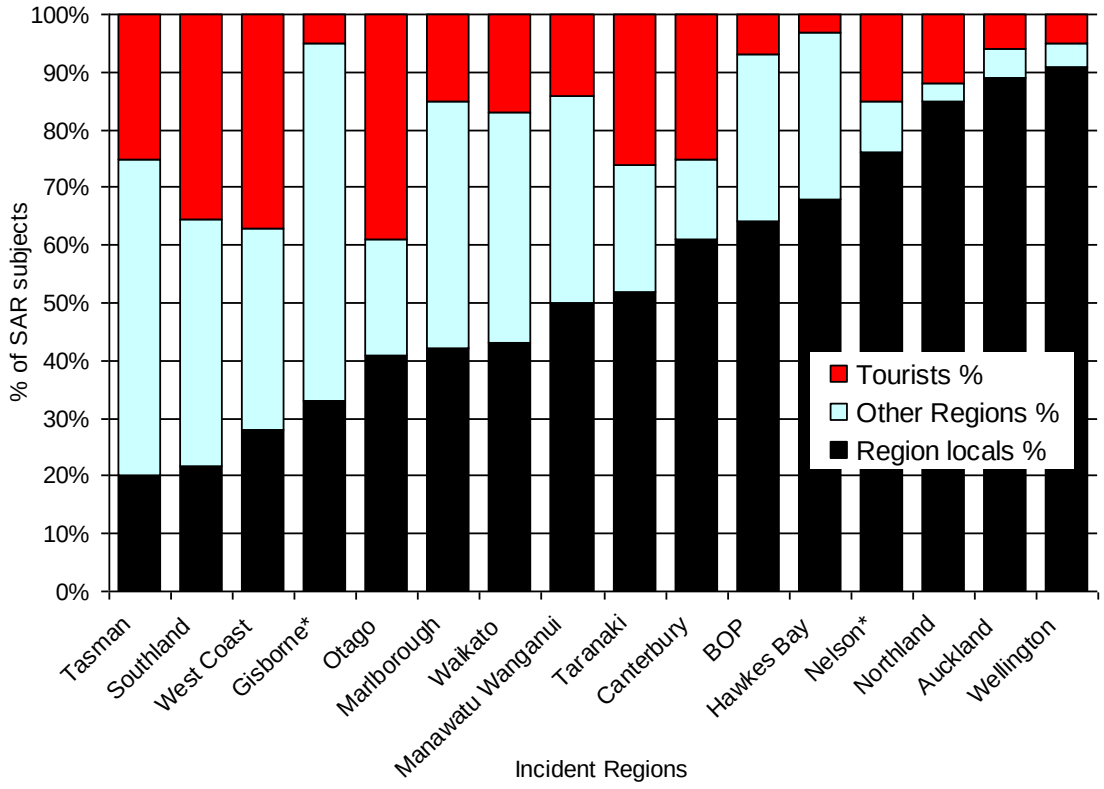


Figure 23. Land-based SAR subjects – locals vs. non-locals by Region
* Low response

Subject Age Groups

Land-based SAR subjects age profiles reveal an over-representation of the 15-19yr, 20-24yr and 25-29yr age groups (Table 21 & Figure 24), and an under-representation of 0-4yr, 5-9yr, and 10-14yr groups.

The profile is shown also in 10 year age group categories and 4-way categories (in order to align with other data sources such as Census based NZ population projections) in sections following.

Table 21. Land-based SAR Subject Age-groups (5yr) – vs. NZ Population

	Land SAR Subjects	Land SAR Subject %	NZ Population %
0 to 4	49	1	7
5 to 9	88	3	7
10 to 14	165	5	8
15 to 19	321	10	7
20 to 24	412	12	7
25 to 29	391	12	6
30 to 34	258	8	7
35 to 39	253	8	7
40 to 44	216	7	8
45 to 49	240	7	7
50 to 54	238	7	6
55 to 59	166	5	6
60 to 64	147	4	4
65 to 69	101	3	4
70 to 74	91	3	3
75 to 79	65	2	3
80 plus	63	2	3
n=	3308	100	100

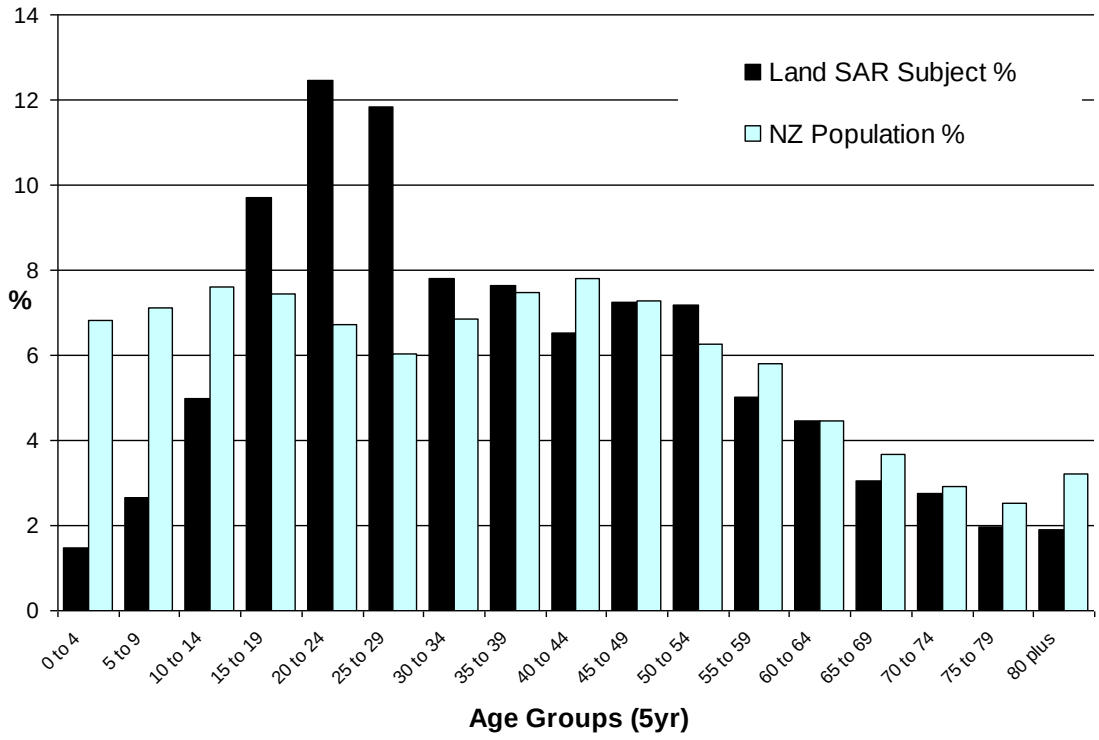


Figure 24. Land-based SAR Subject Age-groups (5yr) – vs. NZ Population

Age-groups by Region (5yr)

Regional age profiles are show in Table 22.

Table 22. Land-based SAR Subject Age groups (5yr) – by NZ Region

	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All Victims	NZ %
0 to 4	3	4	1	10	0	0	1	3	8	1	0	1	0	2	3	0	1	7
5 to 9	6	3	2	0	1	2	2	3	6	2	1	0	2	3	5	2	3	7
10 to 14	6	5	3	0	3	8	3	0	6	2	2	7	5	7	10	3	5	8
15 to 19	7	9	9	10	9	13	9	3	10	10	8	10	14	10	13	5	10	7
20 to 24	9	6	18	20	12	9	16	3	3	19	12	16	11	11	8	18	12	7
25 to 29	6	6	13	0	10	10	9	18	6	18	16	15	11	11	10	14	12	6
30 to 34	5	7	8	0	7	9	8	9	3	10	6	8	11	9	5	11	8	7
35 to 39	6	9	6	5	10	8	5	6	3	7	8	10	8	9	7	9	8	7
40 to 44	6	4	10	0	7	7	8	9	3	5	10	6	6	5	6	7	7	8
45 to 49	7	11	5	25	19	8	5	3	8	7	7	4	8	6	8	7	7	7
50 to 54	5	5	8	20	7	7	7	6	0	6	13	3	8	10	5	5	7	6
55 to 59	5	5	6	5	7	6	6	3	8	4	6	5	2	4	4	7	5	6
60 to 64	2	4	3	5	4	5	6	6	3	4	7	5	4	5	3	4	4	4
65 to 69	3	4	3	0	1	3	2	3	10	4	2	3	3	3	3	4	3	4
70 to 74	7	4	1	0	0	4	3	3	8	1	1	2	3	3	3	1	3	3
75 to 79	6	7	2	0	1	2	0	6	6	0	0	2	1	1	2	2	2	3
80 plus	12	7	2	0	0	0	10	15	6	1	1	2	2	2	5	1	3	3
%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
n=	188	190	344	20	69	243	121	33	62	343	321	143	207	376	387	226	3308	

Age Groups (10yr)

In contrast to the 5yr age category profile, the 10yr age profile shows a moderated pattern that appears to lack useful detail, especially in the 10-14 and 15-19 yr age groups (Table 23 & Figure 25). However, the 10yr category age profiles are a more useful level for assessing regional level profiles.

Table 23. Land-based SAR Subject Age-groups (10yr) – vs. NZ Population

	Land SAR Subjects	Land SAR Subject %	NZ Population %
0 to 9	137	4	14
10 to 19	486	15	15
20 to 29	803	24	13
30 to 39	511	15	14
40 to 49	456	14	15
50 to 59	404	12	12
60 to 69	248	7	8
70 to 79	156	5	5
80 plus	107	3	3
n=	3308	100	100

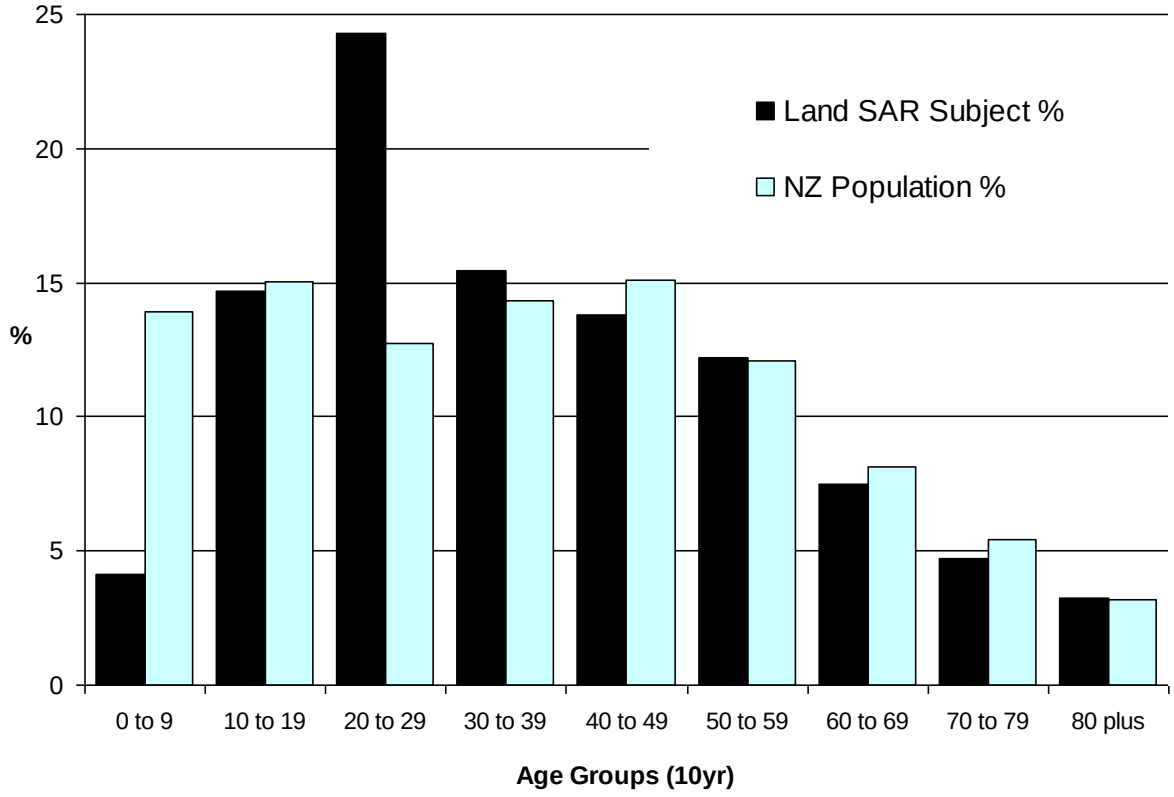


Figure 25. Land-based SAR Subject Age-groups (10yr) – vs. NZ Population

Age-groups by Region (10yr)

Regional age profiles show notable peaks for some regions especially in the 20-29 yr age group – Otago, Southland, Canterbury, West Coast (Table 24). Some other peak results but may be related to low response levels.

Table 24. Land-based SAR Subject Age groups (10yr) – by NZ Region

	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All Subject %	NZ Pop %
0 to 9	9	7	3	10	1	2	2	6	15	2	1	1	2	5	8	0	4	14
10 to 19	13	14	11	10	12	21	12	3	16	11	10	17	18	17	23	8	15	15
20 to 29	15	12	31	20	22	19	25	21	10	37	28	31	22	22	18	32	24	13
30 to 39	11	17	15	5	17	16	13	15	6	17	15	17	19	17	12	19	15	**14**
40 to 49	13	15	15	25	26	14	13	12	11	12	17	10	14	11	13	14	14	**15**
50 to 59	10	11	15	25	14	12	13	9	8	10	19	8	11	14	9	12	12	**12**
60 to 69	5	8	6	5	6	7	7	9	13	8	8	8	7	8	6	9	7	**8**
70 to 79	13	11	3	0	1	6	3	9	15	1	1	4	4	5	5	3	5	**5**
80 plus	12	7	2	0	0	0	10	15	6	1	1	2	2	2	5	1	3	**3**
%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
n=	188	190	344	20	69	243	121	33	62	343	321	143	207	376	387	226	3273	

AGE Groups – 4 Way (for future projections)

These data reported here appear in age categories corresponding to those used for demographic projections (Table 25). The 15-39 age group is highly over-represented in SAR incidents (this group had 49% of incidents while comprising only 35% of the NZ population overall).

Table 25. Land-based SAR Subject Age-groups (4-way) vs. NZ Population

	Land SAR Subject	Land SAR Subject %	NZ Population 2006 %
0-14	302	9	22
15-39	1635	49	35
40-64	1007	30	32
65+	320	10	12
n=	3308	100	100

Land-based SAR Subjects - gender

Land-based SAR subjects are predominantly male (69%, Table 26). The balance is more even among overseas subjects (59% male) than for NZ subjects (71% male, Figure 26).

Table 26. Land-based SAR Subject – Gender by NZ vs. Overseas

	Male	Female	n=
NZ Subjects	71	28	2571
Overseas Subjects	59	41	710
All Subjects	69	31	3281

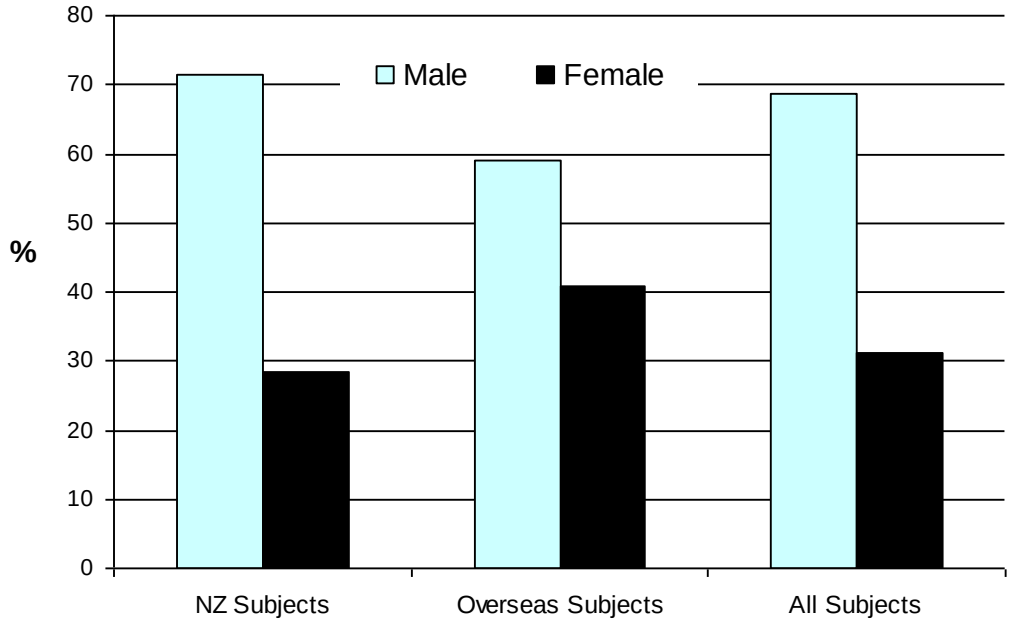


Figure 26. Land-based SAR Subject – Gender by NZ vs. Overseas

Land-based SAR Subjects – Gender by Incident Region

Males feature in larger numbers (relative to females) in incidents for all regions (Table 27 & Figure 27). In contrast to regional residential population sex profiles (refer Section 5.1), male subjects are over-represented in Land-based SAR incidents for all regions.

Table 27. Land-based SAR Subjects – Gender by Incident Region

Regions	% Male	% Female	n=
Gisborne	52	48	21
Nelson	63	37	35
Auckland	64	36	214
Northland	65	35	65
Wellington	65	35	435
Tasman	66	34	230
Taranaki	67	33	150
Marlborough	67	33	130
Manawatu Wanganui	67	33	265
Southland	68	32	341
Otago	69	31	382
BOP	71	29	195
West Coast	73	27	276
Waikato	73	27	383
Canterbury	74	26	373
Hawkes Bay	77	23	69
All NZ victims	69	31	3564

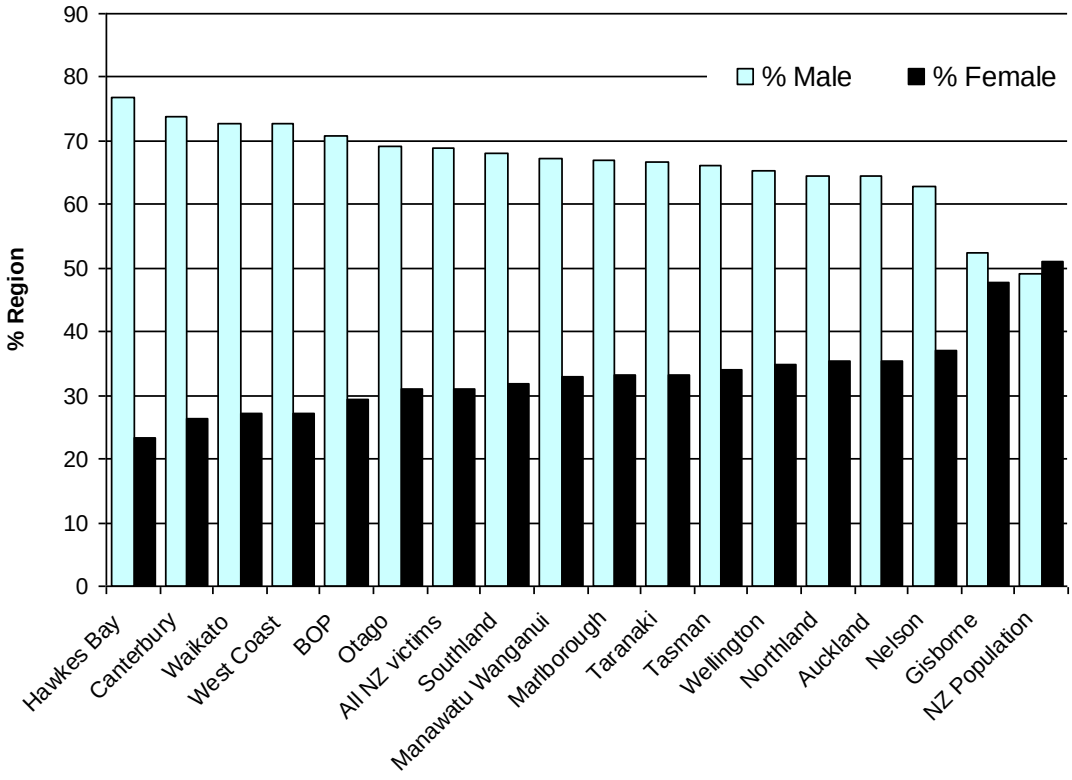


Figure 27. Land-based SAR Subject – Gender by Incident Region

Land-based SAR Subjects – Ethnic origins (NZ Subjects only)

Caucasian NZ subjects are over-represented relative to NZ population (90% vs. 71%), while all other ethnicities are under-represented (Table 28).

Table 28. Land-based SAR Subject - Ethnicity mix

	Land SAR Subject freq	Land SAR Subject %	NZ Population %
Asian	51	3	8
CaucasianNZ	1740	90	71
Maori	114	6	13
MiddleEastern	12	1	1
Polynesian	17	1	6
Other	15	1	0
n=	1934	100	100

Ethnicity by Home Region

48% of Asian Land-based SAR subjects came from the Auckland Region, 12% from Canterbury and 17% from Wellington (Table 29).

Caucasians are spread widely with the highest proportion being from Wellington – indicating that Caucasians from Auckland are under-represented (relative to its locally resident population).

Mäori Land-based SAR subjects came predominantly from BOP (23%), Wellington (14%), Waikato (12%) and from Northland and Auckland (10%).

Table 29. Ethnicity by Home region – where Subjects lived

	Asian	Caucasian NZ	Maori	MiddleEastern	Polynesian	Other	All NZ
Auckland	48	10	10	29	36	32	11
BOP	4	5	23	0	2	0	6
Canterbury	12	13	3	14	2	11	13
Gisborne	0	0	2	0	0	0	0
Hawkes Bay	0	3	2	0	0	5	3
ManawatuWanganui	6	7	7	7	0	0	6
Marlborough	0	2	1	0	0	5	2
Nelson	0	6	1	0	2	0	5
Northland	0	2	10	0	0	0	3
Otago	10	11	2	21	5	11	10
Southland	2	4	3	0	0	0	4
Taranaki	0	4	3	0	5	0	3
Tasman	0	2	1	0	0	0	2
Waikato	2	9	12	21	5	16	9
Wellington	17	19	14	7	43	16	19
West Coast	0	3	3	0	0	5	3
%	100	99	100	100	100	100	99
n=	52	2051	206	14	42	19	2571

Ethnicity by Incident region

Asian subjects had 27% of their incidents in Auckland (Table 30), compared with 48% living in Auckland. Some had incidents in other regions (e.g. Waikato 10% - compare with only 2% living there). Caucasians are widely spread across all regions. Mäori had most incidents in BOP, with Waikato being somewhat over-represented.

Table 30. Land-based SAR Subject – Ethnicity by Incident Region

	Asian	Caucasian	Maori	MiddleEastern	Polynesian	Other	All NZ
Auckland	27	5	10	14	36	11	6
BOP	6	6	20	0	2	0	7
Canterbury	10	10	2	14	2	11	9
Gisborne	0	1	1	0	0	5	1
Hawkes Bay	0	3	5	0	0	0	3
Manawatu Wanganui	8	9	10	7	2	11	9
Marlborough	0	5	2	0	0	11	4
Nelson	0	1	0	0	0	0	1
Northland	0	1	9	0	0	0	2
Otago	10	9	1	21	5	16	9
Southland	6	8	4	0	0	5	7
Taranaki	2	4	4	0	7	0	4
Tasman	6	7	1	0	2	0	6
Waikato	10	12	18	36	5	11	12
Wellington	13	14	9	7	38	11	14
West Coast	4	5	3	0	0	5	5
%	100	100	100	100	100	100	100
n=	52	2051	206	14	42	19	2384

5.2.3. P130 Police Profile – MARINE Incidents

Marine SAR incidents summary

- Data comprised 2968 incident records, from 4546 individual SAR subjects.
- The pattern of incidents was not representative of the NZ population distribution, with an under-representation of incidents in Auckland, Canterbury and over-representation in Wellington, Northland, Tasman and Marlborough Regions.
- The pattern of Marine SAROP incidents is also non-representative of Marine SAR volunteer capacity, with an over-representation of Marine incidents in Wellington, Tasman, Otago and Nelson regions.
- Overall, 94% of Marine incidents involve NZ subjects.
- Almost all incidents related to 'Recreation' (90%) – of these, boating-general was the largest source. A large contributing activity was shore-based fishing/diving/gathering – a specific profile has been prepared (see later section).
- Marine SAR subjects are predominantly male (85%), with an over-representation of subjects in the 20-49yr groups. Compared with Land-based SAR subjects and the NZ population as a whole, Marine subjects tended to be more middle aged.
- For NZ subjects, most incidents occurred in their home regions. Marine SAR subjects are largely representative of New Zealand population. This profile differs from that of Land-based SAR subjects (Land-based SAR is notably more Caucasian).

Data Source:

Data for tables and charts were sourced from an edited summary subset of the NZ Police P130 SAR Operations Database. The data was recorded by incident occurrence, including summary descriptive information about the incident and the SAR subjects (e.g. those individuals who were lost or missing). Data records were collected and combined from 4 years from 2005 to 2009 (July-June).

The database subset derived from this baseline information was edited by having all variables removed that were in any way related to any individual subject's personal information. As a result no individual could ever be identified from these data and results derived from such data were only presented in a summarised form.

Data included in the database related to SAROP incident characteristics and SAROP subject characteristics. These were integrated in the data fields but were separated where required to allow separate incident and subject descriptions/profiles. In some cases new variables were created from baseline data to improve analysis range and capability.

Main Information Areas:

SAROP Incident variables included:

- Type of incident
- Incident location – general area
- Time and date
- Duration
- Causes
- Subject preparation and capability
- SAR techniques applied

SAROP Individual Subject summary variables included:

- Age
- Gender
- Activity type – recreation, non-recreation
- Ethnicity
- NZ vs. Overseas residents
- Home location – general area

The following tables and charts are based on these variables, although all possible breakdowns are not included due to time, relevance and priority. Some are still to be done as new areas of interest emerge.

Number of Marine Incidents and Subjects

The final database subset used for the analyses comprised 2968 marine incident records (Table 31); all records were for independent incidents. In some cases, incidents involved more than one SAR subject (Table 32), and in total there were 4546 individual SAR subjects specified within those incidents[24]. Actual numbers in affected groups or vessels may have been higher, but the figures specified here represent those that were specifically lost or missing in each incident, and noted in the data.

Table 31. SAROP Marine Incident numbers

	n=	Marine SAROP %
2005-06	603	20
2006-07	799	27
2007-08	714	24
2008-09	852	29
Total	2968	100

Table 32. Number of Subjects per marine incident

Subjects per SAROP	%	*n=*	
1	70	*2067*	*SAROPS with 1 subject*
2	17	*490*	*SAROPS with 2 subjects*
3	7	*206*	*SAROPS with 3 subjects*
4	4	*108*	*SAROPS with 4 subjects*
5	2	*48*	*SAROPS with 5 subjects*
6	1	*26*	*SAROPS with 6 subjects*
7+	1	*23*	*SAROPS with 7+ subjects*
	100	2968	

Overall, 70% of incidents involved only one subject. Marine incidents typically involve multiple subjects (Table 33), more so than for land-based incidents.

[24] Note that entry protocols have evolved over time and that there is considerable inconsistency. Figures should be seen as indicative only.

Table 33. Proportions of subjects for Land-based versus Marine incidents

	freq	% LAND Incidents	freq	% MARINE Incidents
1	1722	77	820	40
2	321	14	607	30
3	96	4	265	13
4	39	2	163	8
5	25	1	80	4
6	9	0	42	2
7	9	0	23	1
8	6	0	12	1
9	4	0	4	0
10	2	0	4	0
10+	12	1	13	1
	2245		2033	

Locations of Marine SAROP Incidents

SAROP Callouts by NZ Region (vs. NZ Population)

Marine SAROP incidents do not represent NZ population distribution. The pattern shows an under-representation of incidents in Auckland, Canterbury and some other regional North Island areas (Table 34 & Figure 28). Marine incidents were most over-represented in Wellington, Northland, Tasman and Marlborough Regions.

Table 34. Marine SAROP Callouts by NZ Region (vs. NZ Population)

	freq.	% Incidents	NZ Pop %
Auckland	681	23	32
Wellington	647	22	11
Waikato	281	10	9
Northland	279	9	4
Canterbury	211	7	13
BOP	170	6	6
Otago	148	5	5
Tasman	97	3	1
Southland	90	3	2
Marlborough	74	3	1
Taranaki	73	2	3
Manawatu-Wanganui	57	2	6
Hawkes Bay	53	2	4
Nelson	45	2	1
West Coast	35	1	1
Gisborne	16	1	1
n=	2957	100	100

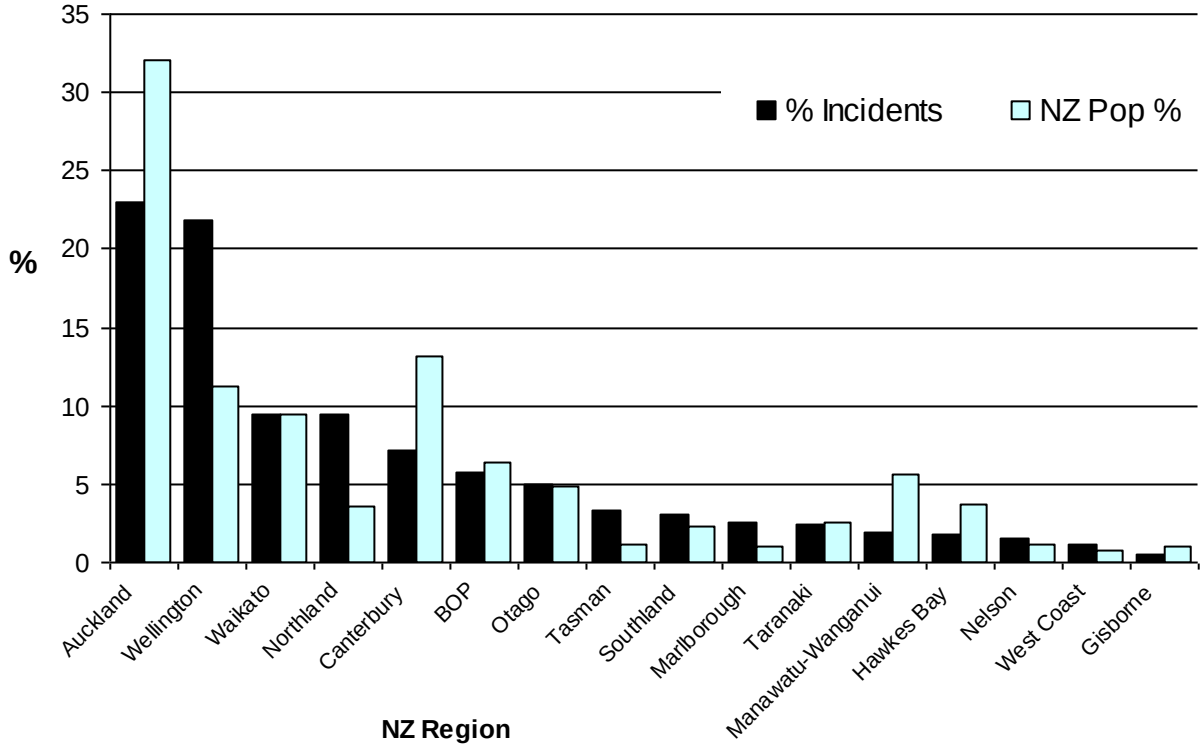


Figure 28. Marine SAROP Callouts by NZ Region (vs. NZ Population)

SAROP Callouts by NZ Region (vs. Coastguard membership)

The pattern of Marine SAROP incidents is also non-representative of Marine SAR volunteer capacity[25] (as evidenced by Coastguard membership - Figure 29). The pattern shows an over-representation of Marine incidents in Wellington, Tasman, Otago and Nelson regions. Some other regions show the reverse (e.g., Auckland and Bay of Plenty) where volunteer resourcing is proportionately larger.

[25]Data on Coastguard capacity are sourced from Coastguard Profile in Volume 2 of this report.

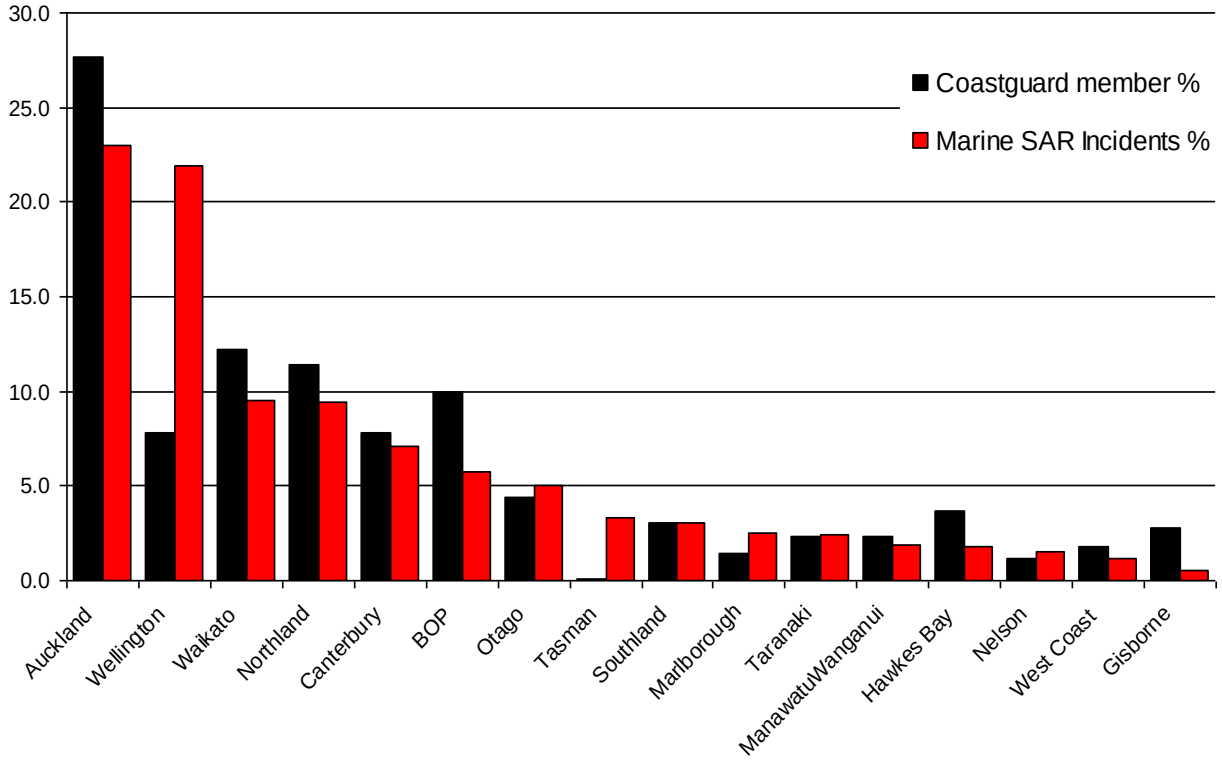


Figure 29. Coastguard Members vs. Marine Incidents (percentage of national totals)

Marine SAROP Incidents by NZ Region – NZ vs. Overseas Subjects

Overall, 94% of Marine incidents involve NZ subjects (Table 35 & Figure 30). The larger urban and North Island regions have proportionately the least tourist-related Marine incidents, in contrast to Otago, Nelson, Tasman, Marlborough and West Coast which have the highest proportions of tourist-related Marine incidents.

Table 35. Marine SAROP Incidents by NZ Region – NZ vs. Overseas Subjects

	NZ Subjects %	Overseas Subject %	n=
Auckland	97	3	703
BOP	87	13	143
Canterbury	94	6	281
Gisborne	100	0	22
Hawkes Bay	98	2	60
Manawatu-Wanganui	89	11	92
Marlborough	88	12	81
Nelson	79	21	34
Northland	95	5	128
Otago	76	24	128
Southland	93	7	199
Taranaki	95	5	73
Tasman	87	13	89
Waikato	95	5	341
Wellington	98	2	750
West Coast	79	21	33
All	94	6	3157

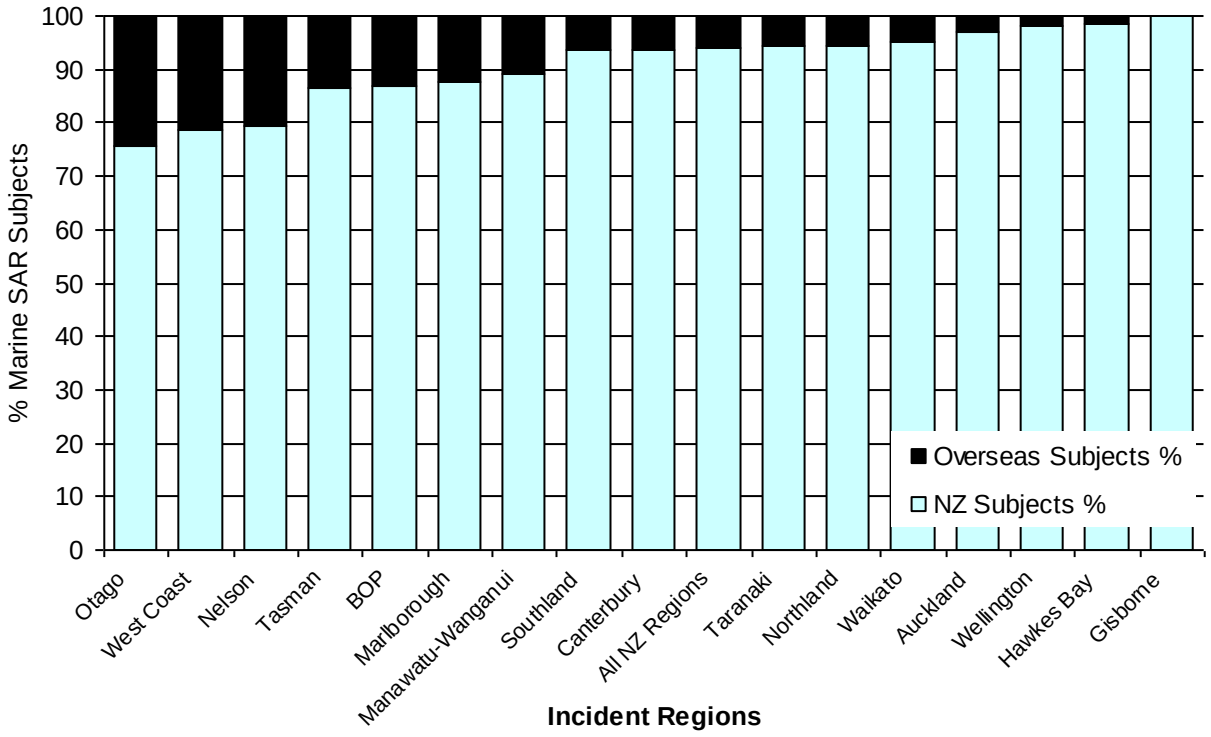


Figure 30. Marine SAROP Incidents by NZ Region – NZ vs. Overseas Subjects

Marine SAROP Subject Behaviour Type

Almost all Marine incidents related to 'Recreation' (90%, Table 36). 'Alarm-Raised' was the next highest category (6%), which includes false alarms of various types (such as unresolved flare sightings, visual observation alarms found to be mistakes or unresolved). Commercial activity (2%) was next largest category (mainly commercial fishing). Psychological incidents comprised less than 1% (0.8%). These were almost all related to suicide attempts. Other Despondent behaviour or other psychological causes such as Dementia were not evident.

Table 36. Marine SAROP Subject Behaviour Type

	freq incidents	% Incidents	Notes
Recreation	2665	90	A variety of activities dominated by boat use, often for the purpose of fishing and diving but often this is not clearly distinguished. Also includes shore-based fishing and diving and a few instances of lake and river incidents.
Alarm Raised	181	6	Alarm raised mostly through flare sightings or observations from shore, but no incident identified. Due to false alarms, malicious activations, and/or mistakes in activations or observations.
Commercial Fishing/Other	64	2	Mostly fishing boats, as well as a few charter boats for recreation/tourism or other purposes.
Psychological	26	1	Almost all of these related to shore-based suicide attempts. There were none related to Dementia, Alzheimers or other Despondent behaviours.
Other	25	1	These included a few instances of flying, bad behaviour (e.g. rescuing people fleeing police), and work (e.g. oil rig, wharf repairs)
n=	2968		

Marine SAROP Behaviour Type by NZ Region

The patterns of incident activity/behaviour types may vary in different areas of New Zealand. 90% of all Marine incidents are from recreational activity; therefore Marine SAR incidents are mostly likely to be determined by recreation participation patterns (with a few minor exceptions).

Marine Recreation Incident Activity Types

The number of Marine incidents relating to recreation activity totalled 2539 (Table 37). There were 429 additional incidents not included (these were non-recreation incidents, alarms or missing values).

Boating-general is the highest source (46%) of recreation incidents overall, although it is unclear if boating here occurred for its own sake, or as a means to engage in other activities (e.g. fishing, diving). Boat size and means of propulsion are not distinguished here (e.g. sail vs. motor). Boat-based fishing was the second major source of incidents (25%), with Boat-based diving much lower (4%). The proportions of incidents relating to shore-based fishing (3%) and diving (1%) activities were relatively small.

Table 37. Marine SAROP Subject Recreation Activities

Recreation Activity	freq	%	Notes
Boating-general	1153	46	Unspecified motor and sail activity
Boat-based fishing	632	25	Where fishing indicated as activity
Beach/shore swimming	177	7	
Surf/Wind sports	166	7	Surf, boogieboard, windsurf, kite surf
Paddle/Oar sports	131	5	Kayaking, canoeing, waka, rowing
Boat-based diving	100	4	Where diving indicated as activity
Shore-based fishing	69	3	
Shore-based diving	33	1	
Shore-based walking	29	1	Walking, play, other
Jet Skiing	18	1	
Towed Activity	15	1	Waterski, wakeboard, tube
Flying	12	0	Aircraft, Parapente, Parachute
	2539	100	

Marine Recreation Incidents - Activity Types by Region

Table 38 reveals there are regional differences in proportions of recreational incidents for some regions. Reading the rows across - those regions above the lines have relatively higher proportions of the Boat-general activity type (e.g. Tasman-61%, Northland-57%) while those below have relatively lower proportions (Nelson-33%, Gisborne-31%, Taranaki-29%, Manawatu-Wanganui-13%). Data are sorted by descending-down 'Boating-general' activity.

Reading rows across - in Northland 57% of Marine incidents were Boating – general, 23% Boat – fishing, 9% Beach – swimming etc.

Table 38. Marine SAROP Subject Recreation Activities – by NZ Region

Read by Row %	Boating-general	Boat-fishing	Beach Swimming	Shore-fishing	Surf Wind Sports	Paddle Oar Sports	Boat-diving	Shore-walking	Shore-diving	Flying	Jet Skiing	Towed Activity	%	*n=*
Tasman	61	25	0	1	7	1	4	0	0	0	0	0	100	*75*
Northland	57	23	9	3	1	2	3	0	1	0	0	0	100	*237*
Waikato	52	20	9	2	9	5	0	0	0	2	0	0	100	*258*
Auckland	46	26	6	5	5	5	2	2	1	1	1	1	100	*599*
Otago	46	14	8	3	16	6	3	3	1	0	1	0	100	*119*
All Regions	*46*	*25*	*7*	*3*	*7*	*5*	*4*	*1*	*1*	*0*	*1*	*1*	*100*	*2539*
West Coast	44	15	19	7	11	0	0	4	0	0	0	0	100	*27*
Canterbury	44	19	9	4	13	2	4	2	0	1	1	1	100	*178*
Wellington	43	26	4	1	6	5	9	1	3	0	1	1	100	*579*
Hawkes Bay	42	37	7	2	2	2	2	2	0	0	2	0	100	*43*
Southland	42	25	10	0	3	10	4	1	1	0	3	1	100	*72*
BOP	42	26	7	1	3	15	5	0	1	0	1	0	100	*137*
Marlborough	39	40	2	2	2	5	6	2	3	0	0	0	100	*62*
Nelson	33	19	17	0	25	0	0	0	3	0	0	3	100	*36*
Gisborne	31	38	8	0	8	8	0	0	8	0	0	0	100	*13*
Taranaki	29	27	12	2	12	10	2	4	0	0	2	0	100	*51*
Manawatu-Wanganui	13	52	8	6	4	10	4	0	0	0	0	2	100	*48*

Marine Recreation Incidents - Regions by Activity Type

Another way to view regional differences is to consider how each activity incident type is spread across the different regions. Table 39 demonstrates this, with the inclusion of an extra column containing the NZ population % by region for comparative purposes (i.e., if incidents are spread according to population size then they should approximately match this population pattern). Overall, incidents are particularly under-represented in Auckland and Canterbury and particularly over-represented in Wellington, Northland and Tasman. Specific incident patterns appear to vary between regions: for example, Auckland has almost half (45%) of all shore-fishing incidents with Northland having 12%. Wellington has over half (55%) of Shore-diving incidents (Auckland has 18%) and 50% of all Boat-diving incidents. On this basis Auckland can be considered a hot-spot for Shore-fishing incidents (45% vs. 32% NZ population) with Wellington a hot-spot for Shore-diving (55% vs. 11% NZ population) and Boat-diving (50% vs. 11% NZ population).

Table 39. Marine SAROP Subject Recreation Activities – by NZ Region

Read by Column %	Boating-general	Boat-fishing	Beach Swimming	Shore-fishing	Surf Wind Sports	Paddle Oar Sports	Boat-diving	Shore-walking	Shore-diving	Flying	Jet Skiing	Towed Activity	*All Rec Activities*	NZ Pop %
Auckland	24	25	21	45	18	22	11	31	18	42	17	21	24	32
BOP	5	6	6	3	2	15	7	0	3	0	6	0	5	6
Canterbury	7	5	9	10	14	3	7	14	0	8	11	14	7	13
Gisborne	0	1	1	0	1	1	0	0	3	0	0	0	1	1
Hawkes Bay	2	3	2	1	1	1	1	3	0	0	6	0	2	4
Manawatu-Wanganui	1	4	2	4	1	4	2	0	0	0	0	7	2	6
Marlborough	2	4	1	1	1	2	4	3	6	0	0	0	2	1
Nelson	1	1	3	0	5	0	0	0	3	0	0	7	1	1
Northland	12	9	12	12	1	4	7	0	6	8	6	0	9	4
Otago	5	3	5	6	11	5	3	10	3	0	6	0	5	5
Southland	3	3	4	0	1	5	3	3	3	0	11	7	3	2
Taranaki	1	2	3	1	4	4	1	7	0	0	6	0	2	3
Tasman	4	3	0	1	3	1	3	0	0	0	0	0	3	1
Waikato	12	8	14	6	14	11	1	0	0	33	6	7	10	9
Wellington	22	23	15	6	21	22	50	24	55	8	28	36	23	11
West Coast	1	1	3	3	2	0	0	3	0	0	0	0	1	1
%	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
n=	*1158*	*632*	*177*	*69*	*166*	*131*	*100*	*29*	*33*	*12*	*18*	*14*	*2539*	

Other Marine SAROP Incident details

There are specific variables addressing types of SAROP techniques and characteristics. These are mainly operational matters related to informing the tactics and targeting of SAR search operations. They do not relate primarily to the projection purpose, and therefore are not reported here.

Unlike Land-based SAR incidents - many key elements of Marine incidents and their subjects are not already summarised in Koester's (2009) "Lost Person Behaviour" and related specialist search material. This represents a significant gap

5.2.4. Subject profile - Marine

The final database subset used for the analyses comprised 2969 Marine incident records (all for independent incidents). In some cases these 2969 incidents involved more than one SAR subject, and in total there were 4546 individual SAR subjects within those incidents. These 4546 were used to develop subject profiles, although in many cases due to missing values in some fields the total number is lower.

New Zealand subjects comprised 94% of all Marine subjects (Table 40).

Table 40. Marine SAR Subjects – NZ vs. Overseas Subjects

	Marine SAR Subjects freq	Marine SAR Subjects %
NZ Subjects	2979	94
Overseas Subjects	191	6
	3170	100

Marine SAR Subjects - gender

Marine SAR subjects are predominantly male (85%, Table 41).

Table 41. Marine SAR Subjects

Female	Male	n=
15	85	3542

Marine SAR Subjects - Overseas Subject Nationality

There are some minor differences apparent between the nationalities of Marine SAR and Land-based SAR subjects (Table 42 & Figure 31), but due to the small size of the overseas Marine SAR group these differences should be considered indicative-only at this stage.

Table 42. Nationality of overseas subjects (Marine-based vs. Land-based SAR)

	MarineSAR freq	MarineSAR %	LandSAR freq	LandSAR %
UK	20	21	92	16
Australia	19	20	97	17
Other Europe	16	17	74	13
North America	13	14	104	18
Germany	11	11	69	12
South America	3	3	11	2
Israel	1	1	44	8
Asia	1	1	40	7
Other	12	13	32	6
n=	96	100		563

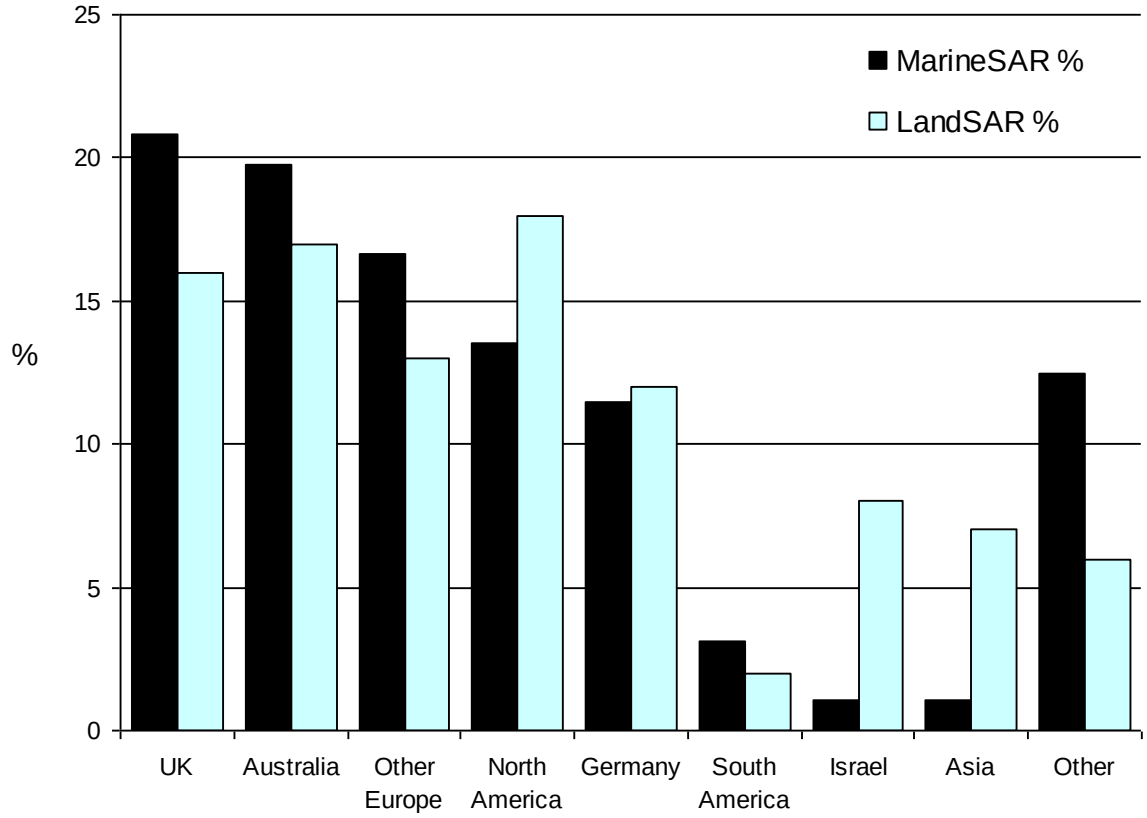


Figure 31. Overseas Subject Nationality – Marine-based SAR and Land-based SAR subjects

Marine SAR Subjects – Distribution

Marine SAR Subjects are over-represented in Otago, Southland, West Coast, Tasman, Marlborough relative to regional population size (Table 43 & Figure 32). Regions most highly under-represented include Auckland, with Canterbury distant second.

Table 43. Marine SAROP Subjects – vs. NZ Population

	freq.	% Incidents	NZ Pop %
Auckland	681	23	32
Wellington	647	22	11
Waikato	281	10	9
Northland	279	9	4
Canterbury	211	7	13
BOP	170	6	6
Otago	148	5	5
Tasman	97	3	1
Southland	90	3	2
Marlborough	74	3	1
Taranaki	73	2	3
Manawatu-Wanganui	57	2	6
Hawkes Bay	53	2	4
Nelson	45	2	1
West Coast	35	1	1
Gisborne	16	1	1
n=	2957	100	100

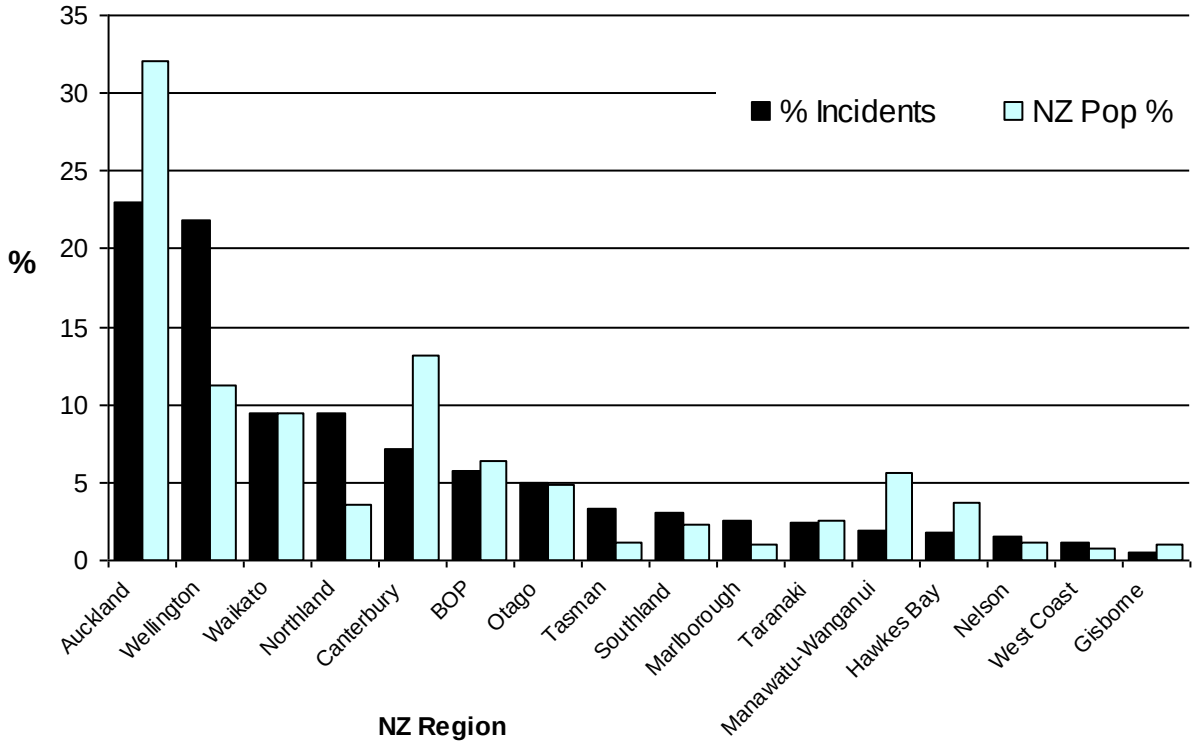


Figure 32. Marine SAROP Subjects – vs NZ Population

Marine Subject Age Groups

Marine SAROP subjects are over-represented in 20-49yr groups (Table 44 & Figure 33), and under-represented in the under- 10 and over-60 age groups. Compared with Land-based SAR subjects and the NZ population as a whole, Marine subjects tend to be more middle aged (Figure 34).

Table 44. Marine SAROP Subject Age-groups (10yr) – vs. NZ Population

	Marine SAR Subjects	Land SAR Subjects	NZ
0-9	3	4	14
10-19	17	15	15
20-29	20	24	13
30-39	20	15	14
40-49	20	14	15
50-59	13	12	12
60-69	6	7	8
70+	2	8	8
	3108	3308	

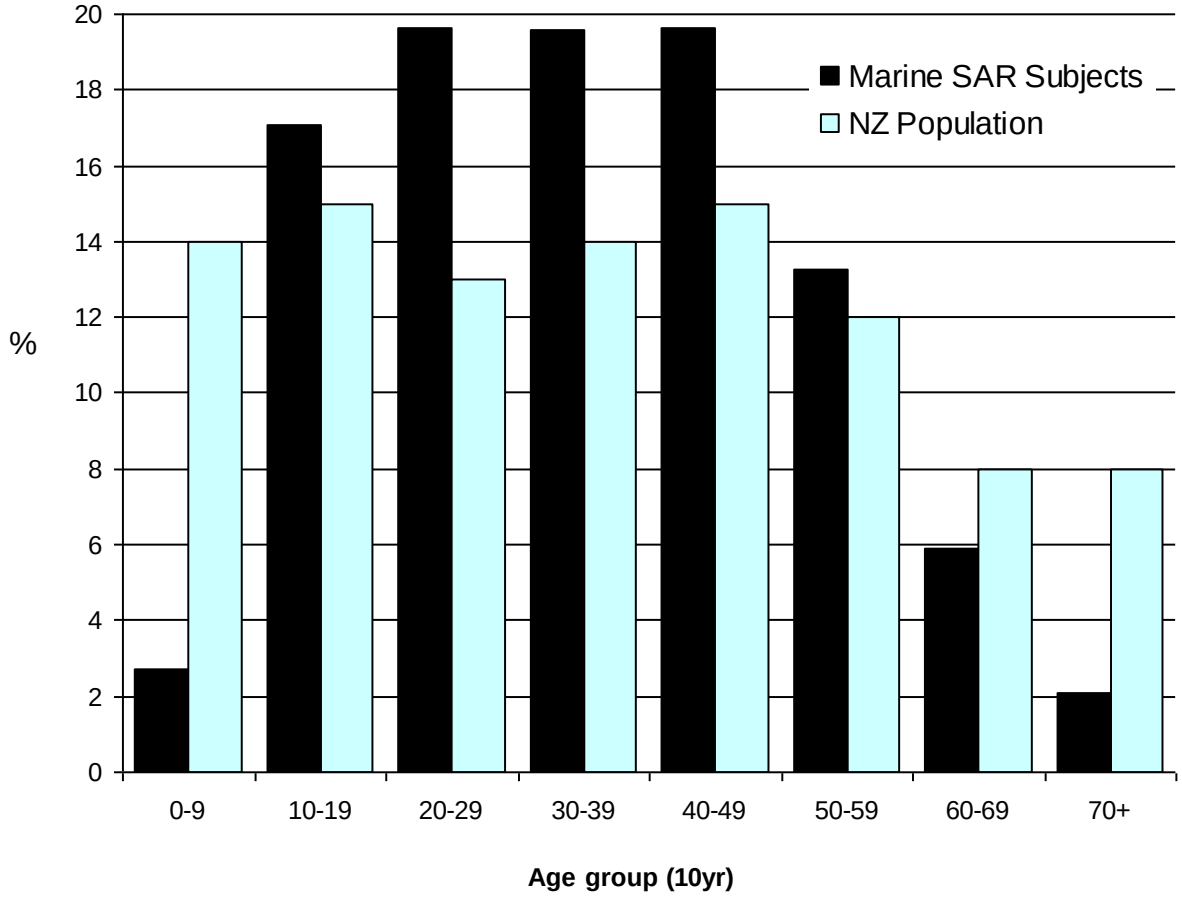


Figure 33. Marine SAROP Subject Age-groups (10yr) – vs. NZ Population

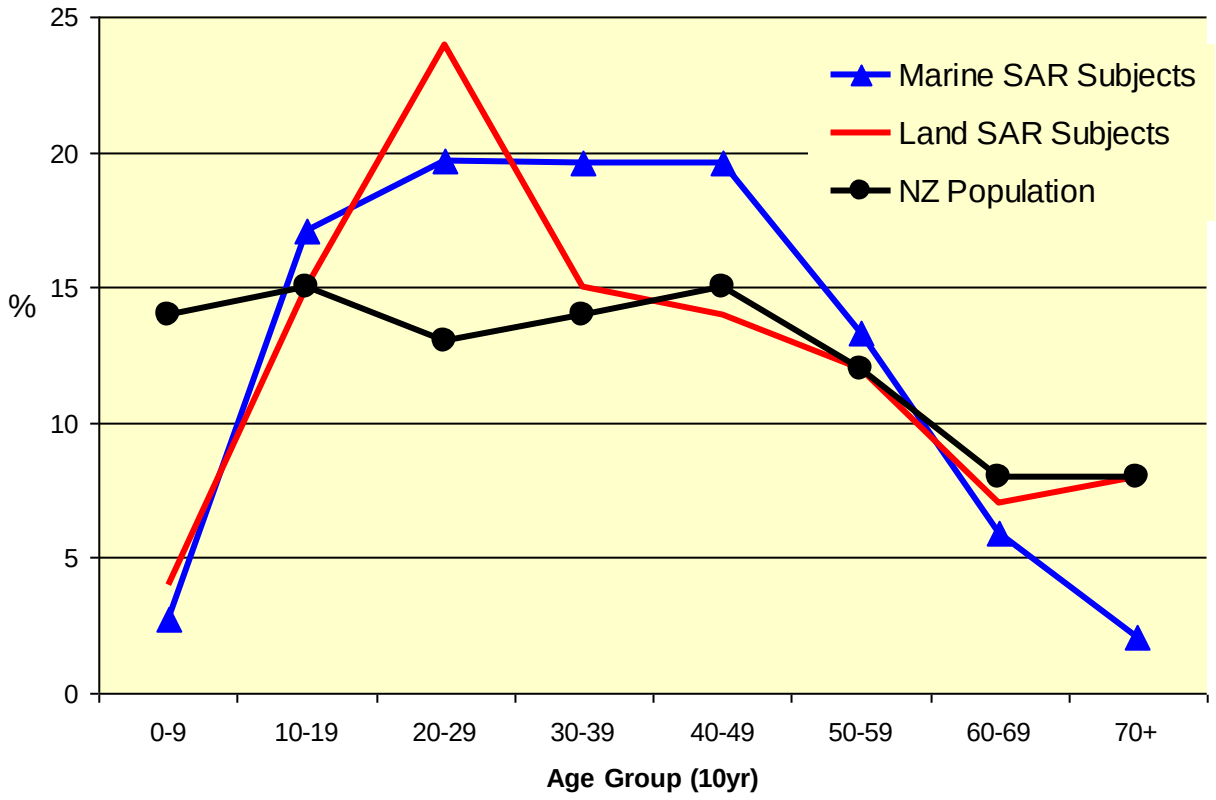


Figure 34. Marine and Land-based SAR Subject Age-groups (10yr) – vs. NZ Population

Patterns of Marine-based SAR Subject Origins and Locations of Land-based SAR Incidents

Table 45 & Table 46 compare the places where SAR subjects came from with the places that they had their incidents. Both illustrate the spread of incidents around the country.

The first (Table 45) takes each Region in which incidents occurred and looks at the regions where from which Marine SAR subjects originated. In the main, Marine SAR subjects were usually local. Few travelled far to other regions to engage in activities resulting in a Marine SAR incident. The only major regional interactions were between Nelson and Tasman (a function of proximity and regional structure) and Auckland resident's presence among Northland (22%) and Waikato (19%) Marine SAR subjects.

The second table (Table 46) takes each Region and looks at where the SAR subjects from there actually went to have their incidents. This data reinforces that most incident subjects were local.

A. Home Source of Marine SAR Subjects having incidents in respective NZ Regions

Four examples are noted below to illustrate how Table 45 may be used (i.e., where people having Land-based SAR incidents in a particular region came from). Some examples here show how the tables can be used by reading down the columns – starting with Auckland:

- Auckland Region - 92% of Marine SAR subjects in Auckland Region were local Auckland residents. 3% were from Waikato
- BOP Region - 64% local BOP Residents, 12% from Waikato, 11% from Auckland
- Northland Region - 71% local Canterbury residents, 22% from Auckland, 2% for BOP and Wellington
- Southland Region - 79% local Southland residents, 17% from Otago.

Table 45. Marine SAR Subjects – In Incident Regions.
(i.e., where did the subjects come from? – Read columns down)

Read column % down	**Incident Location**																
Home Location	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu-Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All Incident Regions
Auckland	92	11	3	0	0	1	2	3	22	2	1	3	4	19	2	3	25
BOP	1	64	2	5	0	0	0	0	4	0	0	1	1	7	1	0	4
Canterbury	0	0	88	5	0	0	20	24	0	5	2	0	13	1	1	3	10
Gisborne	0	0	0	84	3	0	0	0	0	0	0	0	0	0	0	0	1
Hawkes Bay	0	2	0	5	80	8	5	0	0	0	0	0	0	2	1	0	3
Manawatu-Wanganui	0	6	0	0	2	83	2	0	0	0	0	3	0	10	2	0	5
Marlborough	0	0	1	0	2	0	24	0	0	0	0	0	6	0	1	3	1
Nelson	0	0	1	0	0	0	24	69	0	0	1	0	34	0	0	3	3
Northland	2	0	0	0	0	0	0	0	71	0	0	0	0	0	0	0	2
Otago	0	0	0	0	0	0	0	0	1	85	17	0	0	1	0	6	4
Southland	0	0	0	0	10	0	3	0	0	2	79	0	0	1	0	0	5
Taranaki	0	0	0	0	0	1	0	0	1	0	0	86	0	2	0	0	3
Tasman	0	1	1	0	0	0	5	0	0	0	0	0	39	0	0	0	1
Waikato	3	12	1	0	0	1	0	0	0	0	1	7	0	51	1	3	7
Wellington	2	5	2	0	3	6	15	3	0	5	0	0	3	7	91	0	25
West Coast	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	77	1
%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
n=	636	123	275	19	59	88	66	29	77	91	178	74	79	312	701	31	2838

B. Incident Locations for Marine SAR Subjects coming from respective Home Regions

Table 46 identifies where SAR subjects coming from a particular region had their SAR incidents. Some examples below show how this table can be used reading rows across – starting with Auckland:

- Subjects from Auckland – 82% had their incidents in Auckland, 2% in BOP and Northland, and 8% in Waikato
- Subjects from Nelson – 38% had their incidents in Tasman, 28% in Nelson, and 23% in Marlborough
- Subjects from Canterbury – 83% had their incidents in Canterbury, and 4% in Marlborough
- Subjects from Manawatu-Wanganui – 55% had their incidents in Manawatu-Wanganui, 24% in Waikato, 11% in Wellington
- Subjects from Otago – 66% had their incidents in Otago, 26% in Southland

Table 46. Marine SAR Subjects from Different Home Regions
(i.e., where they had their incidents? – Read rows across)

Read row % across **Incident Location**

Home Location	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu-Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	%	n=
Auckland	82	2	1	0	0	0	0	0	2	0	0	0	0	8	2	0	100	709
BOP	4	65	5	1	0	0	0	0	2	0	0	1	1	18	3	0	100	122
Canterbury	1	0	83	0	0	0	4	2	0	2	1	0	3	1	2	0	100	291
Gisborne	0	0	0	89	11	0	0	0	0	0	0	0	0	0	0	0	100	18
Hawkes Bay	4	3	0	1	62	9	4	0	0	0	0	0	0	9	8	0	100	76
Manawatu-Wanganui	1	5	0	0	1	55	1	0	0	0	0	2	0	24	11	0	100	132
Marlborough	0	0	7	0	3	0	55	0	0	0	0	0	17	0	14	3	100	29
Nelson	0	0	4	0	0	0	23	28	0	0	1	0	38	0	4	1	100	71
Northland	19	0	1	0	0	0	0	0	80	0	0	0	0	0	0	0	100	69
Otago	0	0	1	0	0	0	0	0	1	66	26	0	0	2	3	2	100	117
Southland	0	0	0	0	4	0	1	0	0	1	91	0	0	1	1	0	100	154
Taranaki	0	0	1	0	0	1	0	0	1	0	0	89	0	7	0	0	100	72
Tasman	0	3	5	0	0	0	8	0	0	0	0	0	84	0	0	0	100	37
Waikato	9	7	1	0	0	0	0	0	0	0	1	2	0	77	2	0	100	208
Wellington	2	1	1	0	0	1	1	0	0	1	0	0	0	3	90	0	100	708
West Coast	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	96	100	25
All Home Regions	22	4	10	1	2	3	2	1	3	3	6	3	3	11	25	1	100	2838

Marine SAR Subjects – Ethnicity

Marine SAR subjects are largely representative of New Zealand population (Table 47). This profile differs from that of LandSAR subjects (Land-based SAR is notably more Caucasian).

Table 47. Marine SAR Subjects – NZ vs. Overseas Subjects

	Marine SAR Subjects	Marine SAR Subjects %	NZ Population	Land SAR Subjects %
Caucasian	1701	71	71	86
Maori	387	16	13	9
Polynesian	171	7	6	2
Asian	120	5	8	2
Other NZ	8	0	2	1
n=	2387	100	100	100

Ethnicity by Regions

Asian (13%) and Polynesian (16%) Marine SAR subjects are relatively over-represented among subjects of incidents in Auckland (Table 48). Mäori are relatively overrepresented among incidents in BOP, Gisborne, Hawke's Bay and Northland.

Table 49 shows that Asian (62%) and Polynesian (57%) Marine SAR subjects have most of their incidents in Auckland, followed by Wellington (23%) and (25%). Caucasians tend to have most of their incidents in Wellington (25%) and Auckland (20%), with a wide spread elsewhere.

Table 48. Marine SAR Subject ethnicity in Incident Regions
(NB. read rows across)

	Asian	Caucasian	Maori	Other NZ	Polynesian	%	n=
Auckland	13	59	12	0	16	100	588
BOP	1	65	31	0	3	100	93
Canterbury	4	82	11	0	3	100	221
Gisborne	0	42	58	0	0	100	19
Hawkes Bay	0	45	47	0	8	100	49
Manawatu-Wanganui	0	86	14	0	0	100	65
Marlborough	0	87	8	0	5	100	63
Nelson	0	90	10	0	0	100	21
Northland	2	56	38	1	2	100	89
Otago	3	90	5	0	2	100	63
Southland	0	77	23	0	0	100	138
Taranaki	0	77	23	0	0	100	52
Tasman	0	92	8	0	0	100	64
Waikato	2	81	13	0	4	100	238
Wellington	5	71	16	1	7	100	603
West Coast	0	100	0	0	0	100	16
All Regions	5	71	16	0	7	100	2386

Table 49. Marine SAR Subject ethnicities across Regions
(NB. read columns down)

	Asian	Caucasian	Maori	Other NZ	Polynesian	All Marine SAR Subjects
Auckland	62	20	18	25	57	25
BOP	1	4	7	0	2	4
Canterbury	7	11	6	0	4	9
Gisborne	0	0	3	0	0	1
Hawkes Bay	0	1	6	0	2	2
Manawatu-Wanganui	0	3	2	0	0	3
Marlborough	0	3	1	0	2	3
Nelson	0	1	1	0	0	1
Northland	2	3	9	13	1	4
Otago	2	3	1	0	1	3
Southland	0	6	8	0	0	6
Taranaki	0	2	3	0	0	2
Tasman	0	3	1	0	0	3
Waikato	4	11	8	0	5	10
Wellington	23	25	25	63	25	25
West Coast	0	1	0	0	0	1
%	100	100	100	100	100	100
n=	120	1701	388	8	169	2386

Age-groups by Region (10yr)

Marine subject age profiles show regional variations, with notable peaks for some regions especially in the 20-29 yr age group – Otago, Southland, Canterbury, West Coast (Table 50 & Figure 35).

Table 50. Marine SAROP Subject Age groups (10yr) – by NZ Region

	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All Subject %	NZ Pop %
0 to 9	9	7	3	10	1	2	2	6	15	2	1	1	2	5	8	0	4	14
10 to 19	13	14	11	10	12	21	12	3	16	11	10	17	18	17	23	8	15	15
20 to 29	15	12	31	20	22	19	25	21	10	37	28	31	22	22	18	32	24	13
30 to 39	11	17	15	5	17	16	13	15	6	17	15	17	19	17	12	19	15	**14**
40 to 49	13	15	15	25	26	14	13	12	11	12	17	10	14	11	13	14	14	**15**
50 to 59	10	11	15	25	14	12	13	9	8	10	19	8	11	14	9	12	12	**12**
60 to 69	5	8	6	5	6	7	7	9	13	8	8	8	7	8	6	9	7	**8**
70 to 79	13	11	3	0	1	6	3	9	15	1	1	4	4	5	5	3	5	**5**
80 plus	12	7	2	0	0	0	10	15	6	1	1	2	2	2	5	1	3	**3**
%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
n=	188	190	344	20	69	243	121	33	62	343	321	143	207	376	387	226	3273	
															Missing = 127		3300	

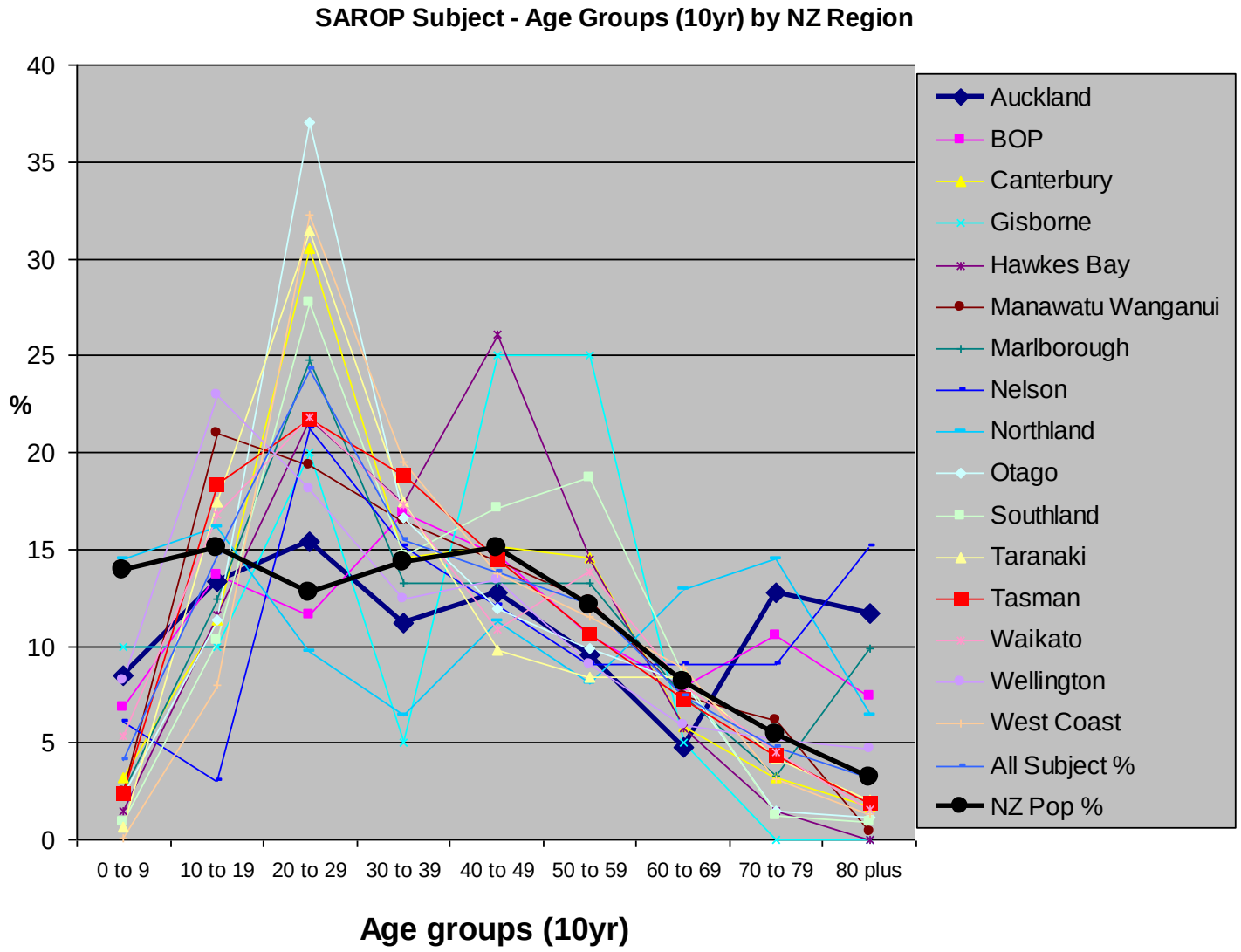


Figure 35. Marine SAROP Subject Age groups (10yr) – by NZ Region

Age-groups by Region (5yr)

The 5 year age profiles for Marine subjects (Table 51) show a more complex pattern than for the 10 year profiles. There is a high variation with peaks between 15-30 yrs in many groups, but not all. Other peaks in the 40-50s and above 70.

Table 51. Marine SAROP Subject Age groups (5yr) – by NZ Region

	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All Victims	NZ %
0 to 4	3	4	1	10	0	0	1	3	8	1	0	1	0	2	3	0	1	7
5 to 9	6	3	2	0	1	2	2	3	6	2	1	0	2	3	5	2	3	7
10 to 14	6	5	3	0	3	8	3	0	6	2	2	7	5	7	10	3	5	8
15 to 19	7	9	9	10	9	13	9	3	10	10	8	10	14	10	13	5	10	7
20 to 24	9	6	18	20	12	9	16	3	3	19	12	16	11	11	8	18	12	7
25 to 29	6	6	13	0	10	10	9	18	6	18	16	15	11	11	10	14	12	6
30 to 34	5	7	8	0	7	9	8	9	3	10	6	8	11	9	5	11	8	7
35 to 39	6	9	6	5	10	8	5	6	3	7	8	10	8	9	7	9	8	7
40 to 44	6	4	10	0	7	7	8	9	3	5	10	6	6	5	6	7	7	8
45 to 49	7	11	5	25	19	8	5	3	8	7	7	4	8	6	8	7	7	7
50 to 54	5	5	8	20	7	7	7	6	0	6	13	3	8	10	5	5	7	6
55 to 59	5	5	6	5	7	6	6	3	8	4	6	5	2	4	4	7	5	6
60 to 64	2	4	3	5	4	5	6	6	3	4	7	5	4	5	3	4	4	4
65 to 69	3	4	3	0	1	3	2	3	10	4	2	3	3	3	3	4	3	4
70 to 74	7	4	1	0	0	4	3	3	8	1	1	2	3	3	3	1	3	3
75 to 79	6	7	2	0	1	2	0	6	6	0	0	2	1	1	2	2	2	3
80 plus	12	7	2	0	0	0	10	15	6	1	1	2	2	2	5	1	3	3
%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
n=	188	190	344	20	69	243	121	33	62	343	321	143	207	376	387	226	3308	
															Missing = 35		3343	

5.3. Specific Sub-group profiles

Summary

A total of eight specific sub-profiles were prepared. A brief summary is provided below for each sub-profile (with detail following in the following profile summary information).

Précis of all sub-group profiles:

Alzheimer's/Dementia (refer p. 94)

193 Land subjects, 60% male, aged, ethnically representative, urban concentrated incidents, regionally unevenly distributed relative to source populations

65+ (Land and Marine subjects) (refer p. 102)

139 Marine subjects: males heavily overrepresented (95%), ethnically representative, most occurring in home regions.

364 Land subjects: males overrepresented (66%), ethnically representative, urban concentration (more-so for Dementia cases, although recreation cases were concentrated in remote natural areas/parks), most occurring in home regions.

Despondents (refer p. 110)

166 Land subjects, predominantly male (66%), ethnically overrepresentation of Europeans, regionally unevenly spread relative to populations (with overrepresentation in Wellington), most incidents occurred in subjects' home regions.

Trampers (refer p. 116)

1208 Land subjects, predominantly male (71%), with overrepresentation in 15-39 age group, ethnicity pattern similar to Non-Tramper subjects (but overrepresented in European), high proportions of tourists (36%) compared to Non-Tramper subjects, incidents geographically unevenly distributed with heavy concentrations in Southland and Otago regions (both with high proportions of tourist subjects), concentrated in remote natural area/parks, most outside of subjects home regions.

Walkers (refer p. 129)

488 Land subjects, even gender balance, with overrepresentation in 15-39 age group, ethnicity pattern similar to Non-Tramper subjects (but overrepresented in European, and notable even representation of Asian subjects), relatively high levels of Tourist subjects, incidents spread geographically with highest concentration in Wellington, with concentration of incidents in remote natural areas/parks (more so for Tourist subjects), most occurring within subjects home regions. Almost ¾ of subjects in walking incidents on the West Coast were tourists.

Hunters (refer p. 142)

434 Land subjects, almost entirely male (97%), with overrepresentation in 15-39 age group, ethnicity pattern similar to Non-Tramper subjects (but overrepresented in European, and notable relatively high representation of Mäori), very low proportion of Tourist subjects, geographically highly dispersed incidents (most in Waikato, Southland, Bay of Plenty and Canterbury) and overrepresented in Waikato and Southland populations, predominantly occurring in remote natural areas/parks, high proportion in incidents occurring outside of subjects' home regions (46%).

Shore-based marine fishing, diving and gathering (refer p. 155)

102 Marine subjects, male dominated (88%), overrepresented in 20-29 age group, ethnically non-representative (with over-representation of Mäori, Polynesian and Asian groups), few Tourists (6%), geographically concentrated with an overrepresentation in Auckland region (40% vs. 32% population), mostly in subjects' home regions (92%).

Tourist (Land and Marine) (refer p. 161)

Land Tourist subjects (n=710):

Represent 22% of all Land subjects, the main nationalities (>10%) are North America, Australia, UK, Other Europe and Germany (with Israel notable at 8%), with overrepresentation of Germany, other Europe and Israel relative to visitor arrival figures

Gender balance slightly tilted towards male (59%); age tended to be overrepresented in 15-39 age group, with most incidents relating to recreation activities (97%) – of these predominant were Tramping (58%) and Walking (21%); Tourists feature in high proportions of Skiing/Boarding incidents, Tramping, Climbing, Walking and Rafting (all over 30% of all such incidents); high geographical concentration of incidents in Otago, Southland, Canterbury and West Coast regions (featuring in over 30% of all incidents in Southland, Otago and West Coast regions).

Tourist subjects incident locations tended to focus strongly on Remote Natural Areas/Parks (78%).

Marine Tourist subjects (n=157):

5% of all Marine subjects, the main nationalities (>10%) are North America, Australia, UK, Other Europe and Germany, with overrepresentation of Germany and other Europe relative to visitor arrival figures; predominantly male (76%)

Geographical concentration of incidents in Otago, Auckland and Bay of Plenty regions, with Tourists comprising large proportions of Marine subjects in Otago, West Coast and Nelson (all over 20% of subjects).

5.3.1. Subject Profile – Alzheimer's/Dementia

This profile aims to identify characteristic socio-demographic features of SAR subjects affected by Alzheimer's/Dementia (referred to onwards as 'Dementia'). The profile provides a baseline for population projections of future demand (refer Section 7.3).

Data Source:

Data for tables and charts were sourced from the Police P130 database of Search and Rescue incidents. SAR subjects who were affected by Dementia were extracted from the P130 database for Land-based SAR. This resulted in a subset of 193 SAR subjects affected by Dementia. There were no such subject records found in the Marine SAR database.

Systematic under-recording of Dementia cases in certain regions is thought to be an important limitation. Also not all Dementia search cases involve a SAR group call-out. For example, estimates suggest that only 12% of Dementia missing person cases in Auckland initiate a SAR volunteer group call-out and then feature in the P130 database (B. Johnstone, pers. comm.). Recent introduction of a Dementia patient tracking system has caused a changed pattern of use of SAR volunteers in the Auckland Region (D. Duthie, pers. comm.).

Dementia SAR Subject – Gender

Overall, 60% of Dementia SAR subjects are male (Table 52). This pattern is the opposite of what would normally be expected for the population overall (where the gender balance in older age groups tends more strongly towards female). 54% of NZ people aged 65+ are women.

Table 52. Dementia SAR Subject – Gender (vs. NZ 65+)

	Dementia SAR Subject %	NZ Aged over 65 %
Male	60	46
Female	40	54
	n=193	

Dementia SAR Subject – Ethnicity

The spread of ethnicities for Dementia SAR subjects appears consistent with the NZ population (Table 53). Regional breakdowns are not presented due to low subject numbers.

Table 53. Dementia SAR Subject Ethnicity (vs. NZ)

	Dementia SAR Subjects	NZ Population
Caucasian	79	71
Maori	14	13
Polynesian	4	6
Asian	2	8
Other	1	2
n=183	100	100

Dementia SAR Incidents – Location Type

Dementia incidents tend to occur most frequently in urban settings (as distinct from most other types of Land-based SAR incidents that more regularly occur in rural locations - Table 54). Specifically, Dementia incidents relate strongly to subjects' home locations, with most in urban areas (70%) or rural towns (15%, Table 55), and comparatively few in areas outside of towns or in the countryside.

Table 54. Dementia SAR Incident Locations (vs Land-based SAR Incidents)

	Dementia SAR Incidents	Dementia SAR Incidents %	LandSAR Incidents %
Rural	21	11	69
Urban	171	89	31
n=	193	100	100

Table 55. Dementia SAR Incident Locations (vs Land-based SAR Incidents)

	Dementia SAR Incidents freq	Dementia SAR Incidents %	LandSAR Incidents %
Urban Areas	135	70	16
Rural Towns	28	15	5
Rural Natural Areas	17	9	16
Urban Fringe	9	5	10
Remote Natural Areas/Parks	2	1	52
Rural Farmland	1	1	1
n=	192	100	100

Dementia Subjects – Age

As expected, Dementia subjects are aged, with 81% of subjects being over 70yrs old (Table 56 & Figure 36). 90% are 65 years or older (Table 57). Records relating Dementia incidents to individuals of younger age groups may be a result of data entry error in the P130 database.

Table 56. Dementia SAR Subjects – Age groups (10yr)

Age group (10 yr)	Dementia Subject freq	Dementia Subject %	NZ Population %
0-9	2*	1	14
10-19	1*	1	15
20-29	0	0	13
30-39	0	0	14
40-49	2	1	15
50-59	6	3	12
60-69	25	13	8
70+	157	81	9
	193	100	100

* Records for 0-19 years are probably due to errors of data entry in the P130 database.

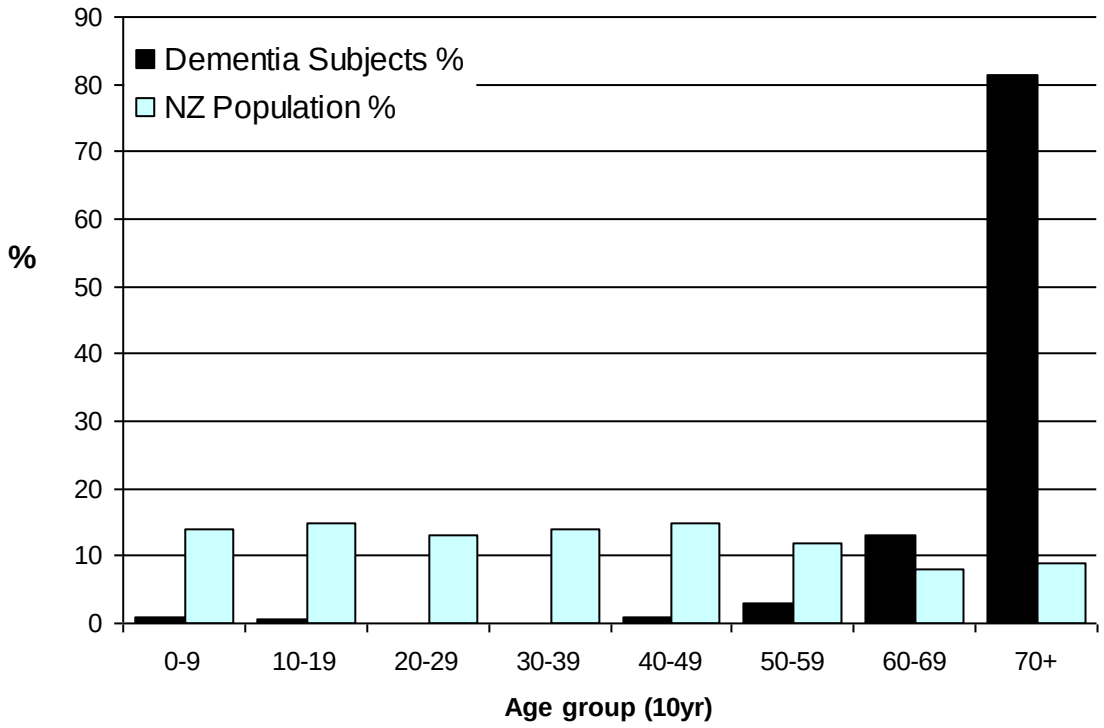


Figure 36. Dementia SAR Subjects – Age groups (10yr)*

* Records for 0-19 years are probably due to errors of data entry in the P130 database.

Table 57. Dementia SAR Subjects – Age groups (4-way – for projections)*

	Dementia Subject freq	Dementia Subject %	NZ Population %
0-14	2	1	22
15-39	1	1	34
40-64	17	9	31
65+	173	90	13
	193	100	100

* Records for 0-19 years are probably due to errors of data entry in the P130 database.

Dementia Subjects – Home location vs. Incident location

Most Dementia incidents occurred in the same area as subject home location (as illustrated by the proportions of Home and Incident locations being almost identical - Table 58). Comparison of home location vs. incident location for New Zealanders revealed that 90% of Dementia SAR incidents happened in the Home region of the subject (10% were in other regions). Table 59 and Table 60 below confirm that home and incident areas were matched in the vast majority of cases.

However, when compared to the national distribution of the 65+ age-group, the pattern of Dementia SAR incidents was not always representative of population (Table 58). Dementia SAR incidents are under-represented relative to population in Canterbury which has 15% of the NZ 65+ age group but only 4% of the Dementia SAR incidents; Otago displays a similar pattern. By contrast, Wellington has 11% of the 65+ population and 16% of the incidents.

Table 58. Home/Incident location of SAR Dementia subjects (vs. NZ 65+ age group)

	Dementia Subjects Home freq	Dementia Subjects Home %	*Dementia Subjects Incident freq*	*Dementia Subjects Incident %*	*NZ 65+*	NZ 65+ %
Auckland	*46*	24	*43*	22	*133800*	26
BOP	*22*	11	*26*	13	*39200*	8
Canterbury	*8*	4	*8*	4	*74700*	15
Gisborne	*1*	1	*0*	0	*5500*	1
Hawkes Bay	*1*	1	*2*	1	*21000*	4
Manawatu-Wanganui	*12*	6	*12*	6	*32500*	6
Marlborough	*12*	6	*13*	7	*7100*	1
Nelson	*13*	7	*11*	6	*6400*	1
Northland	*11*	6	*11*	6	*22100*	4
Otago	*7*	4	*6*	3	*27500*	5
Southland	*2*	1	*1*	1	*13000*	3
Taranaki	*8*	4	*8*	4	*15900*	3
Tasman	*1*	1	*1*	1	*6200*	1
Waikato	*17*	9	*18*	9	*49000*	10
Wellington	*32*	17	*30*	16	*53100*	10
WestCoast	*1*	1	*1*	1	*4500*	1
n=	*193*	100	*193*	100	*511500*	100

Dementia SAR Subjects – In Incident Regions, where did the subjects come from? – Read columns down

Almost all Dementia SAR subjects in any incident region come from within the same region (Table 59). There are small exceptions which appear inflated in the table below due to small sample sizes – but the overwhelming pattern is for incidents happening close to home area.

For example reading down and starting with Auckland 95% of Dementia SAR subjects in Auckland come from Auckland. Similarly, 85% of Dementia SAR subjects in BOP incidents come from BOP, with another 15% of subjects coming from Waikato. However due to low sample size (n=26) this only represents 4 people. This is obviously a limited interpretation due to the small sample size, and is really only presented as another example of how useful data can be generated given sufficient data.

Table 59. SAR Dementia Subjects - Incident Locations by Subject's Home Location

Read column % down	**Incident Location**																
Home Location	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu-Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All
Auckland	95	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	24
BOP	0	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Canterbury	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Gisborne	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	1
Hawkes Bay	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	1
Manawatu-Wanganu	0	0	0	0	0	92	0	0	0	17	0	0	0	0	0	0	6
Marlborough	0	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	6
Nelson	0	0	0	0	0	0	8	100	0	0	0	0	100	0	0	0	7
Northland	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	6
Otago	0	0	0	0	0	0	0	0	0	67	0	0	0	6	0	0	4
Southland	2	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	1
Taranaki	0	0	0	0	0	0	0	0	0	0	0	88	0	6	0	0	4
Tasman	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waikato	2	15	0	0	0	0	0	0	0	0	0	13	0	61	0	0	9
Wellington	0	0	0	0	0	8	0	0	0	17	0	0	0	0	100	0	17
WestCoast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1
%	*100*	*100*	*100*	*0*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
n=	*43*	*26*	*8*	*0*	*2*	*12*	*13*	*11*	*11*	*6*	*1*	*8*	*1*	*18*	*30*	*1*	*193*

Dementia SAR Subjects – Subjects Home Locations by Incident Location – read rows across

Almost all Dementia SAR subjects having an incident had it happen in their home region (Table 60). There are small exceptions which appear inflated in the table below due to small sample sizes – but the overwhelming pattern is for incidents happening close to home area.

For example – reading across and starting with Auckland, 89% of Dementia SAR subjects from Auckland had their incidents in Auckland (Table 60), and a further 11% had their incidents in Waikato. Further down, 92% of Wellington Dementia subjects had their incidents in Wellington. This is obviously a limited interpretation due to the small sample size, and is really only presented as another example of how useful data can be generated given sufficient data.

Table 60. SAR Dementia Subjects from Different Home Regions – where they had their Incidents? – Read rows across

Read row % across **Incident Location**

Home Location	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu-Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	%	n=
Auckland	89	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	100	46
BOP	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	22
Canterbury	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	100	8
Gisborne	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	1
Hawkes Bay	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	1
Manawatu-Wanganui	0	0	0	0	0	92	0	0	0	8	0	0	0	0	0	0	100	12
Marlborough	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	100	12
Nelson	0	0	0	0	0	0	8	85	0	0	0	0	8	0	0	0	100	13
Northland	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	100	11
Otago	0	0	0	0	0	0	0	0	0	57	0	0	0	14	0	0	100	7
Southland	50	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	100	2
Taranaki	0	0	0	0	0	0	0	0	0	0	0	88	0	13	0	0	100	8
Tasman	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Waikato	6	24	0	0	0	0	0	0	0	0	0	6	0	65	0	0	100	17
Wellington	0	0	0	0	0	3	0	0	0	3	0	0	0	0	94	0	100	32
WestCoast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	1
All	22	13	4	0	1	6	7	6	6	3	1	4	1	9	16	1	100	193

Dementia Incident rates

Table 61 presents an estimate of incident rates for Dementia cases in different places. Dementia incidents are highly representative of the wider NZ population because Dementia subjects correspond so closely with the 65+ age group. These results show that there is approximately one Dementia SAR incident for every 566 people aged 65+ in the Nelson Region, and one for every 625 in the Marlborough Region. Overall the regions at the top of the table have the highest Dementia SAR incident rates (per 65+ age group) while those at the bottom have the lowest.

Figures here are indicative, as absolute numbers of SAR cases are subject to involvement of a SAR team (not always the case) and recording of the incident in the P130 database. It is known that many Dementia missing person cases never require SAR intervention due to family, friends or regular police staff resolving the situation. However these results can show general patterns between regions and over time. More detail on the relative levels of Dementia incidents, SAR call-outs and P130 records would assist here.

Table 61. Dementia SAR Incidents – Incident Rate estimates

	Incident Nos	65+ Pop No.	SAR incident rates per 1000 people (65+)	Estimated 1 Incident for every XXXX people
Nelson	*11*	6231	1.8	566
Marlborough	*11*	6879	1.6	625
BOP	*26*	38058	0.7	1464
Southland	*8*	12639	0.6	1580
Hawkes Bay	*12*	20490	0.6	1708
Wellington	*30*	51408	0.6	1714
Manawatu-Wanganui	*13*	31755	0.4	2443
Waikato	*18*	47628	0.4	2646
Gisborne	*2*	5340	0.4	2670
Auckland	*43*	128418	0.3	2986
Northland	*6*	21453	0.3	3576
WestCoast	*1*	4329	0.2	4329
Canterbury	*8*	72612	0.1	9077
Taranaki	*1*	15411	0.1	15411
Otago	*1*	26814	0.0	26814
n=	*193*	489465	0.4	

5.3.2. Subject Profile – 65+ Age group (MARINE and LAND)

This profile aims to identify characteristic socio-demographic features of SAR subjects in the 65+ age group.

Data Source:

SAR subjects who were aged 65+ were extracted from the P130 database for Land-based SAR and for Marine SAR. This resulted in a subset of 139 Marine SAR subjects and 364 Land-based SAR subjects aged 65 and over. Here those subjects are referred to as 'Aged' subjects.

Aged (65+) Subjects – Gender

Marine incidents showed an extreme over-representation of males for the 65+ age group (95% of Land-based SAR subjects within this age category were male, compared with 66% for Land - Table 62). This contrasts with the gender pattern in the NZ population overall, where the balance is more strongly female in this age groups (54% of females among NZ people aged 65+).

Table 62. Aged SAR Subject – Gender (Land vs. Marine SAR subjects)

	Marine SAR	Marine SAR %	Land SAR	Land SAR %	NZ %
Male	129	95	240	66	46
Female	7	5	124	34	54
n=	136	100	364	100	100

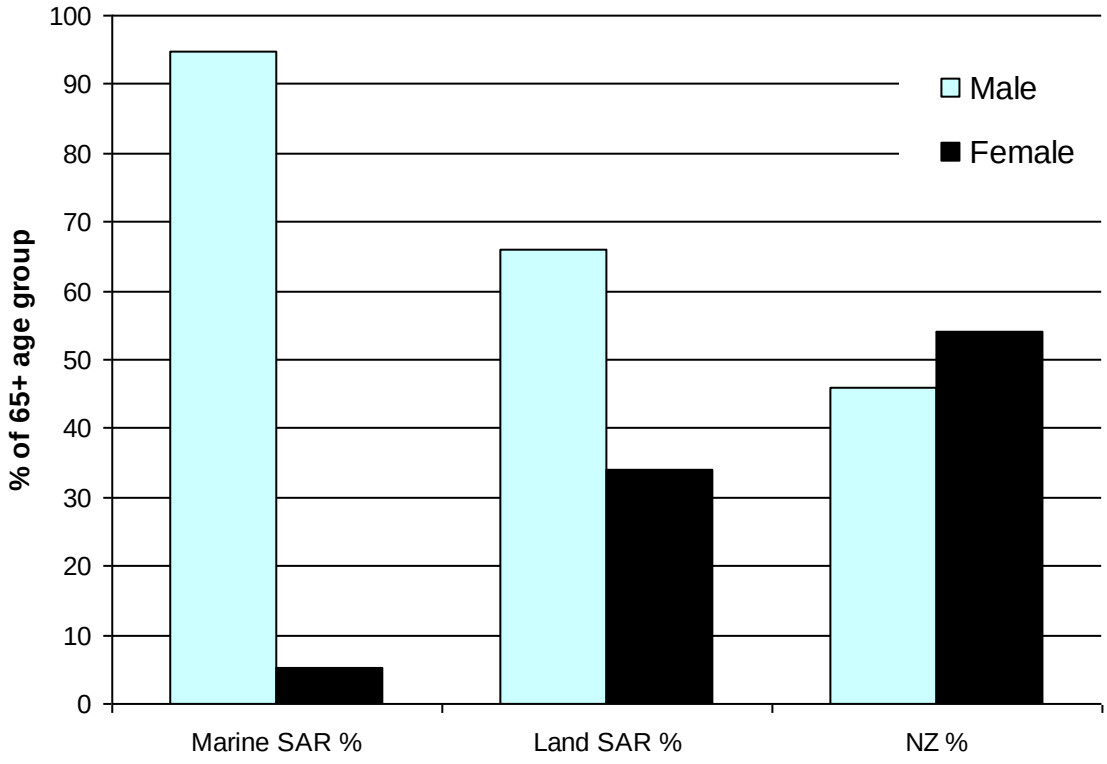


Figure 37. Aged SAR Subject – Gender (Land vs. Marine SAR subjects)

Aged (65+) SAR Subject – Ethnicity

The pattern of ethnicities for Aged Land and Aged Marine SAR subjects are not inconsistent with that for the younger age groups (see Land and Marine profiles – refer Sections 5.2.2 & 5.2.4). Both Land and Marine Aged SAR subjects are generally representative of the ethnicity mix for the overall NZ population (for the 65+ age bracket - Table 63).

Table 63. Aged (65+) SAR Subject Ethnicity (vs. NZ)

	Marine SAR	Marine SAR %	*Land SAR*	Land SAR %	NZ 65+ %	All NZ %
Asian	*5*	6	*7*	2	4	8
European	*70*	80	*248*	85	89	71
Maori	*7*	8	*27*	9	5	13
Polynesian	*5*	6	*9*	3	2	6
Other	*0*	0	*1*	0	0	2
n=	*87*	100	*292*	100	100	100

Aged (65+) SAR Subject – NZ vs. Overseas Subjects

Both the Aged Marine and Land-based SAR subjects have similar proportions of overseas people. This pattern is consistent for all Marine SAR subjects, but not all Land subjects (which has a higher proportion of overseas subjects - 22% - Table 64).

The difference for Land-based SAR (10% 65+ vs. 22% all Land-based SAR subjects) is not simply related to the presence of Dementia subjects, as they are a relatively small number.

When looking at only the recreation-based incidents, the overseas proportion of Land-based SAR subjects was only slightly higher at 27%.

Table 64. Aged (65+) SAR Subject – NZ vs. Overseas Subjects

	Marine SAR	Marine SAR 65+	Land SAR	Land SAR 65+	All Land SAR subjects
NZ %	117	96	314	90	78
Overseas %	5	4	36	10	22
	122	100	350	100	

Aged (65+) SAR Subject – Recreation Activity (vs. all NZ Subjects)

In comparison to all NZ subjects, the proportion of aged SAR subjects who were involved in Walking at the time of their incident (38%) was well above that for all NZ subjects (16%), and Hunting was lower (9% vs. 20%, Table 65).

Table 65. Aged (65+) SAR Subjects and Recreation Activities (vs. all NZ subjects)

	NZ Subjects %	NZ 65+ Subjects %
Tramping	37	40
Walking	16	38
Hunting	20	9
Other	27	13
n=	1839	151

Aged (65+) SAR Subjects – Incident Location Type

Rural vs. Urban

Data were examined only for Land-based SAR incidents. Most Land-based SAR incidents overall (69%) happened in Rural areas, but this decreases in the 65+ age group overall (to 40% - Figure 87). The results here appear to be affected by the prevalence of Dementia in this group. Over 90% of Dementia-based incidents in the 65+ age group were urban (while this was only 25% of the Recreation-based incidents). The overall Rural Urban incident pattern is relatively consistent across age groups where Recreation is the context of the incident, but changes extremely when Dementia is the context. This is also expanded in Figure 38, where the distinction between Urban and Remote Natural areas is highlighted.

Table 66. Aged 65+ SAR Incident Locations - Rural vs. Urban
(Vs. Recreation/Dementia context)

	Land SAR 65+	Land SAR 65+ %	All Land SAR	Land SAR 65+ Recreation %	LandSAR 65+ Dementia %
Rural	*146*	40	69	75	10
Urban	*216*	60	31	25	90
n=	*362*	100	100	138	181

SAR Area Type

Spatial patterns for Dementia and Recreation-based incidents are different for the 65+ age group. Dementia-based SAR incidents relate to where people live (predominantly urban areas – 70% - Table 67), while those based on Recreation more commonly occur at Non-urban locations, such as Remote natural areas/parks (62%).

Table 67. Aged (65+) SAR Incident Contexts – Context type vs. Area Type

	Incident Context	
Incident Area	Dementia	Recreation
Urban Areas	70	10
Rural Town	15	4
Rural Natural Areas	9	12
Urban Fringe	4	11
Rural Farmland	1	1
Remote Natural Areas/Park	1	62
%	100	100
n=	182	138

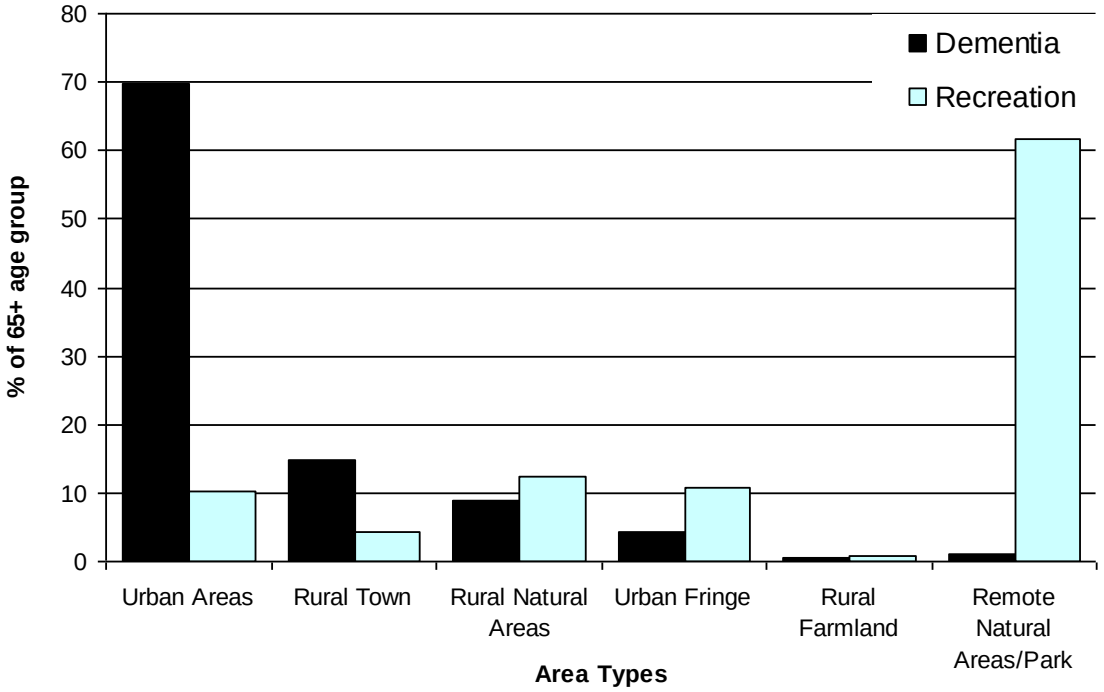


Figure 38. Aged (65+) SAR Contexts – Incident context vs. Area Type

Aged (65+) SAR Subjects – Age Breakdown

While all subjects are aged over 65 years, the breakdown into older age groups differs a lot between Land and Marine SAR subjects. Land-based SAR subjects are found more often in the older age groups, while Marine were concentrated (54%) in the 65-69 group (Table 68 & Figure 39).

Table 68. Aged SAR Subjects – Age Breakdown (Land vs. Marine SAR subjects)

Age groups	Marine SAR	Marine SAR %	Land SAR	Land SAR %
65-69	73	54	101	28
70-74	36	26	91	25
75-79	20	15	65	18
80-84	5	4	63	17
85-89	2	1	30	8
90+	0	0	14	4
n=	136	100	364	100

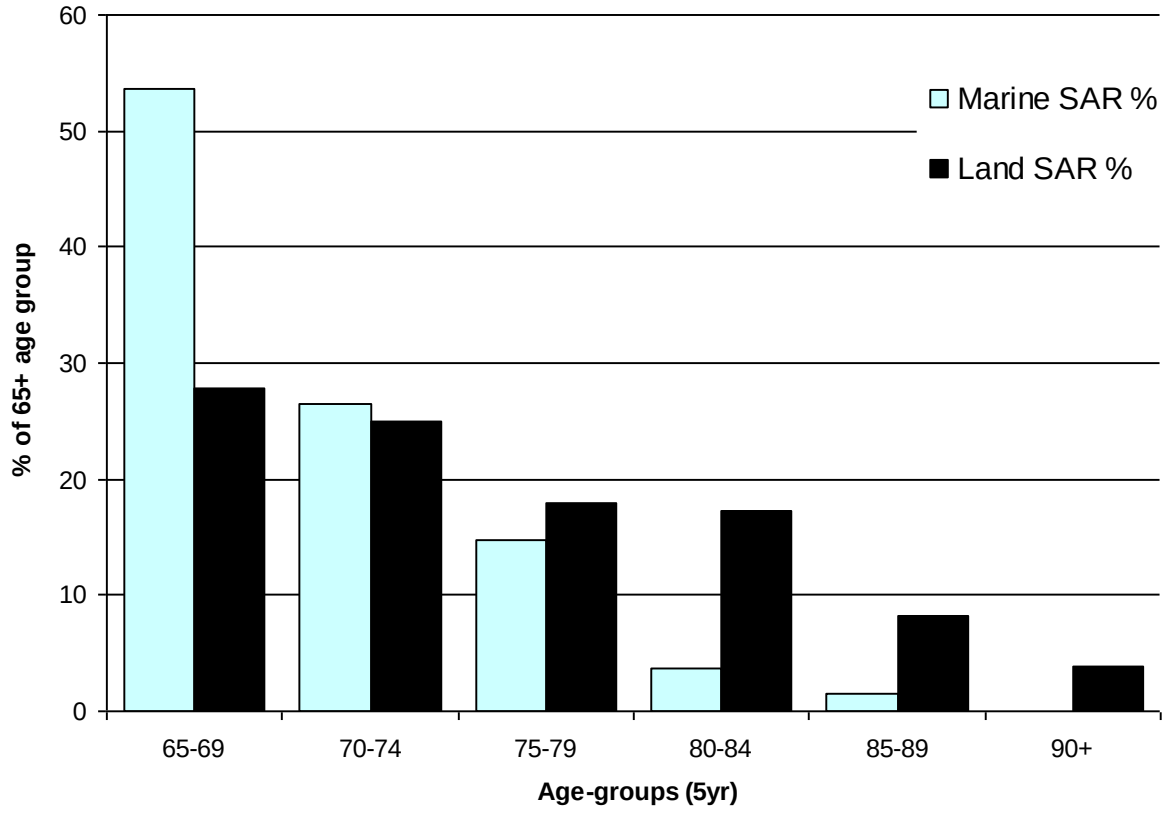


Figure 39. Aged SAR Subjects – Age Breakdown (Land vs. Marine SAR subjects)

Aged (65+) SAR Subjects – Age Breakdown by Incident context

Aged Land-based SAR subjects from recreation-based incidents (Table 69 & Figure 40) had a 65+ age profile similar to that for the Marine SAR subjects (Table 68). The difference between the Aged Land and Marine SAR subjects was due to the greater prevalence of Dementia-based incidents in the Land-based SAR group.

Table 69. Aged SAR Subjects – Dementia vs. Recreation Incidents (for Land-based SAR subjects)

	Dementia	Dementia %	Recreation	Recreation %
65-69	17	9	70	51
70-74	38	21	38	28
75-79	42	23	18	13
80-84	48	26	7	5
85-89	24	13	5	4
90+	13	7		0
n=	182	100	138	100

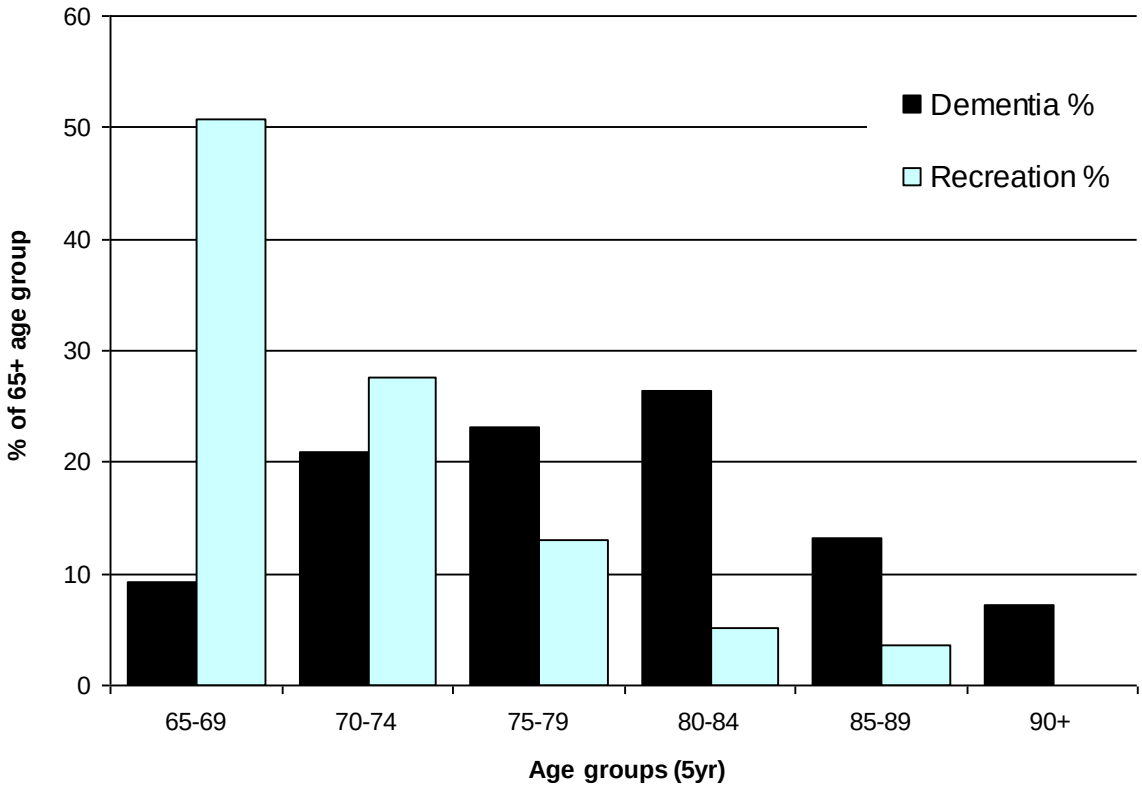


Figure 40. Aged SAR Subjects – Dementia vs. Recreation Incidents (for Land-based SAR subjects)

Aged Land-based SAR Subjects – Home location vs. Incident Location

Most incidents took place in subjects' home regions, and this was consistent with the overall Land-based SAR pattern. Comparison of home location vs. incident location for New Zealanders revealed that 81% of Land 65+ SAR incidents happened in the Home region of the subject. Limited data numbers prevents this being presented in a cross-tabulation table of home vs. Incident region.

However, relative to the overall New Zealand 65+ age-group distribution, Land-based SAR incidents for this age group appear under-represented particularly in Auckland (16% of incidents vs. 26% of 65+ population) and Canterbury (7% vs. 15%), and overrepresented in Wellington (15% vs. 10% - Table 70).

Table 70. Home/Incident location of 65+ Land-based SAR subjects (vs. NZ 65+ age group)

	65+ Home	Home Location %	*65+ Incident*	Incident Location %	*NZ 65+*	NZ 65+ %
Auckland	*52*	17	*48*	16	*133800*	26
BOP	*29*	9	*38*	12	*39200*	8
Canterbury	*25*	8	*22*	7	*74700*	15
Gisborne	*1*	0	*0*	0	*5500*	1
Hawkes Bay	*1*	0	*2*	1	*21000*	4
Manawatu-Wanganui	*20*	6	*22*	7	*32500*	6
Marlborough	*13*	4	*16*	5	*7100*	1
Nelson	*18*	6	*9*	3	*6400*	1
Northland	*15*	5	*14*	5	*22100*	4
Otago	*13*	4	*13*	4	*27500*	5
Southland	*6*	2	*8*	3	*13000*	3
Taranaki	*13*	4	*14*	5	*15900*	3
Tasman	*3*	1	*15*	5	*6200*	1
Waikato	*31*	10	*29*	9	*49000*	10
Wellington	*58*	19	*46*	15	*53100*	10
WestCoast	*11*	4	*13*	4	*4500*	1
n=	*309*	100	*309*	100	*511500*	100

Aged Marine SAR Subjects – Home location vs. Incident Location

As with Land-based SAR incidents, Marine SAR incidents for 65+ aged subjects are most likely to happen in subjects' home regions. Comparison of home location vs. incident location for New Zealanders revealed that 78% of Marine 65+ SAR incidents happened in the Home region of the subject. Limited data numbers prevents this being presented in a cross-tabulation table of home vs. Incident region.

Incidents for 65+ subjects in Auckland are relatively representative of the overall pattern for Marine SAR. Incidents are relatively under-represented in Canterbury (8% of 65+ incidents vs. 15% of overall 65+ NZ population, Table 71). Incidents are relatively over-represented in Wellington (19% of 65+ incidents vs. 10% of overall 65+ NZ population) and Waikato (18% vs. 10%).

Table 71. Home/Incident location of 65+ Marine SAR subjects (vs. NZ 65+ age group)

	65+ Home	Home Location %	*65+ Incident*	Incident Location %	*NZ 65+*	NZ 65+ %
Auckland	*32*	28	*26*	23	*133800*	26
BOP	*6*	5	*6*	5	*39200*	8
Canterbury	*8*	7	*9*	8	*74700*	15
Gisborne	*0*	0	*0*	0	*5500*	1
Hawkes Bay	*2*	2	*1*	1	*21000*	4
Manawatu-Wanganui	*10*	9	*6*	5	*32500*	6
Marlborough	*2*	2	*5*	4	*7100*	1
Nelson	*6*	5	*0*	0	*6400*	1
Northland	*2*	2	*2*	2	*22100*	4
Otago	*4*	3	*3*	3	*27500*	5
Southland	*6*	5	*5*	4	*13000*	3
Taranaki	*1*	1	*1*	1	*15900*	3
Tasman	*3*	3	*4*	3	*6200*	1
Waikato	*13*	11	*21*	18	*49000*	10
Wellington	*18*	16	*22*	19	*53100*	10
WestCoast	*2*	2	*4*	3	*4500*	1
n=	*115*	100	*115*	100	*511500*	100

5.3.3. Subject Profile – Despondent

This profile aims to identify characteristic socio-demographic features of SAR subjects whose incident was related to being in a 'Despondent' state. The profile provides a baseline for future projections of demand.

Data Source:

Data for tables and charts were sourced from the Police P130 database of Search and Rescue incidents. SAR subjects who were in a Despondent state were extracted from the P130 database for Land-based SAR incidents. This resulted in a subset of 166 Land-based SAR subjects. Here those subjects are referred to as Despondents.

This represents a relatively small sub-group size for some of the more in-depth analyses undertaken for the larger profile groups, and as a result not all analyses were conducted for the Despondent profile group.

Despondent SAR Subjects – Gender

Overall, Despondent SAR subjects tended to be predominantly male (66%) in a pattern similar to that for the Non-Despondent subjects (Table 72 & Figure 41).

Table 72. Despondent SAR Subjects – Gender vs. Non-Despondents (and NZ pop)

	Despondent Subjects freq	Despondent Subjects %	*Non-Despondent Subjects freq*	Non-Despondent Subjects %	NZ Population %
Male	*105*	66	*2306*	69	49
Female	*54*	34	*1037*	31	51
n=	*159*	100	*3343*	100	100

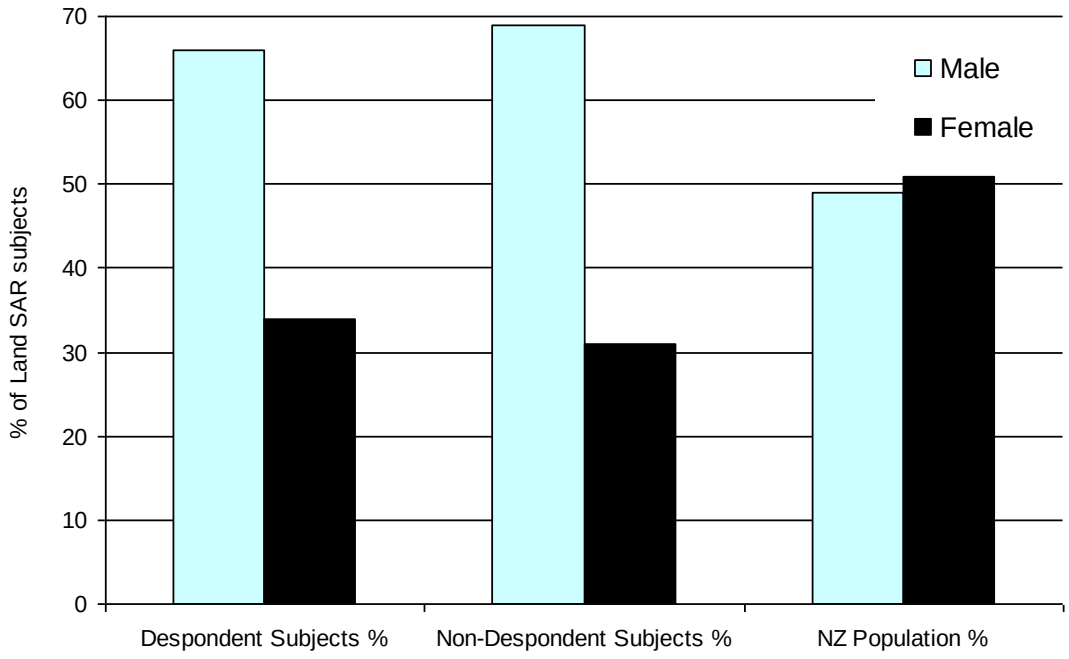


Figure 41. Despondent SAR Subjects – Gender vs. Non-Despondents (and NZ pop)

Despondent SAR Subjects – Ethnicity

The pattern of ethnicities for Despondent SAR subjects appears largely consistent with that for Non-Despondent SAR subjects, with both having an over-representation of Europeans relative to the NZ population (Table 73 & Figure 42).

Table 73. Despondent SAR Subject - Ethnicity (Despondent vs. Non-Despondent, and NZ)

	Despondent Subjects freq	Despondent Subjects %	*Non-Despondent Subjects freq*	Non-Despondent Subjects %	NZ Population %
Asian	*1*	1	*60*	2	8
European	*131*	87	*2153*	87	71
Maori	*13*	9	*184*	7	13
Other NZ	*0*	0	*32*	1	1
Polynesian	*5*	3	*32*	1	6
n=	*150*	100	*2461*	100	100

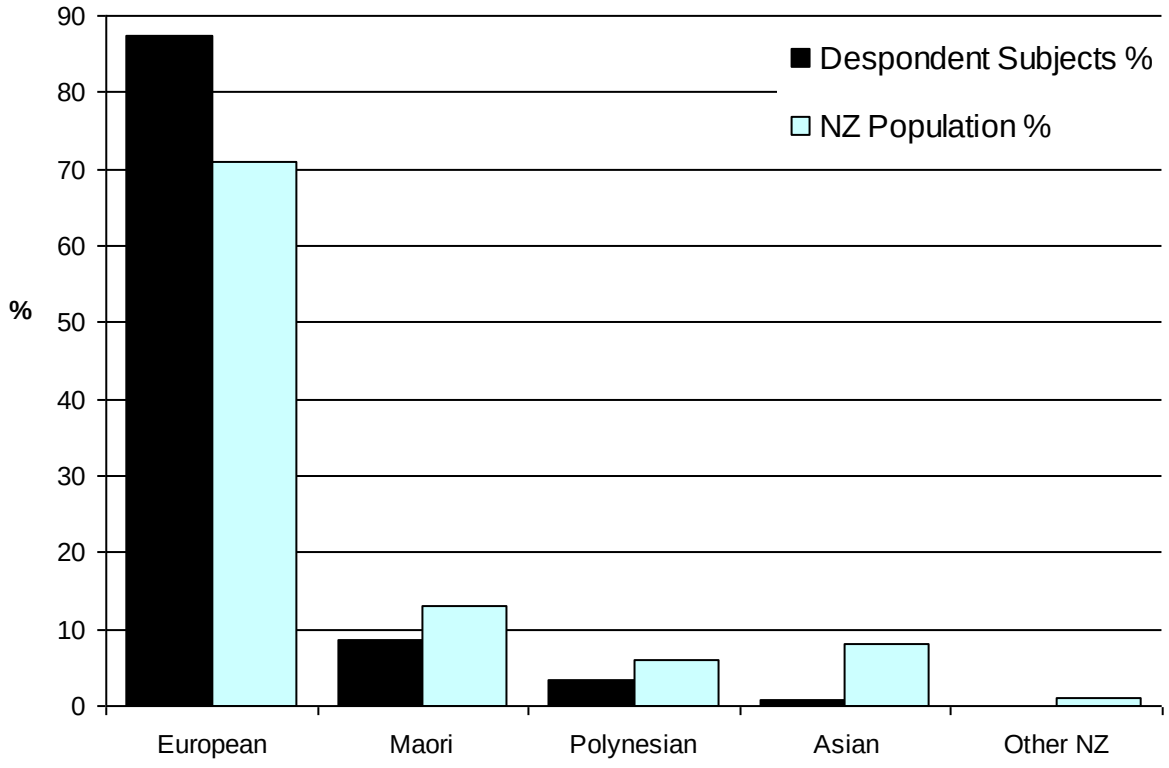


Figure 42. Despondent SAR Subjects - Ethnicity (Despondent vs. Non-Despondent)

Despondent SAR Subjects – Incident Locations

Despondent SAR incidents are spread unevenly across New Zealand. Relative to NZ population, Despondent subjects appear under-represented in Auckland (19% of Despondents vs. 32% of NZ) and over-represented in Wellington (21% vs. 11% NZ - Table 74).

Table 74. Despondent SAR Subjects vs Non-Despondents

Incident region	*Despondent Subjects freq*	Despondent Subjects %	*Non-Despondent Subjects freq*	Non-Despondent Subjects %	NZ Population %
Auckland	31	19	*199*	6	32
BOP	17	10	*176*	5	6
Canterbury	17	10	*357*	10	13
Gisborne	1	1	*22*	1	1
Hawkes Bay	5	3	*63*	2	4
Manawatu Wanganui	9	5	*258*	8	6
Marlborough	3	2	*133*	4	1
Nelson		0	*31*	1	1
Northland	9	5	*68*	2	4
Otago	18	11	*367*	11	5
Southland	2	1	*336*	10	2
Taranaki	2	1	*144*	4	3
Tasman	6	4	*222*	6	1
Waikato	7	4	*383*	11	9
Wellington	35	21	*402*	12	11
West Coast	3	2	*278*	8	1
n=	166	100	*3439*	100	100

Despondent SAR Subjects – Home Locations

Despondent SAR subject home areas are spread unevenly across New Zealand. Relative to NZ population, Despondent subjects appear under-represented in Auckland (15% of Despondents homes vs. 32% of NZ) and over-represented in Wellington (20% vs. 11% NZ - Table 75).

Table 75. Home Locations of Despondent SAR Subjects (and Non-Despondents) vs. NZ population

Home region	*Despondent Subjects freq*	Despondent Subjects %	*Non-Despondent Subjects freq*	Non-Despondent Subjects %	NZ Population %
Auckland	25	15	254	11	32
BOP	13	8	142	6	6
Canterbury	18	11	303	13	13
Gisborne		0	12	1	1
Hawkes Bay	3	2	62	3	4
Manawatu Wanganui	10	6	149	6	6
Marlborough	1	1	52	2	1
Nelson	3	2	122	5	1
Northland	7	4	62	3	4
Otago	17	10	233	10	5
Southland	2	1	99	4	2
Taranaki	2	1	78	3	3
Tasman	2	1	45	2	1
Waikato	3	2	237	10	9
Wellington	34	20	434	18	11
West Coast	2	1	74	3	1
n=	166	100	2358	100	100

Despondent SAR Subjects – Incident Location Type

There are differences between Despondent and non-Despondent SAR subjects in the types of incident locations (Table 76 & Figure 43). Despondent incidents are more prevalent in Urban areas (35%), Urban fringe (20%), and Rural towns (13%). Non-Despondent incidents tend to occur in Remote areas and parks (59%).

Table 76. Despondent SAR Subjects – Incident Area Type (vs. Non-Despondent Subjects)

	Despondent Subjects freq	Despondent Subjects %	*Non-Despondent Subjects freq*	Non-Despondent Subjects %
Urban Areas	*58*	35	*135*	4
Rural Natural Areas	*35*	21	*536*	15
Urban Fringe	*34*	20	*28*	1
Rural Town	*21*	13	*400*	12
Remote Natural Areas/Parks	*15*	9	*2046*	59
Rural Farmland	*3*	2	*321*	9
n=	*166*	100	*3466*	100

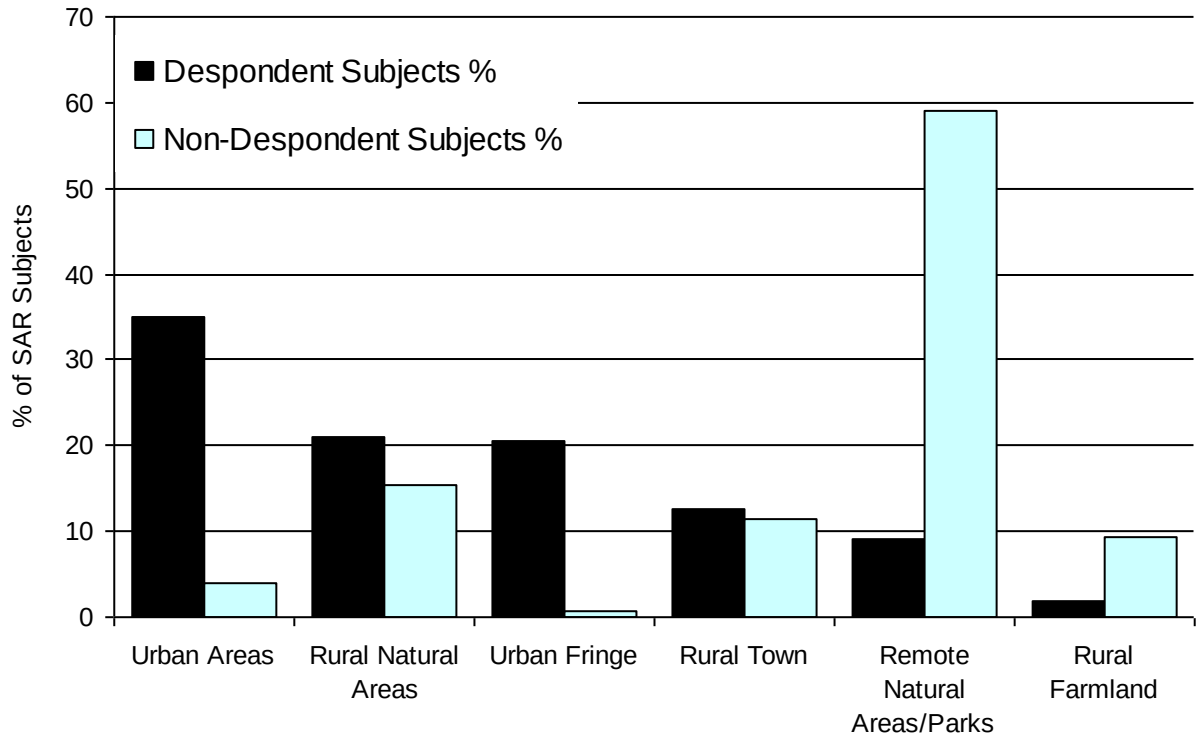


Figure 43. Despondent SAR Subjects – Incident Area Type (vs. Non-Despondent Subjects)

Despondent SAR Subjects – Home location vs. Incident Location

Comparison of home location against incident location revealed that 87% of Despondent SAR subjects happened in the Home region of the subject (13% in other regions). This shows a high home-incident association. Limited data numbers prevents this being presented as a cross-tabulation table of home vs. Incident region.

However, incident and home locations do not match the overall New Zealand population distribution (Table 77). The most notable variation is for Auckland which was notably under-represented in Despondent incidents. It had 15% of Despondent home locations and 19% of Despondent SAR incidents reported, but this region accounts for 32% of the population. By contrast, Wellington represented 20% of Despondent home areas and 21% of Despondent incidents, but only comprised 11% of the NZ population.

Table 77. Home and Incident locations for SAR Despondent subjects (vs. NZ population)

	Despondent Home freq	Despondent Home %	*Despondent Incident freq*	Despondent Incident %	NZ Population %
Auckland	*25*	15	*31*	19	32
BOP	*13*	8	*17*	10	6
Canterbury	*18*	11	*17*	10	13
Gisborne	*0*	0	*1*	1	1
Hawkes Bay	*3*	2	*5*	3	4
Manawatu Wanganui	*10*	6	*9*	5	6
Marlborough	*1*	1	*3*	2	1
Nelson	*3*	2		0	1
Northland	*7*	4	*9*	5	4
Otago	*17*	10	*18*	11	5
Southland	*2*	1	*2*	1	2
Taranaki	*2*	1	*2*	1	3
Tasman	*2*	1	*6*	4	1
Waikato	*3*	2	*7*	4	9
Wellington	*34*	20	*35*	21	11
West Coast	*2*	1	*3*	2	1
n=	*166*	100	*166*	100	100

5.3.4. Subject Profile – Trampers

This profile aims to identify characteristic socio-demographic features of SAR subjects who were engaged in Tramping. The profile provides a baseline for future projections of demand.

Data Source:

SAR subjects who were engaged in Tramping were extracted from the P130 database for Land-based SAR incidents. This resulted in a subset of 1208 Land-based SAR subjects (referred to as Trampers).

Tramper Subjects – Gender

Overall, Tramper subjects were over-represented with males (71%) relative to the overall NZ population (49% - Table 78 & Figure 44). Trampers were also more gender balanced (61:39) than other Non-Tramper SAR subjects (75:25).

Table 78. Tramper SAR subject – Gender

	Tramper freq	Tramper Subjects %	Non-Tramper Subjects %	All NZ Pop %
Male	*720*	61	75	49
Female	*465*	39	25	51
n=	*1185*	100	n=1653	100

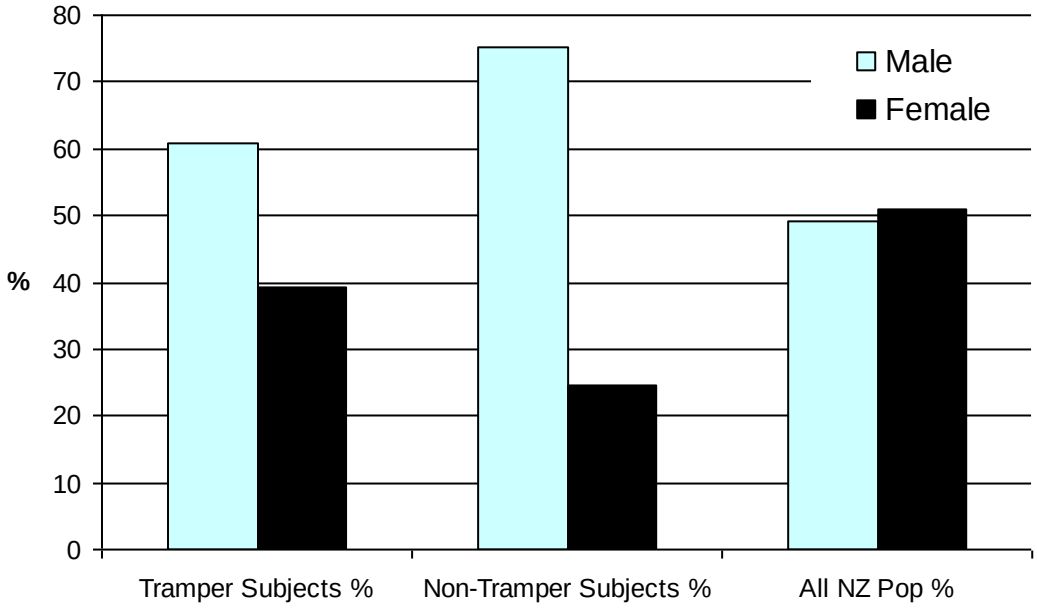


Figure 44. Tramper SAR Subject – Gender

Tramper SAR Subject Gender by Age group (10yr)

Tramper gender-balance does not notably change with age. This remains approximately 60:40 in all age groups (with the exception of 10-19 yrs where males represent 69% of the subjects within this age group - Table 79 & Figure 45).

Table 79. Tramper SAR Subject Gender by Age group (10yr)

	Male Trampers %	Female Trampers %	n=
0-9	63	38	16
10-19	69	31	175
20-29	62	38	304
30-39	54	46	136
40-49	56	44	139
50-59	62	38	164
60-69	63	37	109
70+	63	38	24
All Trampers	61	39	1067

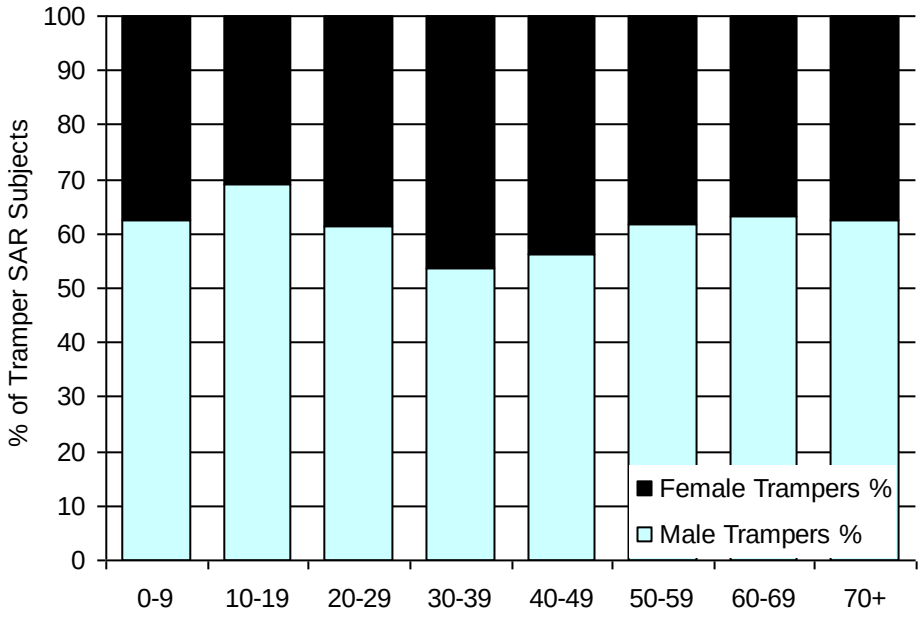


Figure 45. Tramper SAR Subject Gender by Age group (10yr)

Tramper Subjects – Age

AGE 4 Way (for projections)

The age profile of Tramper subjects shows a notable peak in the 15-39 age category (Table 80). This age category is overrepresented in incidents compared to its proportion of the total population. The very young (under 15 years) and the 65+ groups are both under-represented.

Table 80. Tramper subject age profile – 4 way age category

	Tramper Subject freq	Tramper Subject %	NZ Population 2006 %
0-14	*2*	0	22
15-39	*615*	58	35
40-64	*389*	36	32
65+	*61*	6	12
n=	*1067*	100	100

AGE Groups – 5 year

Table 81. Tramper subject age profile (vs. all Land-based SAR subjects and NZ pop) - 5 year category

	Tramper Subject freq	Tramper Subject %	All Land SAR Subject %	NZ Population %
0 - 4	*2*	0	1	7
5 - 9	*14*	1	3	7
10 - 14	*43*	4	5	8
15 - 19	*132*	11	10	7
20 - 24	*153*	13	12	7
25 - 29	*151*	13	12	6
30 - 34	*68*	6	8	7
35 - 39	*68*	6	8	7
40 - 44	*61*	5	7	8
45 - 49	*78*	6	7	7
50 - 54	*96*	8	7	6
55 - 59	*68*	6	5	6
60 - 64	*72*	6	4	4
65 - 69	*37*	3	3	4
70 - 74	*17*	1	3	3
75 - 79	*6*	0	2	3
80 +	*1*	0	2	3
n=	*1208*	100	100	100

AGE Groups – 10 year

Vs Non-Tramper Land-based SAR subjects and NZ population

Tramper subjects are overrepresented in age categories 20-29 and 50-59 against both Non-Tramper subjects (Table 82 & Figure 46) and against the NZ population (Table 82).

Table 82. Tramper SAR Subject Ages (10yr) – vs. Non-Tramper SAR subjects and NZ Pop

	Tramper Subject freq	Tramper Subject %	Non-Tramper Subject %	NZ Population %
0 - 9	*137*	1	6	14
10 - 19	*486*	16	24	15
20 - 29	*803*	28	23	13
30 - 39	*511*	13	17	14
40 - 49	*456*	13	15	15
50 - 59	*404*	15	6	12
60 - 69	*248*	10	6	8
70 - 79	*156*	2	3	5
80+	*107*	0	1	3
n=	*3308*	100	100	100

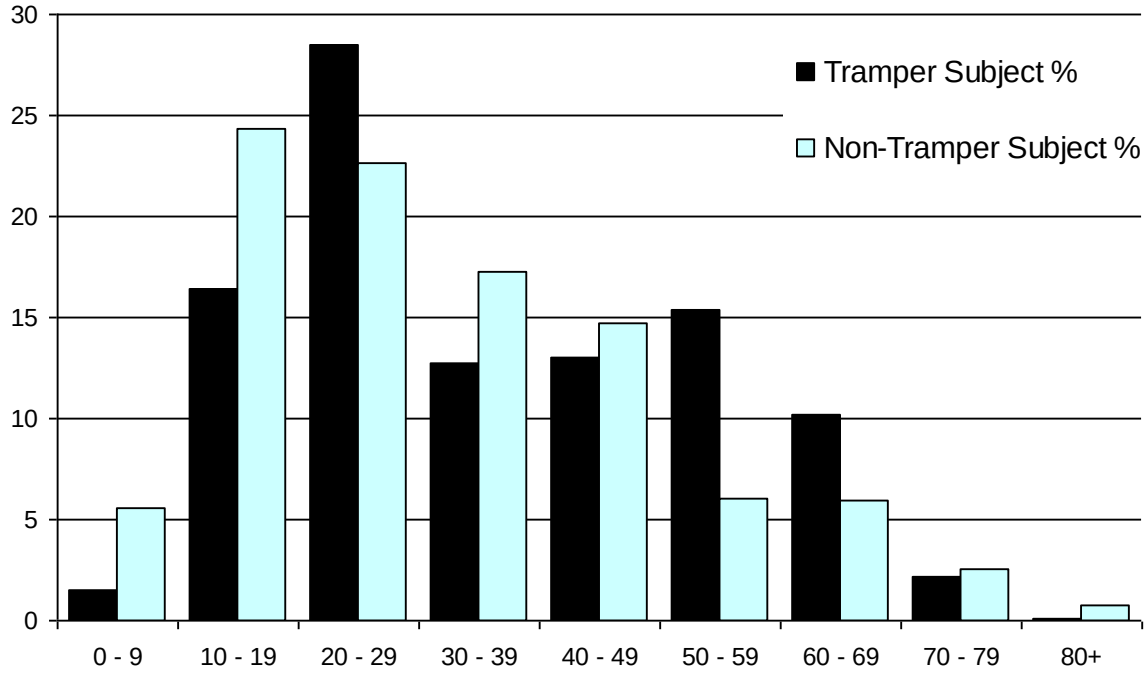


Figure 46. Tramper SAR Subject Age-groups (10yr) – vs. Non-Tramper SAR subjects

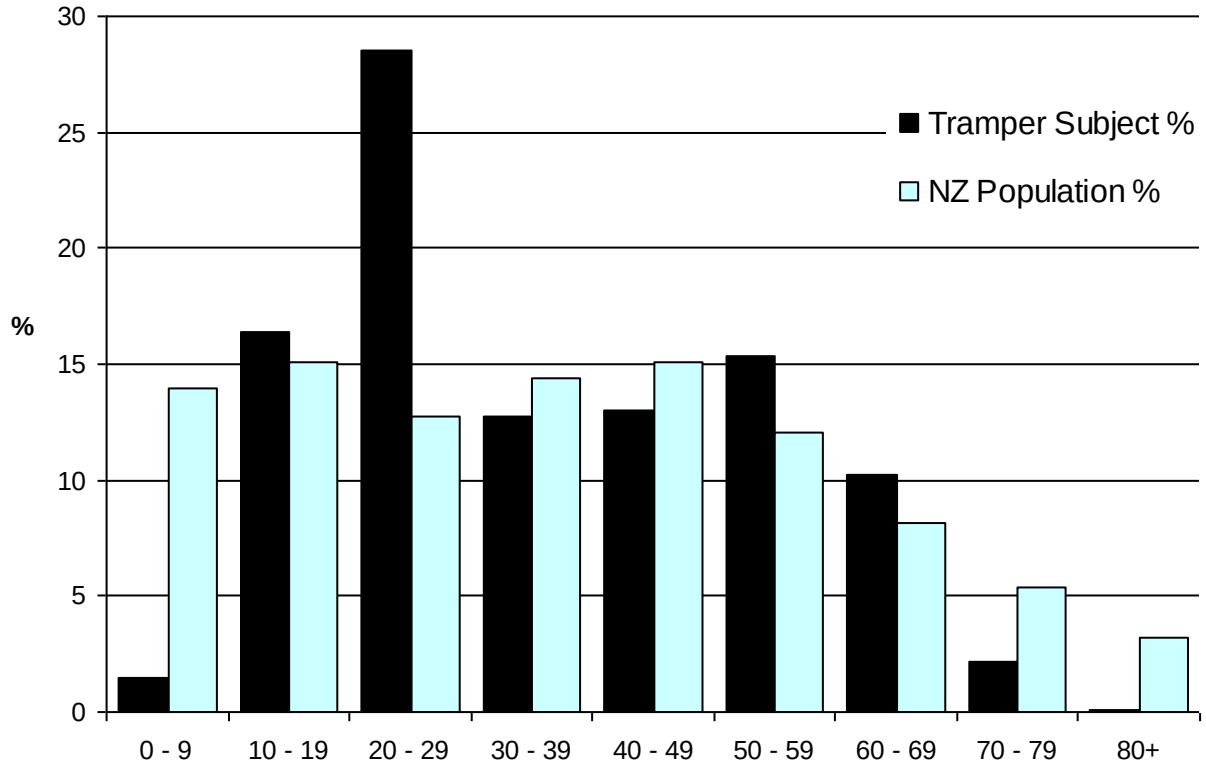


Figure 47. Tramper SAR Subject Age-groups (10yr) – vs. NZ Population

Tramper SAR Subject – Ethnicity

The pattern of ethnicities for Trampers appears largely consistent with that for overall Land-based SAR subjects (Table 83), Non-Tramper Subjects (Table 84) and the NZ population.

Table 83. Tramper SAR Subject Ethnicity - vs. All Land-based SAR subjects and NZ population

	Tramper Subject freq	Tramper subject %	All Land SAR Subject %	All NZ Pop %
Asian	*15*	1	3	8
CaucasianNZ	*553*	93	90	71
Maori	*17*	3	6	13
MiddleEastern	*2*	0	1	1
Polynesian	*2*	0	1	6
Other	*6*	1	1	0
	595	100	100	100

Table 84. Tramper SAR Subject Ethnicity - vs. Non-Tramper subjects and NZ population

	Tramper Subject freq	Tramper subject %	Non-Tramper subject %	All NZ Pop %
Asian	*15*	1	3	8
CaucasianNZ	*553*	93	87	71
Maori	*17*	3	8	13
MiddleEastern	*2*	0	1	1
Polynesian	*2*	0	1	6
Other	*6*	1	1	0
	595	100	100	100

Tramper SAR Subject – NZ vs Tourist

Tramper SAR subjects had higher proportions of Tourists than for Land-based SAR subjects overall (36% vs. 22% - Table 85) and Non-Tramper SAR subjects (19% - Table 86).

Tramping subjects show a notable over-representation of Tourists. While 27% of NZ SAR Subjects were engaged in Tramping, the corresponding level for Tourists was 55%.

Table 85. Tramper SAR Subject – NZ vs. Tourist (by All Land-based SAR subjects)

	Tramper Subjects freq	Tramper Subjects %	All Land SAR subject %
NZ Subjects	*640*	64	78
Tourist Subjects	*345*	36	22
n=	*985*	100	100

Table 86. Tramper SAR Subject – NZ vs. Tourist (by Non-Tramper SAR subjects)

	Tramper Subjects freq	Tramper Subjects %	Non-Tramper Subjects %
NZ Subjects	*640*	64	81
Tourist Subjects	*345*	36	19
n=	*985*	100	100

Tramper SAR Subjects – Incident Locations

Tramper SAR incidents are geographically dispersed across New Zealand. This spread reflects appears to reflect recreation and tourism activity patterns rather than population distribution. This is partially due to the impact of tourism on Tramping SAR incident numbers and distribution (mentioned earlier). Southland (15%) had the highest proportion of Tramping SAR incidents overall, and this was also where the largest proportion or SAR Tourist Tramper incidents occurred (26% - Table 87). Otago (12%) was next, also including a high proportion of SAR Tourist Tramper incidents (17%).

Manawatu-Wanganui Region had the highest proportion of NZ Tramper SAR incidents (15%) – this region includes parts of the Tararua Ranges and Central North Island areas.

Table 87. Tramper SAR Locations – NZ vs Tourist Trampers

	All Trampers %	NZ Trampers %	Tourist Trampers %
Southland	15	9	26
Otago	12	10	17
Manawatu Wanganui	11	15	7
Tasman	10	10	10
Waikato	9	10	8
Wellington	9	11	1
West Coast	8	8	9
Canterbury	8	9	7
Taranaki	5	5	7
Marlborough	3	4	3
Auckland	3	3	1
Hawkes Bay	2	4	0
BOP	2	2	0
Northland	1	0	1
Gisborne	1	1	0
Nelson	0	0	1
%	100	100	100
n=	1208	681	388

NZ vs. Tourist Trampers

Tourist Tramper SAR incidents are proportionately most prevalent in Southland (64% of this regions Tramping incidents relate to Tourist subjects) and Otago (50%), Taranaki (43%) and the West Coast (40% - Table 88 & Figure 48). They are least prevalent in North Island regional areas and Wellington.

Table 88. Tramper SAR Locations – NZ vs Tourist Trampers by Region

	NZ Trampers %	Tourist Trampers%	n=
Southland	36	64	159
Otago	50	50	133
Taranaki	57	43	60
West Coast	60	40	87
Tasman/Nelson	61	39	110
All NZ	64	36	1055
Waikato	69	31	97
Canterbury	69	31	85
Marlborough	73	27	37
Manawatu Wanganui	78	22	129
Auckland	79	21	29
BOP	94	6	18
Hawkes Bay/Gisborne	96	4	32
Wellington	96	4	79
n=	676	379	

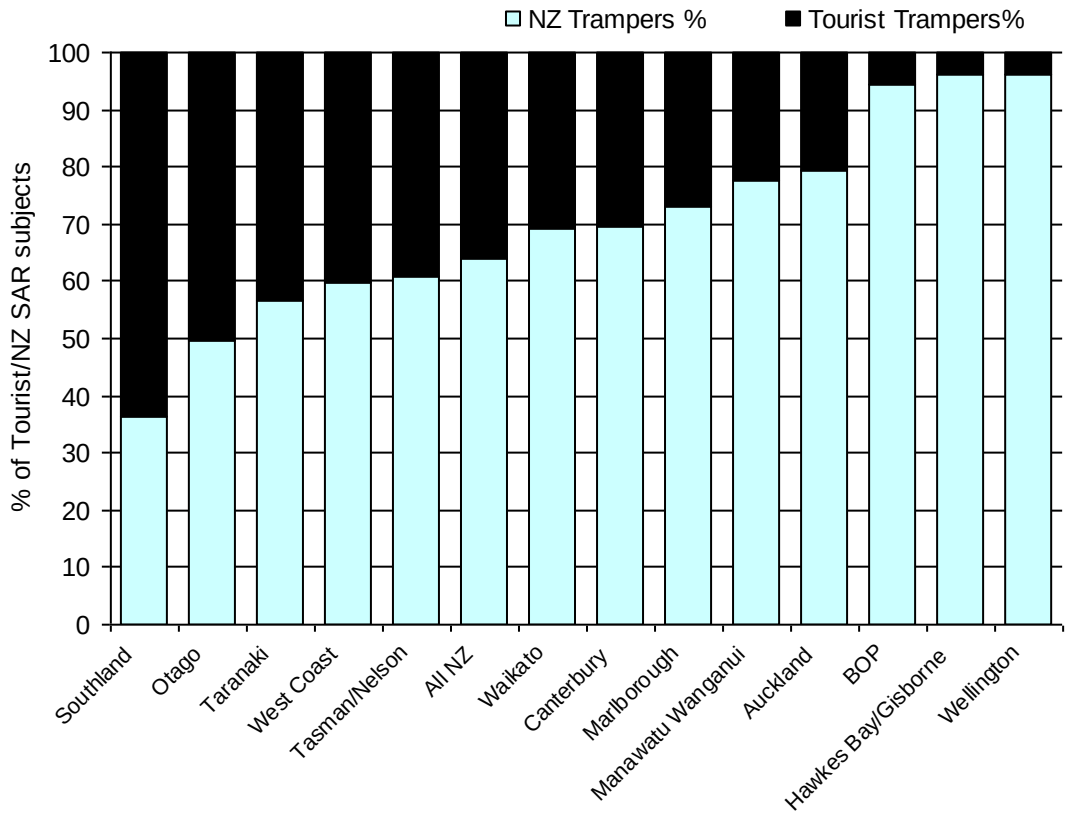


Figure 48. Tramper SAR Locations – NZ vs. Tourist Trampers by Region

Tramper SAR Subjects – Incident Location Type

There is a predominance of Tramper incidents in remote natural areas/parks (Table 89) - as would be expected as this is the area type most frequented by Trampers.

Table 89. Tramper SAR Subjects – Incident Area Type

	Tramper SAR incidents	Tramper SAR Incidents %	Land SAR Incident %
Remote Natural Areas/Parks	1052	87	52
Rural Natural Areas	73	6	16
Urban Fringe	57	5	10
Rural Town	16	1	5
Urban Areas	9	1	16
Rural Farmland	1	0	1
n=	1208	100	100

Terrain Type/Setting

Most Tramper incidents occurred in bush settings (56%, Table 90), with a high proportion also in Alpine settings (39%).

Table 90. Tramper SAR Incident – Incident Terrain Type

	Tramper SAR Incidents	Tramper SAR Incidents %
AlpineBush	451	39
Bush	657	56
Cave	1	0
Cliff	2	0
Coastal	22	2
Farmland	26	2
Urban	3	0
UrbanFringe	2	0
n=	1164	100

Tramper SAR Subjects – Home location vs. Incident Location

This section only deals with New Zealand Trampers. Comparison of home location vs. incident location for New Zealanders revealed that 49% of Tramping SAR incidents happened in the Home region of the subject.

In some Regions the clear majority SAR Tramper subjects who had incidents there were from local regions (e.g. of all Auckland/Northland subjects 82% locals; Canterbury 88%, Wellington 96% - Table 91).

In some other Regions the clear majority were non-locals, with relatively low local subject levels (e.g. Manawatu-Wanganui 50% - with 44% from Wellington; Southland 24% - with 26% from Otago, and 17% Auckland; West Coast 20% - with 33% from Canterbury, 16% Auckland, and 14% Otago; Otago 53% - with 17% from Canterbury and Southland each).

Only 22% of Tramper Subjects from Auckland had their incidents there (Table 92) – 26% were in Waikato, 12% Southland etc. This pattern was most unique to Auckland. They travelled to destinations further away (more than any other regional group). Canterbury was similar with 50% having local incidents, 16% on the West Coast, and 10% each in Otago and Tasman/Nelson.

By contrast, 77% of Wellington Tramper subjects had incidents locally, or nearby Manawatu-Wanganui (30%). Similarly 78% of Manawatu-Wanganui Tramper SAR subjects had their incidents locally.

Table 91. Tramper SAR Subjects – Incident Location vs. Home Regions
(i.e., where did the subjects come from? – Read columns down)

	Incident Locations													
Home Locations	Auckland Northland	BOP	Canterbury	Hawkes-Bay Gisborne	Manawatu Wanganui	Marlborough	Otago	Southland	Taranaki	Tasman Nelson	Waikato	Wellington	West Coast	n=
Auckland	82	6	3	0	3	4	6	17	18	12	32	0	16	82
BOP	0	29	0	0	0	0	0	0	9	0	9	0	4	16
Canterbury	0	0	88	0	0	19	17	16	0	15	2	0	33	105
Gisborne	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawkes Bay	0	0	0	63	0	0	0	2	0	0	8	0	0	25
Manawatu Wanganui	0	24	2	7	50	4	0	2	3	0	5	1	0	64
Marlborough	0	0	0	0	0	33	0	0	0	1	0	0	2	11
Nelson	5	0	0	0	0	22	0	0	0	36	0	0	4	33
Northland	14	0	0	0	0	7	2	2	0	0	12	0	0	15
Otago	0	0	0	0	0	0	53	26	6	0	2	0	14	60
Southland	0	0	0	0	0	0	17	24	0	0	0	0	2	26
Taranaki	0	0	0	0	0	0	0	0	56	0	2	1	0	21
Tasman	0	0	2	0	0	4	0	3	0	25	0	0	4	23
Waikato	0	41	2	17	4	7	0	0	0	3	23	1	2	38
Wellington	0	0	3	13	44	0	2	9	9	7	8	96	0	147
West Coast	0	0	0	0	0	0	5	0	0	0	0	0	20	13
%	100	100	100	100	100	100	100	100	100	100	100	100	100	679
n=	21	17	59	30	101	27	66	58	34	67	66	81	51	679

Table 92. Tramper SAR Subjects – Home Regions by Incident Locations
(i.e., where did they have their Incidents? – Read rows across)

	Incident Locations														
Home Locations	Auckland Northland	BOP	Canterbury	Hawkes-Bay Gisborne	Manawatu Wanganui	Marlborough	Otago	Southland	Taranaki	Tasman Nelson	Waikato	Wellington	West Coast	%	n=
Auckland	22	1	2	0	4	1	5	12	7	10	26	0	10	100	82
BOP	0	31	0	0	0	0	0	0	19	0	38	0	13	100	16
Canterbury	0	0	50	0	0	5	10	9	0	10	1	0	16	100	105
Gisborne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawkes Bay	0	0	0	76	0	0	0	4	0	0	20	0	0	100	25
Manawatu Wanganui	0	6	2	3	78	2	0	2	2	0	5	2	0	100	64
Marlborough	0	0	0	0	0	82	0	0	0	9	0	0	9	100	11
Nelson	3	0	0	0	0	18	0	0	0	73	0	0	6	100	33
Northland	20	0	0	0	0	13	7	7	0	0	53	0	0	100	15
Otago	0	0	0	0	0	0	58	25	3	0	2	0	12	100	60
Southland	0	0	0	0	0	0	42	54	0	0	0	0	4	100	26
Taranaki	0	0	0	0	0	0	0	0	90	0	5	5	0	100	21
Tasman	0	0	4	0	0	4	0	9	0	74	0	0	9	100	23
Waikato	0	18	3	13	11	5	0	0	0	5	39	3	3	100	38
Wellington	0	0	1	3	30	0	1	3	2	3	3	53	0	100	147
West Coast	0	0	0	0	0	0	23	0	0	0	0	0	77	100	13
All	3	3	9	4	15	4	10	9	5	10	10	12	8	100	679

5.3.5. Subject Profile – Walkers

This profile aims to identify characteristic socio-demographic features of SAR subjects who were engaged in walking as an activity (note there is a separate profile for Trampers). The profile provides a baseline for future projections of demand.

Data Source:

SAR subjects engaged in Walking were extracted from the P130 database for Land-based SAR incidents. This resulted in a subset of 488 Land-based SAR subjects (where they are referred to as Walkers).

Walker SAR Subjects – Gender

Overall, Walker SAR subjects had a much more even gender balance (52% male) in comparison to Non-Walker Subjects (73% male; Table 93 & Figure 49). In that respect Walkers were much more representative of the overall NZ population (49% male).

Table 93. Walker SAR subject – Gender

	Walker Subject freq	Walker Subject %	Non-Walker Subject %	All NZ Pop %
Male	245	52	73	49
Female	222	48	27	51
n=	467	100	n=2371	100

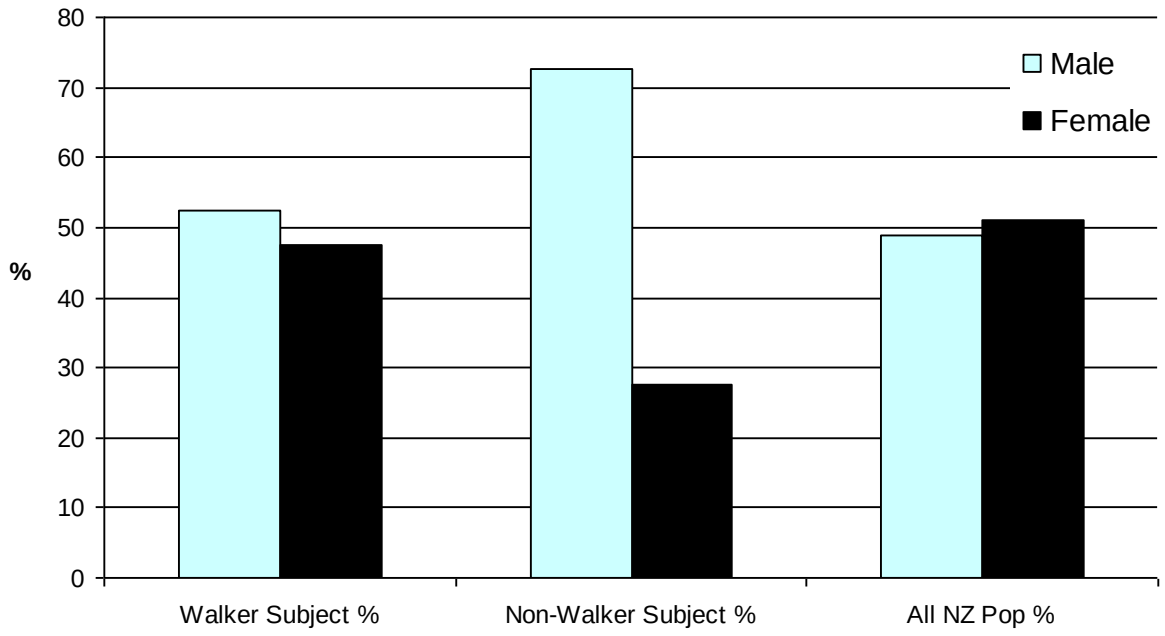


Figure 49. Walker SAR Subject – Gender

Walker SAR Subject Gender by Age group (10yr)

The male-female gender balance for Walker SAR subjects is relatively even (52% male) across most age categories, with the exception of the 30-39 and 40-49 year age groups (where women are more highly represented – 60 and 58%) and the 60-69 and 70+ age group (where males represent 58% and 83% of subjects respectively - Table 94 & Figure 50).

Table 94. Walker SAR Subject Gender by Age group (10yr)

	Male Walkers %	Female Walkers %	n=
0-9	50	50	18
10-19	49	51	78
20-29	55	45	102
30-39	40	60	62
40-49	42	58	36
50-59	55	45	56
60-69	58	42	43
70+	83	17	35
All Walkers	53	47	430

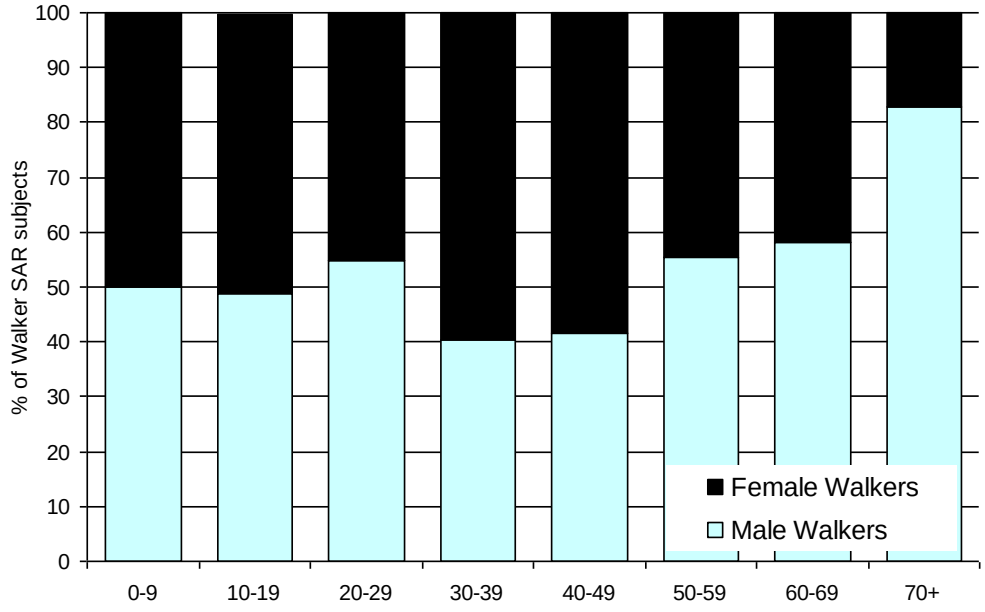


Figure 50. Walker SAR Subject Gender by Age group (10yr)

Walker SAR Subject – Age (4 part)

The age pattern of Walker SAR subjects shows a clear peak in the 15-39yr age group (50% - Table 95).

Table 95. Walker SAR Subject - Age group (4 way)

	Walker Subjects freq	Walker Subjects %
0-14	299	9
15-39	1621	50
40-64	*995*	30
65+	358	11
n=	3273	100

Walker SAR Subject – Age (5yr)

The 5 yr age profile for Walkers differs slightly to that of Non-Walker Land-based SAR subjects (Table 96). Minor differences are observed in most age intervals, with a peak in the 20-29 yr group.

Table 96. Walker SAR Subject - Age group (5 yr)

	Walker Subject freq	Walker Subject %	Non-Walker Subject freq	Non-Walker Subject %	NZ Population %
0 - 4	3	1	3	0	7
5 - 9	15	3	29	1	7
10 - 14	43	9	85	3	8
15 - 19	35	7	242	10	7
20 - 24	60	12	320	13	7
25 - 29	42	9	301	12	6
30 - 34	35	7	185	7	7
35 - 39	27	6	183	7	7
40 - 44	16	3	168	7	8
45 - 49	20	4	175	7	7
50 - 54	32	7	171	7	6
55 - 59	24	5	108	4	6
60 - 64	21	4	106	4	4
65 - 69	22	5	53	2	4
70 - 74	17	3	25	1	3
75 - 79	8	2	13	1	3
80 +	10	2	3	0	3
n=	488	100	2496	100	100

Walker SAR Subjects – Age (10yr)

Walker SAR Subject age distribution differs from that of Non-Walkers. These are mostly minor differences in most age intervals, with the largest differences apparent in the 0-9 yr, 70-79 and 80+ age categories where Walker subjects have a higher proportion than Non-Walkers (Table 97 & Figure 51). This might reflect the influence of wandering children or Dementia issues within a group of incidents classified as walking. The effect is small and would require further testing to clarify.

Age (10yr) - Walker vs. Non-Walker Subjects

Table 97. Walker SAR Subjects - Age group (10 yr)

	Walker Subject freq	Walker Subject %	*Non-Walker Subject freq*	Non-Walker Subject %	NZ Population %
0-9	*18*	4	*32*	1	14
10-19	*78*	18	*327*	15	15
20-29	*102*	24	*621*	29	13
30-39	*62*	14	*368*	17	14
40-49	*36*	8	*343*	16	15
50-59	*56*	13	*279*	13	12
60-69	*43*	10	*159*	7	8
70-79	*25*	6	*38*	2	5
80+	*10*	2	*3*	0	3
	430	100	*2170*	100	100

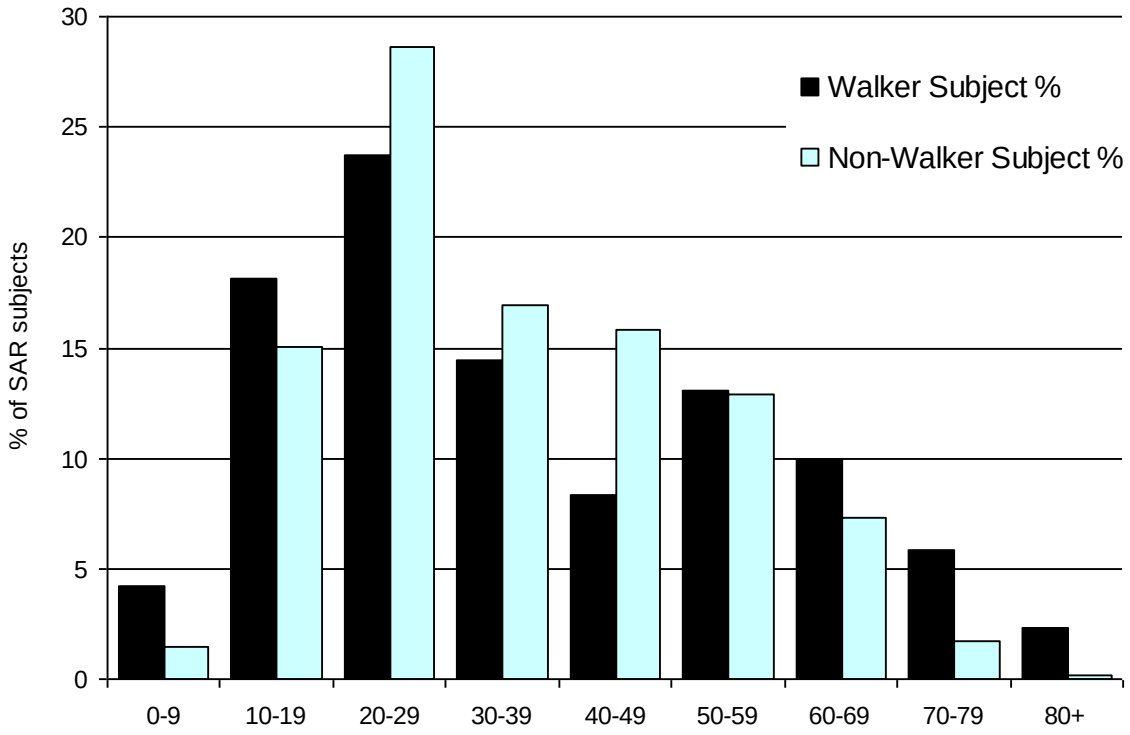


Figure 51. Walker SAR Subjects - Age group (10 yr) vs. Non-Walker subjects

Age (10yr) Walker Subject vs. NZ Population

Some differences are apparent between age profiles of Walker subjects and the NZ population (Figure 52). Very young children are under-represented among Walker subjects – reflecting lower rates of independent participation at this age). Teenagers emerge at a higher level. The largest difference is the over-representation by Walker subjects in the 20-29 age group. There is no obvious relative increase in walking among older age groups.

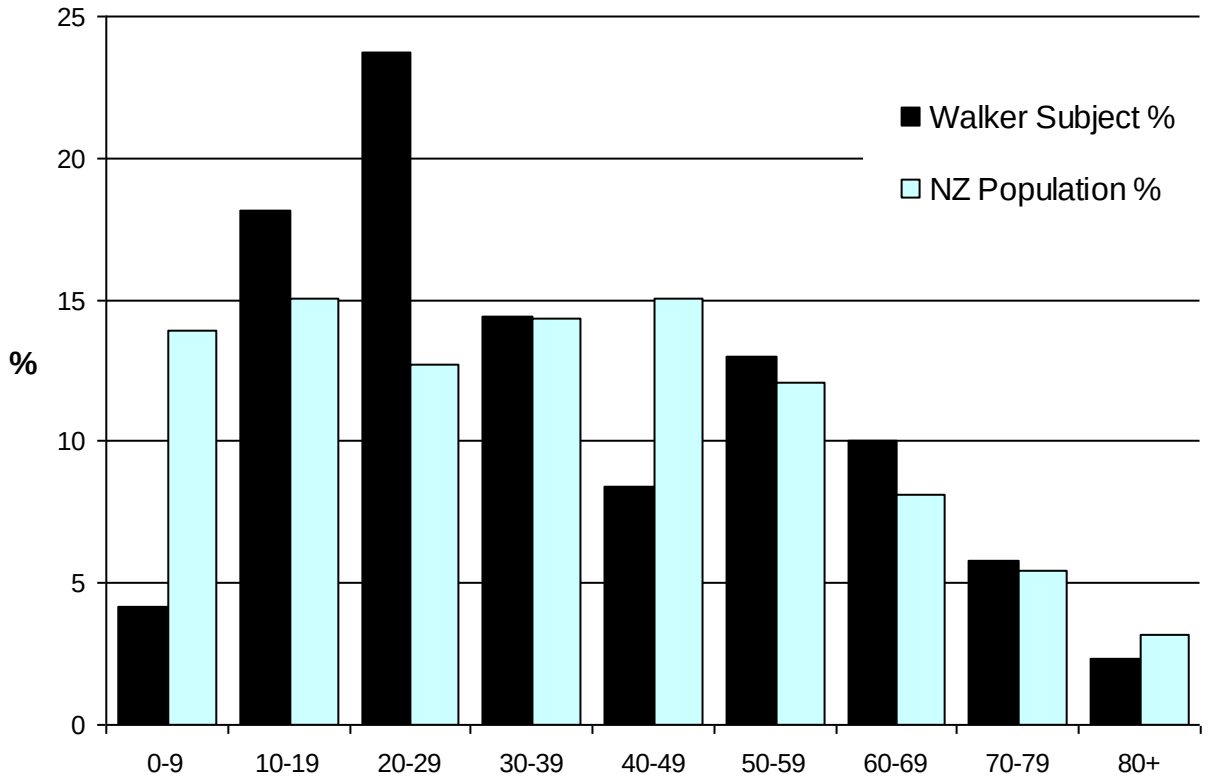


Figure 52. Walker SAR Subjects - Age group (10 yr) vs. NZ Population

Walker SAR Subject – Ethnicity

The pattern of ethnicities for Walker SAR subjects is not inconsistent with the general pattern of Land-based SAR subjects overall – both show notable over-representations of Europeans relative to the NZ population (Table 98 & Figure 53). However when Walkers are compared specifically to Non-Walker SAR subjects, the Non-Walkers have an even more extreme over-representation of Europeans.

Among Walkers, the proportion of Asians is notably higher than elsewhere. While not a large proportion, it is notable given the general under-representation of non-European ethnic groups in most recreation types and situations.

Table 98. Walker SAR Subject - Ethnicity (Walker vs. Non-Walkers, and NZ)

	Walker Subjects freq	Walker Subjects %	Non-Walker Subjects %	All Land SAR Subject %	All NZ Pop %
Asian	25	8	2	2	8
European	237	80	91	86	71
Maori	14	5	6	9	13
Middle Eastern	8	3	0	1	1
Polynesian	9	3	0	2	6
Other	5	2	1	1	0
n=	298	298	1651		

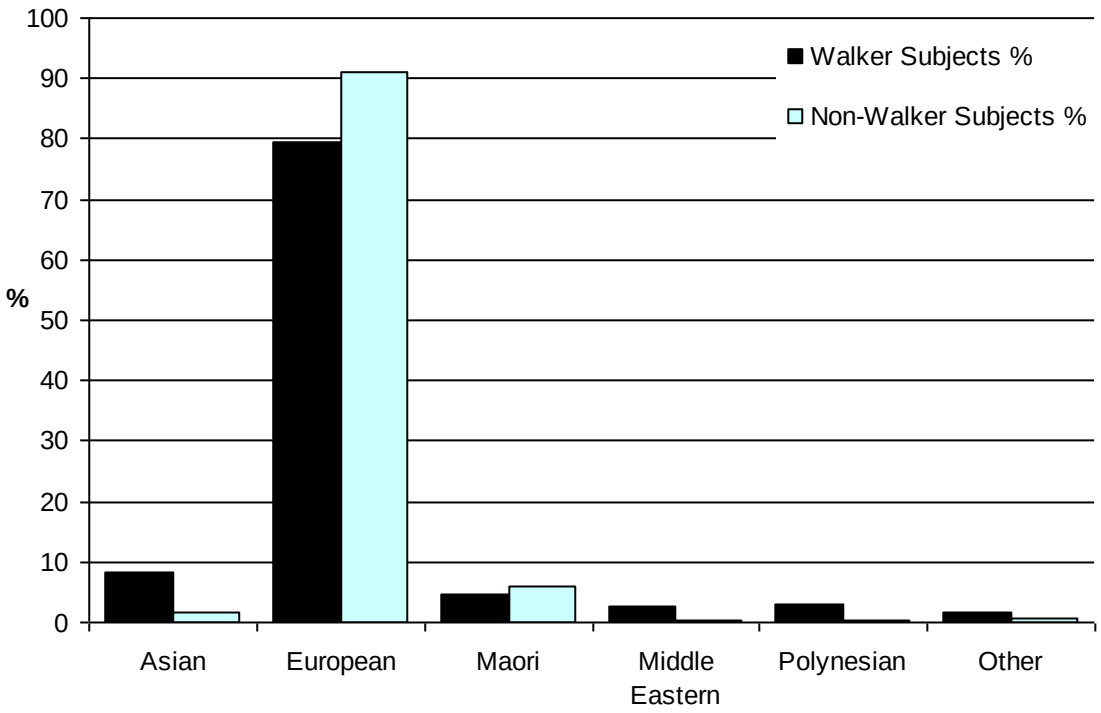


Figure 53. Walker SAR Subjects - Ethnicity (Walker vs. Non-Walker)

Walker SAR Subject – NZ vs. Tourist

Walker SAR subjects had higher proportions of Tourists (33%) in comparison to Non-Walker SAR subjects overall (25%, Table 99 & Figure 54). While only 12% of NZ SAR Subjects were engaged in walking, the corresponding level for Tourists was 20%.

Table 99. Walker SAR Subjects – NZ by Tourists (vs. Non-Walker Subjects)

	Walkers Subject %	Non-Walkers Subject %	All Land SAR Subject %
NZ Subjects	67	75	73
Tourist Subjects	33	25	27
n=	430	2174	2604

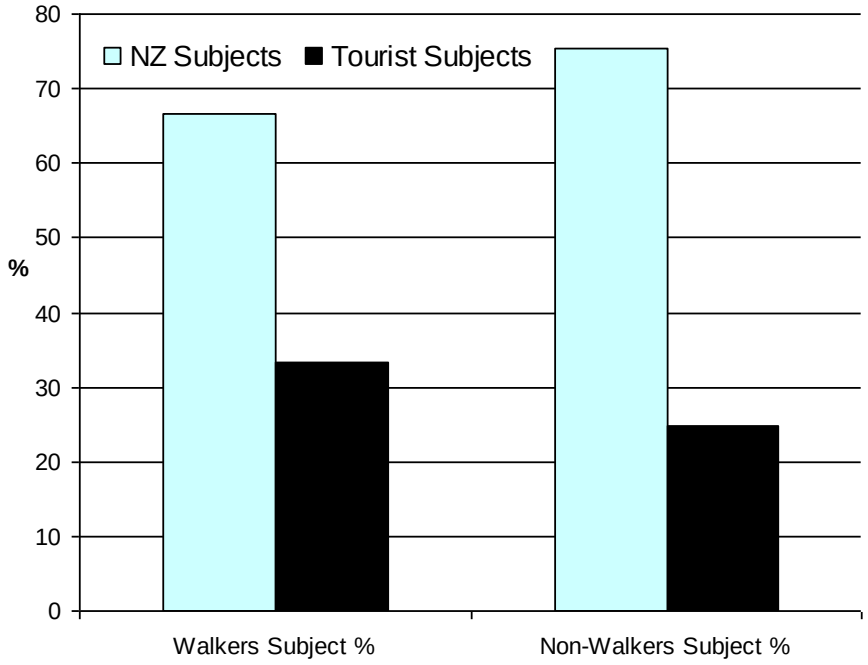


Figure 54. Walker SAR Subjects – NZ by Tourists (vs. Non-Walker Subjects)

Walker SAR Subjects – Incident Locations

Walker SAR incidents are spread geographically across New Zealand. Most Walker SAR incidents happened in Wellington (18%), Waikato (16%), Otago and West Coast (12% each, Table 100).

The largest proportion of NZ Walker incidents occurred in Wellington (23%). Wellington incidents were almost all (87%) NZ Walkers (Table 101). By contrast West Coast had 12% of Walker incidents (Table 100), and of this 12% almost all (74%) were Tourist Walkers (Table 101). Reflecting this tourism predominance, the West Coast has 26% of all Tourist Walker incidents in New Zealand overall.

Table 100. Walker SAR Locations – NZ vs. Tourist Walkers across SAR Incident Regions

SAR Incident Regions	All Walkers %	NZ Walkers %	Tourist Walkers %
Wellington	18	23	7
Waikato	16	18	13
Otago	12	8	19
West Coast	12	5	26
Canterbury	10	9	13
Southland	7	8	6
Auckland/Northland	6	8	3
BOP	6	7	4
Tasman/Nelson	4	3	5
Marlborough	3	4	1
Taranaki	3	4	1
Manawatu Wanganui	3	3	1
Hawkes Bay/Gisborne	1	2	1
n=	427	287	140

NZ vs. Tourist Walkers

Tourist Walker SAR incidents are predominant within West Coast (74%), and Otago (53%) regions, with Tasman/Nelson and Canterbury regions also having high rates of Tourist Walker incidents (Table 101 & Figure 55). Southland, however, is a surprising exception (which contrasts markedly with other findings showing that Tourists are the subject of a large majority of Tramper incidents within this region – 64% - Figure 48 on p.124). Tourist Walker SAR subjects are least prevalent in North Island regional areas and cities.

Table 101. Walker SAR Locations – NZ vs. Tourist Walkers by Incident Region

SAR Incident Regions	NZ Walkers %	Tourist Walkers %	n=
West Coast	26	74	50
Otago	47	53	51
Tasman/Nelson	56	44	16
Canterbury	58	42	43
ALL AREAS	67	33	427
Southland	73	27	30
Waikato	74	26	69
BOP	80	20	25
Manawatu Wanganui	82	18	11
Hawkes Bay/Gisborne	83	17	6
Auckland/Northland	85	15	26
Marlborough	85	15	13
Wellington	87	13	75
Taranaki	92	8	12

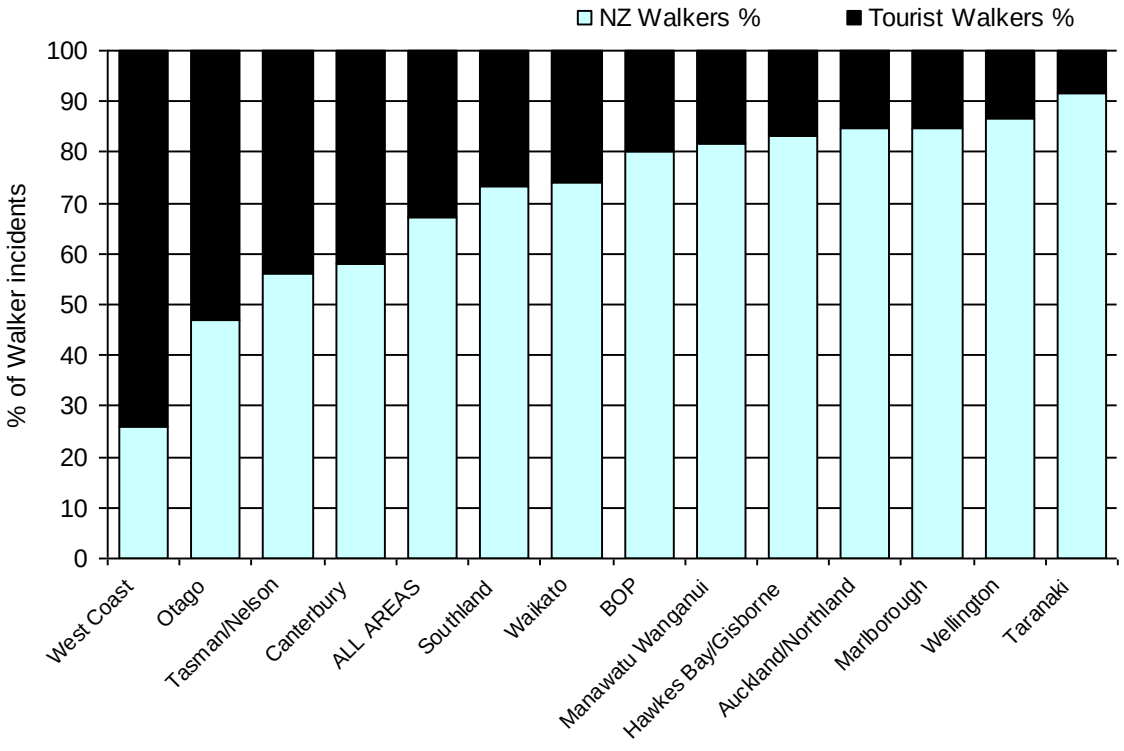


Figure 55. Walker SAR Locations – NZ vs. Tourist Walkers by Region

Walker SAR Subjects – Incident Location Type

While most Walker SAR subjects had their incidents in Remote Parks (46%) this was much lower than for Non-Walkers (71% - Table 102 & Figure 56). Compared with the Non-Walkers, Walker incidents were more prominent in the Urban Fringe (23% vs. 7% for Non-Walkers) and Urban Areas (11% vs. 3%).

Table 102. Walker SAR Subjects – Incident Area Type (Walker vs. Non-Walker Subjects)

	Walker Subjects freq	Walker Subjects %	*Non-Walker Subjects freq*	Non-Walker Subjects %
Remote Natural Areas/Parks	*223*	46	*1770*	71
Rural Farmland	*1*	0	*15*	1
Rural Natural Areas	*84*	17	*386*	15
Rural Town	*16*	3	*64*	3
Urban Areas	*52*	11	*81*	3
Urban Fringe	*112*	23	*177*	7
n=	*488*	100	*2496*	100

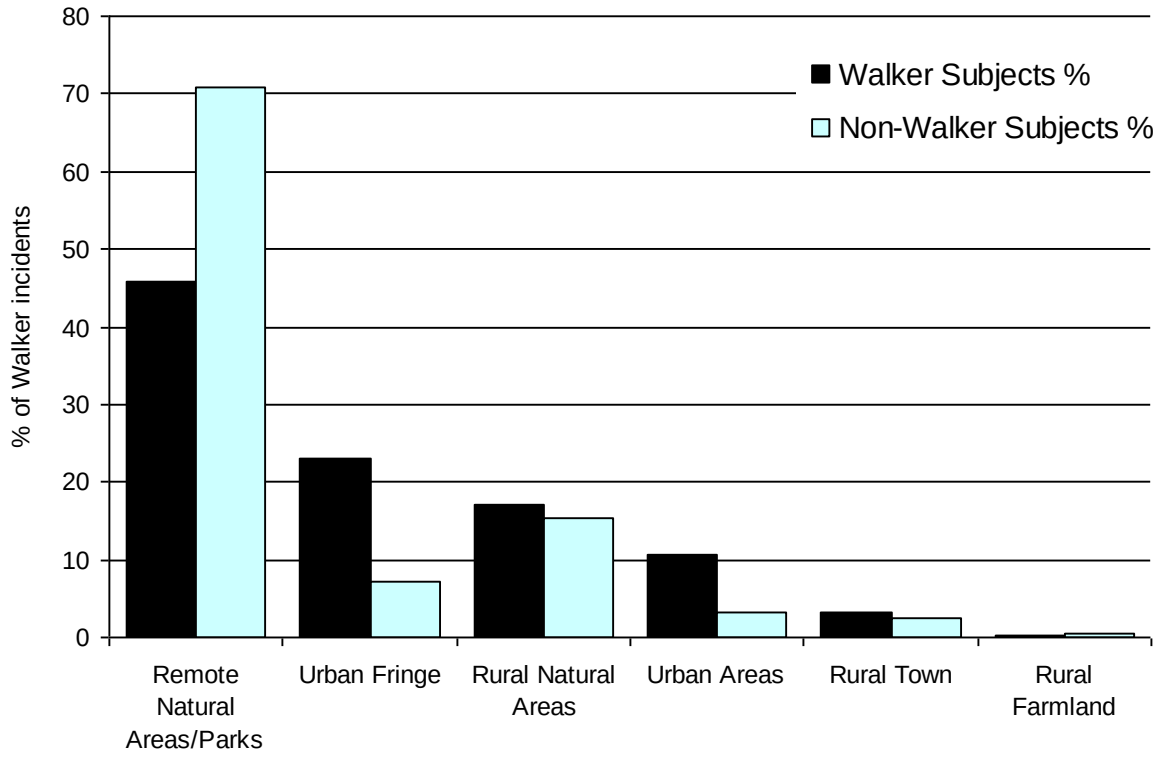


Figure 56. Walker SAR Subjects – Incident Area Type (Walker vs. Non-Walker Subjects)

NZ vs. Tourist Walkers

Remote park areas are much more common locations of Tourist Walker incidents (58%) than NZ Walker incidents (41% - Table 103 & Figure 57). Urban Fringe incidents are common locations for both NZ (22%) and Tourist (25%) Walker subjects. Urban areas are more common for New Zealand Walker SAR incidents (16%) than those for Tourist Walkers (1%).

Table 103. Walker SAR Subjects – Incident Area Type (NZ vs. Tourist Subjects)

	NZ Walker Subjects freq	NZ Walker Subjects %	*Tourist Walker Subjects freq*	Tourist Walker Subjects %	*Walker Subjects freq*	Walker Subjects %
Remote Natural Areas/Parks	*118*	41	*83*	58	*223*	46
Urban Fringe	*62*	22	*36*	25	*112*	23
Rural Natural Areas	*50*	17	*20*	14	*84*	17
Urban Areas	*45*	16	*2*	1	*52*	11
Rural Town	*11*	4	*2*	1	*16*	3
Rural Farmland	*1*	0		0	*1*	0
n=	*287*	100	*143*	100	*488*	100

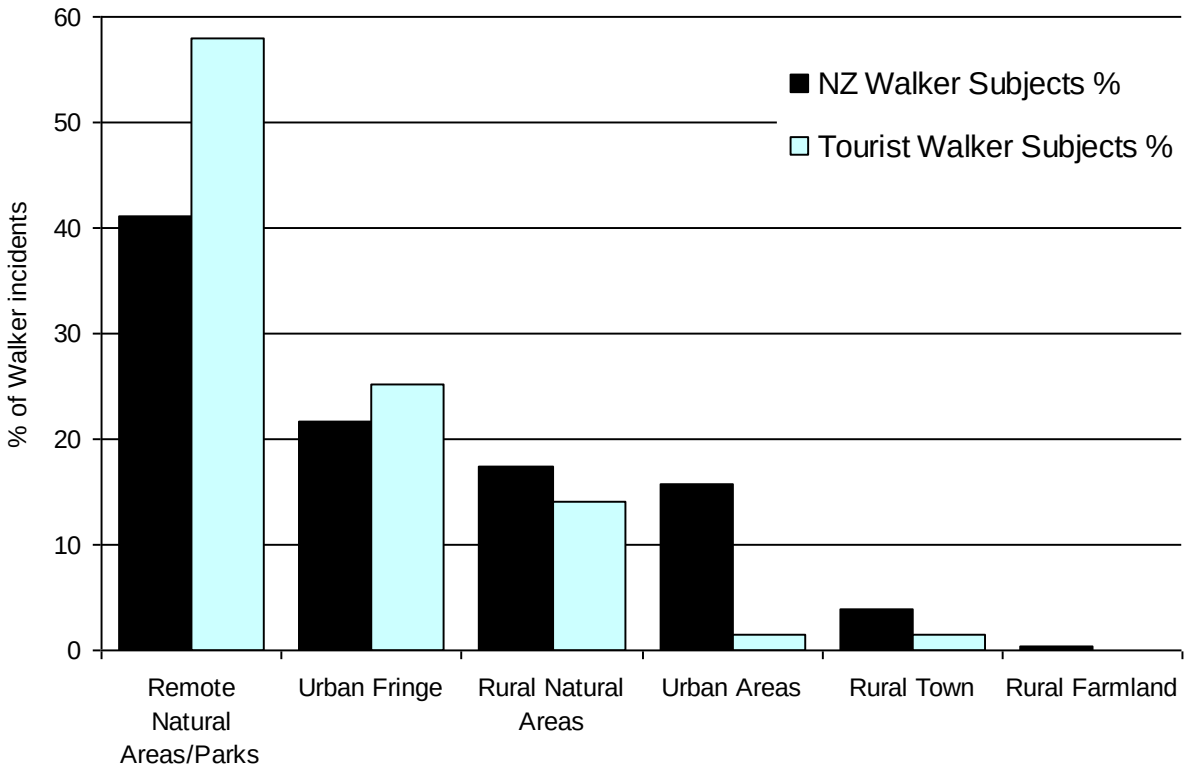


Figure 57. Walker SAR Subjects – Incident Area Type (NZ vs. Tourist Subjects)

Walker SAR Subjects – Home location vs. Incident Location

This section only deals with New Zealand Walkers. Overall, most Walker incidents took place in the subjects home region, and the general correspondence between incident region % and home region % distribution in Table 104 represents this. Comparison of home location vs. incident location for New Zealanders revealed that 78% of Walking SAR incidents happened in the Home region of the subject (22% in other regions).

This can also be seen in detail by region in Tables 105 and 106, as response size allows indicative use of cross-tabulation. This is obviously a limited interpretation due to the small sample size, and is really only presented as another example of how useful data can be generated given sufficient data.

Incident and home locations do not match the overall New Zealand population distribution (Table 104). Walker SAR subject incidents were under-represented in Auckland (6% of incidents vs. 32% of the population) and over-represented in Wellington (23% vs. 11%), Waikato (18% vs. 9%) and Southland (8% vs. 2%).

Similarly Walker SAR subject home areas appear to be under-represented in Auckland (12% of Walker subjects were from Auckland (Table 104) vs. 32% of population) and over-represented in Wellington (26% of Walker subjects were from Wellington vs. 11% of population).

Table 104. Home and Incident locations for SAR Walker subjects (vs. NZ population)

	Walker Home Location freq	Walker Home Location %	*Walker Incident Location freq*	*Walker Incident Location %*	NZ Population %
Auckland	35	12	18	6	32
BOP	16	6	20	7	6
Canterbury	27	10	25	9	13
Gisborne	4	1	4	1	1
Hawkes Bay	5	2	1	0	4
Manawatu Wanganui	6	2	9	3	6
Marlborough	5	2	11	4	1
Nelson	7	2		0	1
Northland	3	1	4	1	4
Otago	26	9	24	8	5
Southland	16	6	22	8	2
Taranaki	9	3	11	4	3
Tasman	2	1	9	3	1
Waikato	41	14	51	18	9
Wellington	73	26	65	23	11
West Coast	9	3	13	5	1
ALL	284	100	287	100	100

Table 105. Walker SAR Subjects – Incident Location vs. Home Regions

(i.e., where did the subjects come from? – Read columns down)

Home Areas	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All
Auckland	89	0	4	0	0	0	18	0	0	0	5	27	0	22	2	0	12
BOP	0	75	0	0	0	0	0	0	0	0	0	0	0	2	0	0	6
Canterbury	6	0	84	0	0	0	9	0	0	0	9	0	0	0	2	8	10
Gisborne	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	1
Hawkes Bay	0	0	0	0	100	11	18	0	0	0	0	0	0	2	0	0	2
Manawatu Wanganui	0	0	0	0	0	56	0	0	0	4	0	0	0	0	0	0	2
Marlborough	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0	2
Nelson	0	0	0	0	0	0	9	0	0	0	0	0	67	0	0	0	2
Northland	0	0	0	0	0	0	0	0	75	0	0	0	0	0	0	0	1
Otago	0	0	8	0	0	0	0	0	0	92	9	0	0	0	0	0	9
Southland	0	0	0	0	0	0	0	0	0	0	73	0	0	0	0	0	6
Taranaki	0	0	0	0	0	0	0	0	0	0	0	73	11	0	0	0	3
Tasman	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	1
Waikato	6	15	4	0	0	0	0	0	25	0	0	0	0	68	2	0	14
Wellington	0	10	0	0	0	33	0	0	0	4	5	0	0	6	95	23	26
West Coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69	3
%	100	100	100	100	100	100	100	0	100	100	100	100	100	100	100	100	100
n=	18	20	25	4	1	9	11	0	4	24	22	11	9	50	63	13	284

Table 106. Walker SAR Subjects – Home Regions by Incident Locations

(i.e., where did they have their Incidents? – Read rows across)

Home Areas	Auckland	BOP	Canterbury	Gisborne	Hawkes Bay	Manawatu Wanganui	Marlborough	Nelson	Northland	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	%	n=
Auckland	46	0	3	0	0	0	6	0	0	0	3	9	0	31	3	0	100	35
BOP	0	94	0	0	0	0	0	0	0	0	0	0	0	6	0	0	100	16
Canterbury	4	0	78	0	0	0	4	0	0	0	7	0	0	0	4	4	100	27
Gisborne	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	100	4
Hawkes Bay	0	0	0	0	20	20	40	0	0	0	0	0	0	20	0	0	100	5
Manawatu Wanganui	0	0	0	0	0	83	0	0	0	17	0	0	0	0	0	0	100	6
Marlborough	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	100	5
Nelson	0	0	0	0	0	0	14	0	0	0	0	0	86	0	0	0	100	7
Northland	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	100	3
Otago	0	0	8	0	0	0	0	0	0	85	8	0	0	0	0	0	100	26
Southland	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	16
Taranaki	0	0	0	0	0	0	0	0	0	0	0	89	11	0	0	0	100	9
Tasman	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100	2
Waikato	2	7	2	0	0	0	0	0	2	0	0	0	0	83	2	0	100	41
Wellington	0	3	0	0	0	4	0	0	0	1	1	0	0	4	82	4	100	73
West Coast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	9
ALL	6	7	9	1	0	3	4	0	1	8	8	4	3	18	22	5	100	284

5.3.6. Subject Profile – Hunters

This profile aims to identify characteristic socio-demographic features of SAR subjects who were engaged in Hunting as an activity. The profile provides a baseline for future projections of demand.

Data Source:

SAR subjects who were engaged in hunting were extracted from the P130 database for Land-based SAR incidents. This resulted in a subset of 434 Land-based SAR subjects (referred to as Hunters).

Hunter SAR Subjects – Gender

Hunter SAR subjects were almost all male (97%, Table 107 & Figure 58), reflecting the common gender pattern of participation in this activity. Non-Hunter SAR subjects by contrast were much more evenly balanced (65% male).

Table 107. Hunter SAR subject – Gender

	Hunter Subjects freq	Hunter Subjects %	*Non-Hunters Subject freq*	Non-Hunters Subject %	NZ Population %
Male	*414*	97	*1551*	65	49
Female	*13*	3	*860*	35	51
n=	*427*	100	*2371*	100	100

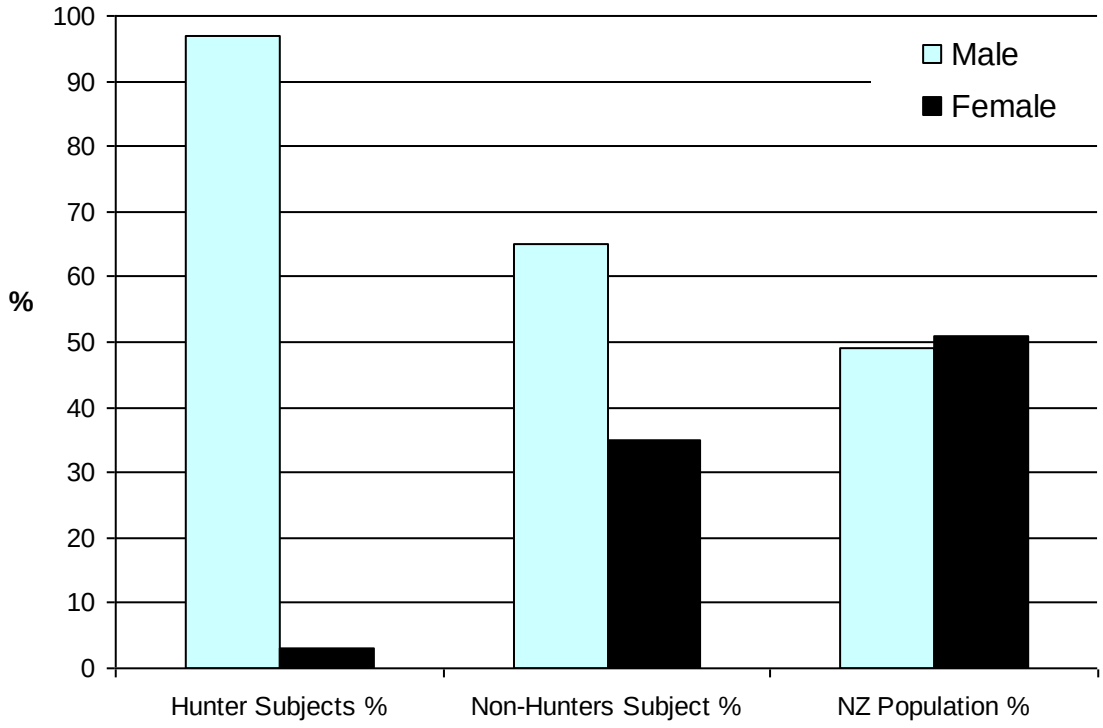


Figure 58. Hunter SAR Subject – Gender

Hunter SAR Subject – Age (4-way)

The 4-way age profile for Hunter SAR subjects appears largely consistent with that of Non-Hunter SAR subjects, with a clear peak in the 15-39 yr age group (Table 108).

Table 108. Hunter SAR Subject - Age group (4-way)

	Hunter Subjects freq	*Hunter Subjects %*	Non-Hunter Subjects freq	Non-Hunter Subjects %	NZ Population %
0-14	15	4	163	7	22
15-39	230	56	1200	55	35
40-64	151	37	690	31	32
65+	13	3	138	6	12
n=	409	100	2191	100	100

Hunter SAR Subject – Age (5yr)

The pattern of age-groups (5yr) for Hunter SAR subjects does not appear in-consistent with that of Non-Hunter SAR subjects (Table 109). There is a slight tendency for more Hunter subjects aged between 30-50 yrs (Figure 59).

Table 109. Hunter SAR Subject - Age group (5yr) vs. Non-Hunter

	Hunter Subjects freq	Hunter Subjects %	*Non-Hunter Subjects freq*	Non-Hunter Subjects %	NZ Population %
0 - 4	0	0	*6*	0	7
5 - 9	3	1	*39*	2	7
10 - 14	12	3	*111*	5	8
15 - 19	41	10	*233*	11	7
20 - 24	65	16	*313*	14	7
25 - 29	46	11	*296*	14	6
30 - 34	37	9	*181*	8	7
35 - 39	41	10	*168*	8	7
40 - 44	44	11	*136*	6	8
45 - 49	40	10	*154*	7	7
50 - 54	35	9	*167*	8	6
55 - 59	18	4	*113*	5	6
60 - 64	14	3	*111*	5	4
65 - 69	8	2	*65*	3	4
70 - 74	2	0	*39*	2	3
75 - 79	3	1	*18*	1	3
80 +	0	0	*13*	1	3
n=	409	100	*2163*	100	100

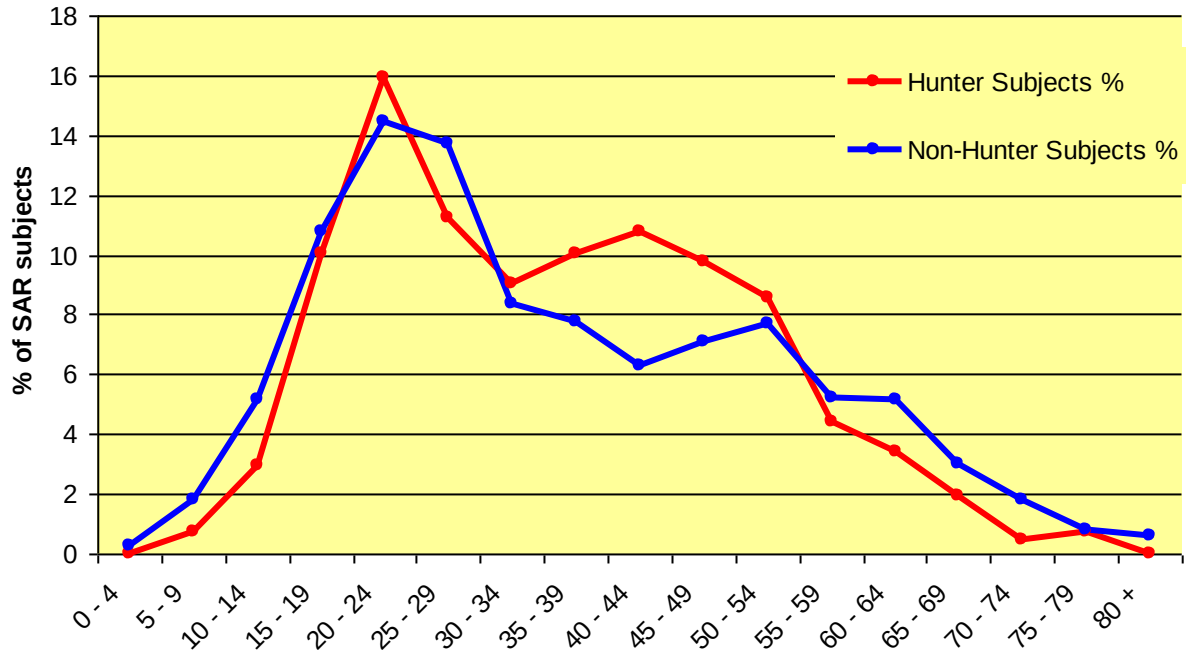


Figure 59. Hunter SAR Subject - Age group (5yr) vs. Non-Hunter

Hunter SAR Subject – Age (10yr)

The pattern of age-groups (10yr) for Hunter SAR subjects is not inconsistent with that of Non-Hunter SAR subjects (Table 110 & Figure 60), with an over-representation of subjects in the 40-49 yr group (19% vs. 12% Non-Hunters and 15% of the NZ population).

Table 110. Hunter SAR Subject - Age group (10yr) vs. Non-Hunter

	Hunter Subjects freq	Hunter Subjects %	*Non-Hunter Subjects freq*	Non-Hunter Subjects %	NZ Population %
0 - 9	3	1	47	2	14
10 - 19	53	12	352	14	15
20 - 29	111	26	612	24	13
30 - 39	78	18	352	14	14
40 - 49	84	19	295	12	15
50 - 59	53	12	282	11	12
60 - 69	22	5	180	7	8
70 - 79	5	1	58	2	5
80+	0	0	13	1	3
n=	434	100	2554	100	100

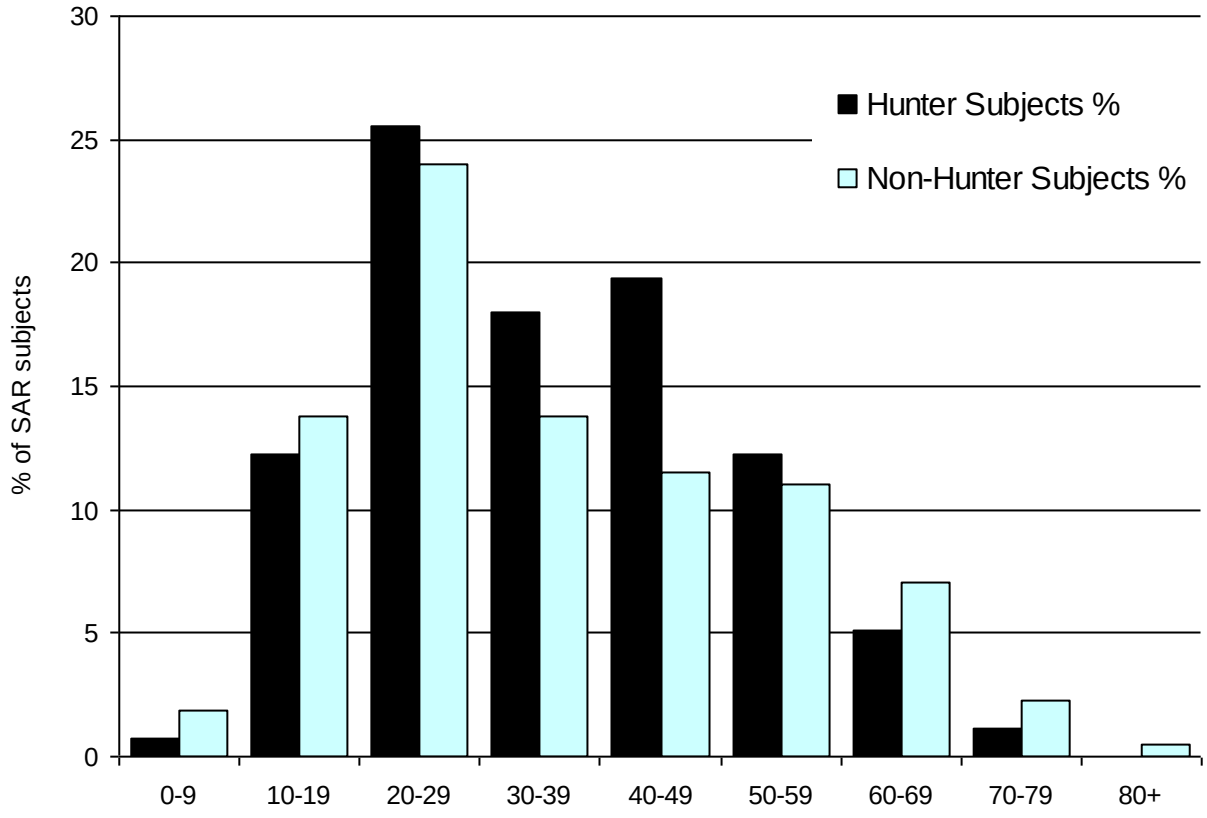


Figure 60. Hunter SAR Subject - Age group (10yr) vs. Non-Hunter

Hunter SAR Subject – Ethnicity

Hunter vs. Non-Hunter SAR subjects

The pattern of ethnicities for Hunter SAR subjects appears largely consistent with that for Non-Hunters overall – both having notable over-representation of Europeans relative to the NZ population (Table 111), but with an even representation of Mäori. However when Hunters are compared specifically to Non-Hunter SAR subjects, the Non-Hunters actually have a slightly larger over-representation of Europeans (Figure 61). Among Hunters, the proportion of Mäori is notably higher (12%) than for Non-Hunters (4%).

Table 111. Hunter SAR Subjects - Ethnicity (Hunter vs. Non-Hunters, and NZ)

	Hunter Subjects freq	Hunter Subjects %	*Non-Hunter Subjects freq*	Non-Hunter Subjects %	NZ Population %
European	*333*	87	*1433*	90	71
Maori	*47*	12	*67*	4	13
Asian	*1*	0	*50*	3	8
Polynesian	*1*	0	*16*	1	6
Other NZ	*1*	0	*26*	2	0
n=	*383*	100	*1592*	100	100

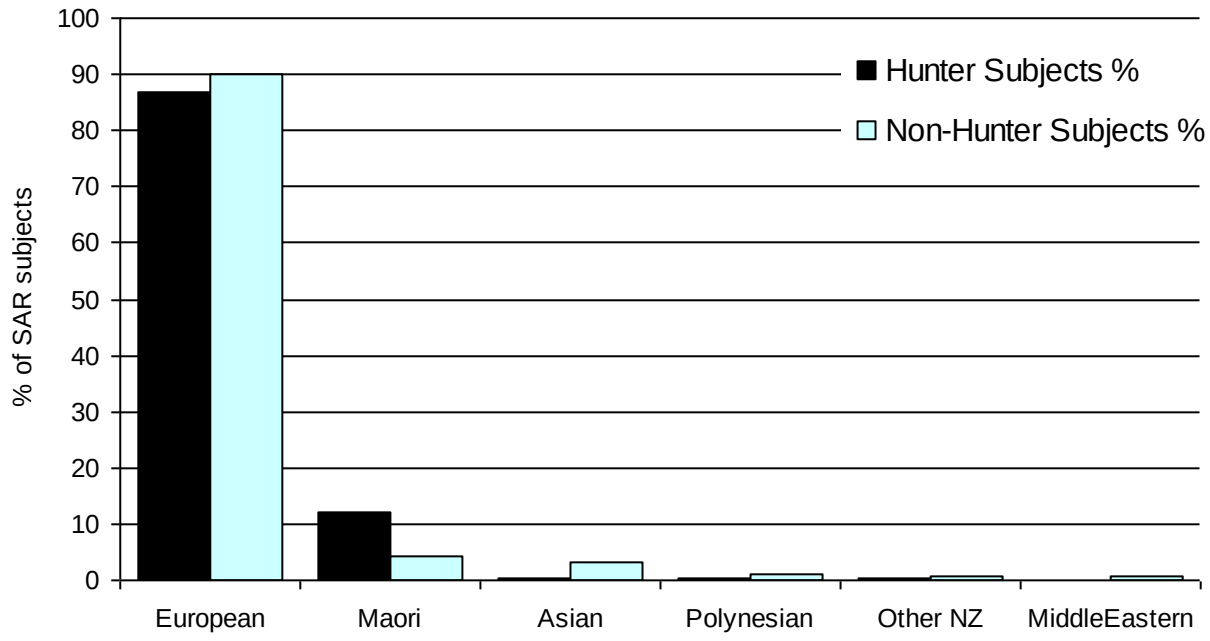


Figure 61. Hunter SAR Subjects - Ethnicity (Hunter vs. Non-Hunter)

Hunter vs. NZ Population

Overall, Hunter SAR subjects are over-represented among Europeans (Figure 62). Mäori are evenly represented. Asian, Polynesian and Other NZ Hunter subjects do not feature much in the Hunting incident statistics.

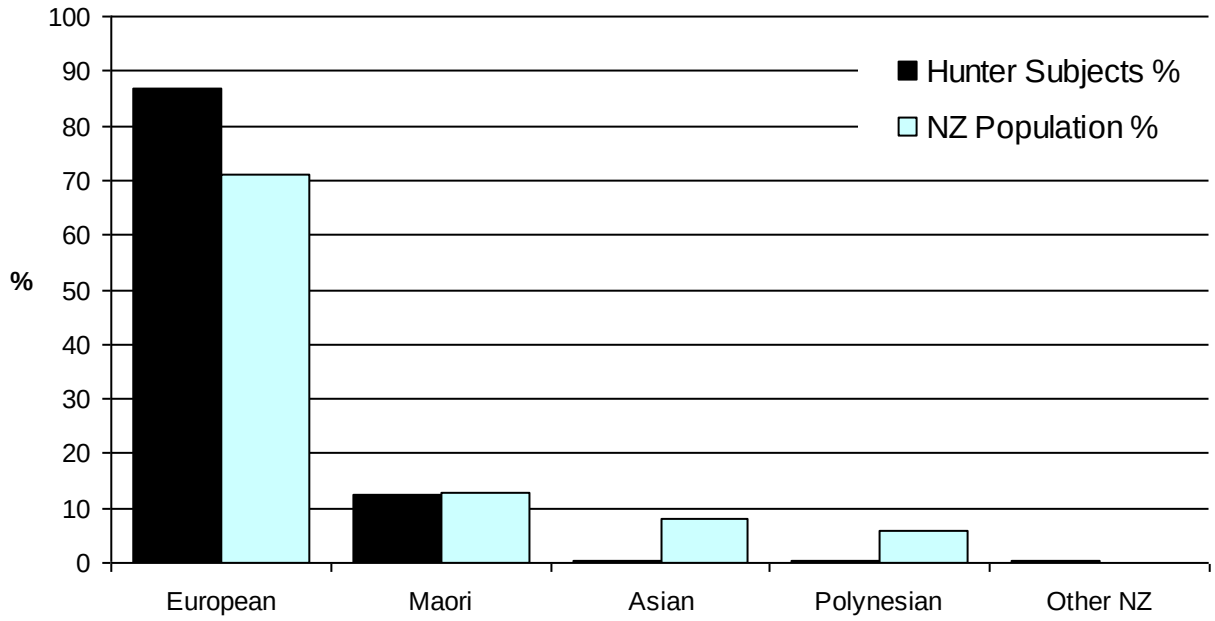


Figure 62. Hunter SAR Subjects - Ethnicity (Hunters vs. NZ Population)

Hunter SAR Subject – NZ vs. Tourist

Hunter SAR subjects had very low proportions of Tourists (4%) compared with Non-Hunter SAR subjects overall (30% - Table 112 & Figure 63).

Table 112. Hunter SAR Subjects – NZ by Tourists (vs. Non-Hunter Subjects)

	Hunter Subjects freq	Hunter Subjects %	*Non-Hunter Subjects %*	Non-Hunter Subjects %
NZ Subjects	*375*	96	*1549*	70
Tourist Subjects	*15*	4	*665*	30
n=	*390*	100	*2214*	100

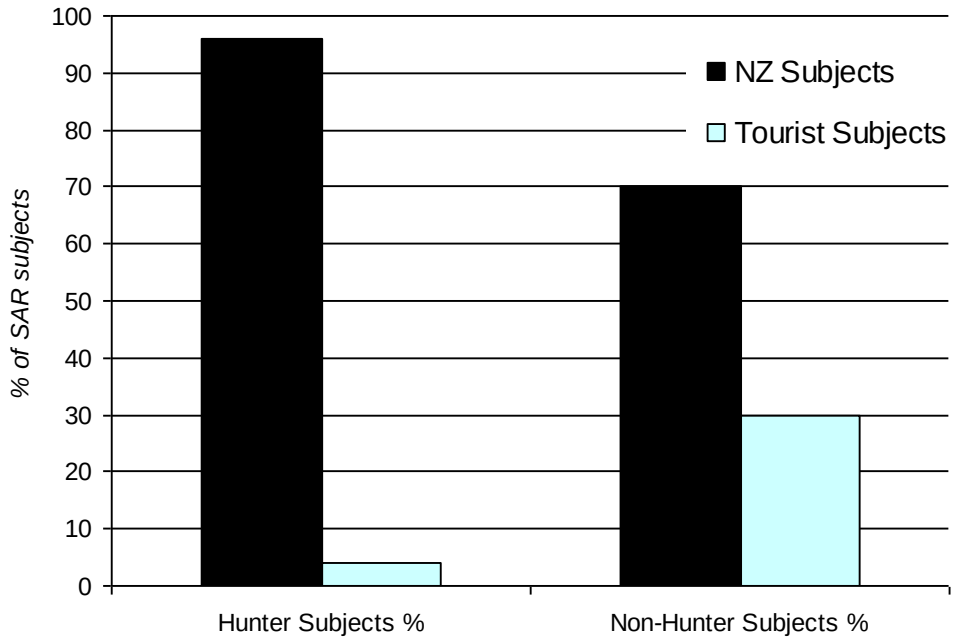


Figure 63. Hunter SAR Subjects – NZ by Tourists (vs. Non-Hunter Subjects)

Hunter SAR Subjects – Incident Locations

While Hunter SAR subject incidents are well spread across New Zealand, this pattern does not seem to reflect recreation and tourism activity patterns or general population distribution in particular. The pattern is simply much dispersed.

Hunter vs. Non-Hunter subject incident patterns

Most Hunter SAR subjects had incidents in Waikato (23%), Southland (12%), BOP, Canterbury and West Coast (10% each, Table 113). Compared with Non-Hunter SAR subjects (9%), Hunters (23%) were relatively over-represented in Waikato. On the other hand, Hunter incidents were relatively under-represented in Wellington (3% vs. 12% Non-Hunters).

Hunter Subject Incident regions vs. NZ Population

Hunter SAR subjects are most under-represented relative to NZ Population in Auckland (1% vs. 32% NZ pop) and Wellington (3% vs. 11% NZ pop). Hunter SAR subjects are most over-represented relative to NZ Population in Waikato (23% vs. 9% NZ pop) and Southland (12% vs. 2%)

Table 113. Hunter SAR Locations –vs. Non-Hunters across Incident Regions

Incident Regions	*Hunter Subjects freq*	Hunter Subjects %	*Non-Hunters Subjects freq*	Non-Hunters Subjects %	NZ Population %
Auckland	*6*	1	*107*	4	32
BOP	*43*	10	*79*	3	6
Canterbury	*41*	10	*294*	12	13
Gisborne	*2*	0	*17*	1	1
Hawkes Bay	*14*	3	*47*	2	4
Manawatu Wanganui	*25*	6	*190*	8	6
Marlborough	*23*	5	*83*	3	1
Nelson	*3*	1	*10*	0	1
Northland	*4*	1	*37*	1	4
Otago	*15*	3	*326*	13	5
Southland	*50*	12	*276*	11	2
Taranaki	*24*	6	*107*	4	3
Tasman	*26*	6	*174*	7	1
Waikato	*97*	23	*233*	9	9
Wellington	*15*	3	*291*	12	11
West Coast	*42*	10	*221*	9	1
n=	*430*	100	*2492*	100	100

Hunter SAR Subjects – Home Locations

Hunter SAR subject home areas are spread across New Zealand.

Hunter vs. Non-Hunter subject incident patterns

Largest numbers of Hunter SAR subjects came from Waikato (18%), BOP (12%) and Canterbury (11%, Table 114). Compared with Non-Hunter SAR subjects these Hunter SAR subjects were relatively over-represented in Waikato (18% vs. 10%) and BOP (12% vs. 5%). They were relatively under-represented in Wellington (8% vs. 18%)

Hunter Subject Incident regions vs. NZ Population

Hunter SAR subjects are most under-represented relative to NZ Population in Auckland (4% vs. 32% NZ pop), and most over-represented in Waikato (18% vs. 9% NZ pop) and BOP (12% vs. 6%)

Table 114. Hunter SAR Locations –vs. Non-Hunters across Home Regions

Incident Regions	Hunter Subjects freq	Hunter Subjects %	Non-Hunters Subjects freq	Non-Hunters Subjects %	NZ Population %
Auckland	15	4	177	9	32
BOP	46	12	98	5	6
Canterbury	41	11	276	15	13
Gisborne	2	1	6	0	1
Hawkes Bay	12	3	61	3	4
Manawatu Wanganui	20	5	113	6	6
Marlborough	10	3	35	2	1
Nelson	25	7	93	5	1
Northland	11	3	37	2	4
Otago	28	7	209	11	5
Southland	26	7	92	5	2
Taranaki	18	5	65	3	3
Tasman	7	2	38	2	1
Waikato	69	18	188	10	9
Wellington	30	8	342	18	11
West Coast	16	4	64	3	1
n=	376	100	1894	100	100

Hunter SAR Subjects – Incident Location Type

Most Hunter SAR subjects had their incidents in Remote Parks (73%, Table 115 & Figure 64). This was only slightly higher than for Non-Hunters (66%).

Table 115. Hunter SAR Subjects – Incident Area Type (Hunter vs. Non-Hunter Subjects)

	Hunter SAR incidents freq	Hunter SAR Incidents %	Non-Hunter SAR incidents	Non-Hunter SAR Incidents %
Remote Natural Areas/Parks	318	73	1678	66
Rural Natural Areas	77	18	393	15
Rural Town	19	4	61	2
Rural Farmland	8	2	8	0
Urban Areas	8	2	125	5
Urban Fringe	3	1	287	11
n=	433	100	2552	100

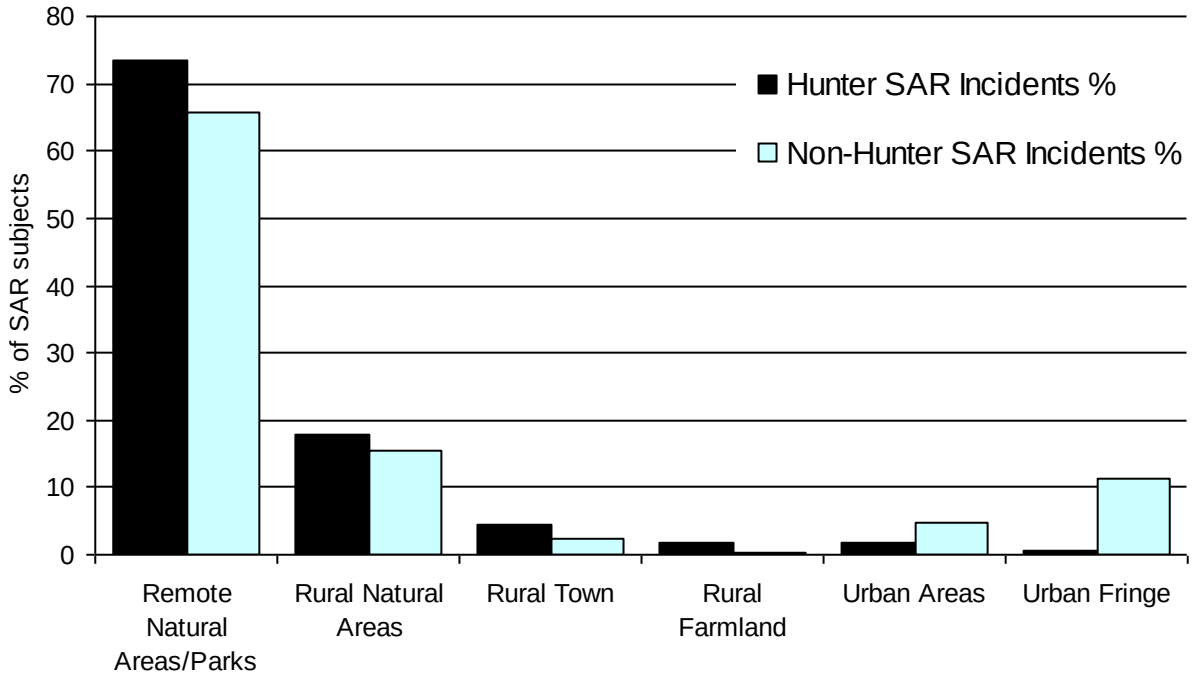


Figure 64. Hunter SAR Subjects – Incident Area Type (Hunter vs. Non-Hunter Subjects)

Hunter SAR Subjects – Home location vs. Incident Location

Overall, most Hunter incidents took place outside of the subjects home region, and the low level of correspondence between incident region % and home region % in Table 116 represents this. Direct comparison of home location vs. incident location for New Zealanders revealed that only 54% of Hunting SAR incidents happened in the Home region of the subject (46% happened in other regions). This can be seen in more detail in Tables 117 and 118. Overall this indicates that Hunter subjects travel between regions for their activity (or perhaps that those Hunters travelling outside of their local region may be more at risk in terms of S&R incidents).

However, incident and home locations do not match up well with New Zealand's population distribution in Table 116 below. Hunter SAR subject incidents appear under-represented in Auckland (4% of incidents vs. 32% of the population) and over-represented in Waikato (18% vs. 9%) and Bay of Plenty (12% vs. 6%) and Southland (7% vs. 2%). This suggest Hunter activity distribution does not represent New Zealand population distribution

Similarly Hunter SAR subject home areas appear to under-represent in Auckland (1% of homes vs. 32% of population) and over-represent in Waikato (23% vs. 9%), Southland (12% vs. 2%) and Marlborough (5% vs. 1%).

Table 116. Home and Incident locations for SAR Hunter subjects (vs. NZ population)

Incident Regions	*Hunter Subjects Incident freq*	Hunter Subjects Incident %	*Hunter Subjects Home freq*	Hunter Subjects Home %	NZ Population %
Auckland	*15*	4	*6*	1	32
BOP	*46*	12	*43*	10	6
Canterbury	*41*	11	*41*	10	13
Gisborne	*2*	1	*2*	0	1
Hawkes Bay	*12*	3	*14*	3	4
Manawatu Wanganui	*20*	5	*25*	6	6
Marlborough	*10*	3	*23*	5	1
Nelson	*25*	7	*3*	1	1
Northland	*11*	3	*4*	1	4
Otago	*28*	7	*15*	3	5
Southland	*26*	7	*50*	12	2
Taranaki	*18*	5	*24*	6	3
Tasman	*7*	2	*26*	6	1
Waikato	*69*	18	*97*	23	9
Wellington	*30*	8	*15*	3	11
West Coast	*16*	4	*42*	10	1
n=	*376*	100	*430*	100	100

Home vs. Incident Location comparison

Table 117. Hunter SAR Subjects – Incident Location vs. Home Regions
(i.e., where did the subjects come from? – Read columns down)

	Incident Region													
Home Region	Auckland Northland	BOP	Canterbury	Hawkes Bay Gisborne	Manawatu Wanganui	Marlborough	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	All
Auckland Northland	100	0	0	7	5	6	0	2	0	0	19	0	4	7
BOP	0	70	0	0	0	0	0	0	0	0	17	0	0	12
Canterbury	0	0	74	0	0	0	31	8	0	0	0	0	25	11
Hawkes Bay Gisborne	0	0	0	50	14	0	0	6	0	0	1	0	0	4
Manawatu Wanganui	0	0	0	29	48	0	0	0	17	0	1	8	0	5
Marlborough	0	0	0	0	0	63	0	0	0	0	0	0	0	3
Otago	0	0	12	0	0	0	54	19	0	0	0	0	25	7
Southland	0	0	12	0	0	0	8	44	0	0	0	0	0	7
Taranaki	0	0	0	0	0	0	0	2	70	0	1	0	0	5
Tasman Nelson	0	0	0	0	0	31	8	0	4	92	0	0	4	9
Waikato	0	30	0	14	5	0	0	13	9	0	48	0	0	18
Wellington	0	0	3	0	29	0	0	2	0	0	12	92	0	8
West Coast	0	0	0	0	0	0	0	4	0	8	0	0	43	4
%	100	100	100	100	100	100	100	100	100	100	100	100	100	100
n=	3	43	34	14	21	16	13	48	23	26	93	12	28	374

Table 118. Hunter SAR Subjects – Home Regions by Incident Locations

(i.e., where did they have their Incidents? – Read rows across)

	Incident Region														
Home Region	Auckland Northland	BOP	Canterbury	Hawkes Bay Gisborne	Manawatu Wanganui	Marlborough	Otago	Southland	Taranaki	Tasman	Waikato	Wellington	West Coast	%	n=
Auckland Northland	12	0	0	4	4	4	0	4	0	0	69	0	4	100	26
BOP	0	65	0	0	0	0	0	0	0	0	35	0	0	100	46
Canterbury	0	0	63	0	0	0	10	10	0	0	0	0	18	100	40
Hawkes Bay Gisborne	0	0	0	50	21	0	0	21	0	0	7	0	0	100	14
Manawatu Wanganui	0	0	0	20	50	0	0	0	20	0	5	5	0	100	20
Marlborough	0	0	0	0	0	100	0	0	0	0	0	0	0	100	10
Otago	0	0	15	0	0	0	26	33	0	0	0	0	26	100	27
Southland	0	0	15	0	0	0	4	81	0	0	0	0	0	100	26
Taranaki	0	0	0	0	0	0	0	6	89	0	6	0	0	100	18
Tasman Nelson	0	0	0	0	0	16	3	0	3	75	0	0	3	100	32
Waikato	0	19	0	3	1	0	0	9	3	0	65	0	0	100	69
Wellington	0	0	3	0	20	0	0	3	0	0	37	37	0	100	30
West Coast	0	0	0	0	0	0	0	13	0	13	0	0	75	100	16
All	1	11	9	4	6	4	3	13	6	7	25	3	7	100	374

5.3.7. Subject Profile – Shore-based Marine

This profile aims to identify characteristic socio-demographic features of SAR subjects who were engaged in shore-based marine fishing, diving and gathering. This was prepared to provide a baseline for population projections of future demand.

Data Source:

Data on SAR subjects who were engaged in Shore-based fishing, diving and gathering were extracted from the P130 database for Land-based SAR incidents. This resulted in a subset of 102 Shore-based subjects. This is a relatively small sub-set so the degree of analysis breakdown is lower than in some other profiles.

Shore-based SAR Subjects – Gender

Shore-based SAR subjects had a highly male dominated gender balance (88% male) which contrasts with that of the NZ population as a whole (49% male - Table 119). The predominance of males in Shore-based subjects is consistent with the balance for the Other Marine Activities (85%).

Table 119. Shore-based SAR subject – Gender

	Shore Fishing-Gathering freq	Shore Fishing-Gathering %	*Other Marine Activities freq*	Other Marine Activities %	All NZ %
Female	*15*	13	*531*	15	51
Male	*105*	88	*3010*	85	49
n=	*120*	100	*3541*	100	100

Shore-based SAR Subjects – Age

Shore-based Fishing-Gathering subjects tended to have higher representation in the 20-29yr age bracket (30%), both in comparison to Other Marine activities (19%) and the NZ population (13%, Table 120).

Table 120. Shore-based marine subject age profiles (10yr) vs. Other Marine activities and NZ population

	Shore Fishing-Gathering freq	Shore Fishing-Gathering %	Other Marine Activities freq	Other Marine Activities %	NZ Population %
0-9	3	3	82	3	14
10-19	11	11	520	17	15
20-29	31	30	580	19	13
30-39	19	19	590	19	14
40-49	14	14	596	19	15
50-59	14	14	399	13	12
60-69	7	7	177	6	8
70+	3	3	62	2	8
n=	102	100	3066	100	

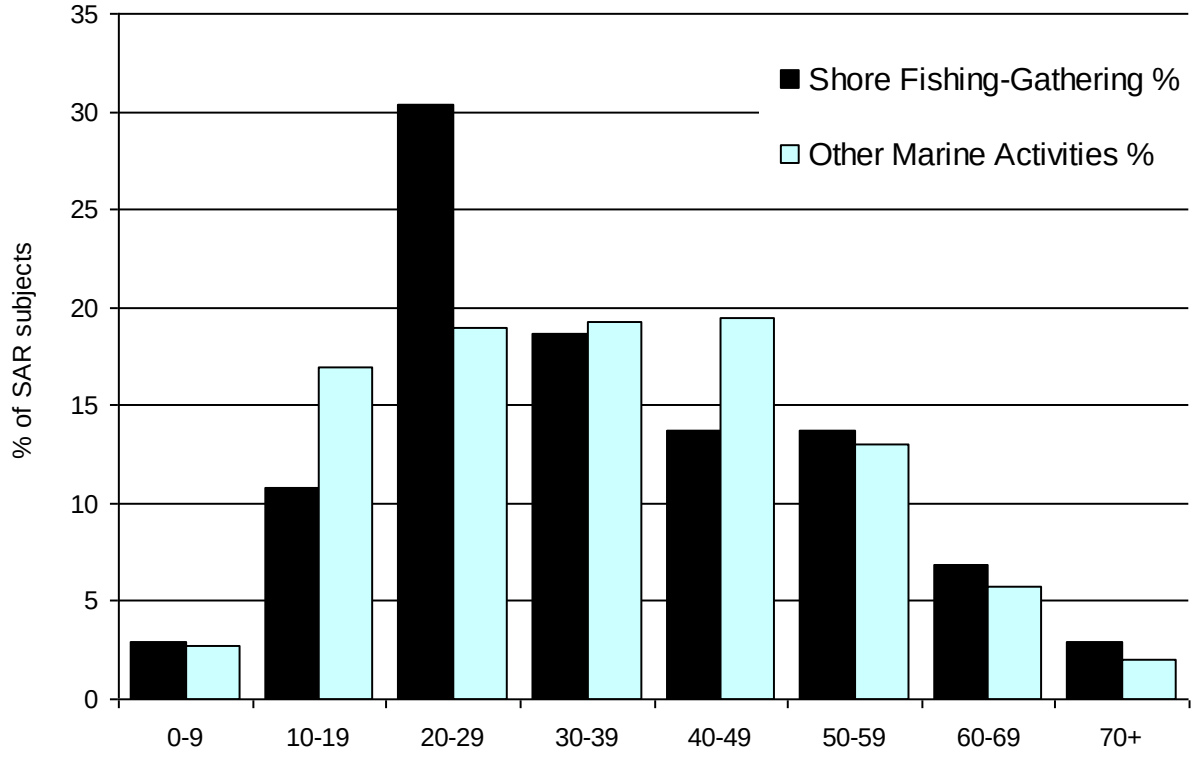


Figure 65. Shore-based marine subject age profiles (10yr) vs. Other Marine activities

Shore-based SAR Subject – Ethnicity

The pattern of ethnicities for Shore-based SAR subjects is notably different from the Other Marine SAR subjects (and the NZ Population). Europeans comprise only 29% of Shore-based subjects, compared with 73% for Other Marine Activities, 71% for the NZ Population and 90% for Land-based SAR subjects (Table 121 & Figure 66). Mäori, Polynesian and Asian Shore-based SAR subjects are all highly over-represented relative to all other profiles.

Table 121. Shore-based SAR Subject - Ethnicity (Shore-based vs. Other Activities, and NZ)

	Shore-Based Activities freq	Shore-Based Activities %	*Other Marine Activities freq*	Other Activities %	NZ Population %
European NZ	*26*	29	*1672*	73	71
Maori	*26*	29	*361*	16	13
Polynesian NZ	*19*	21	*151*	7	6
Asian	*18*	20	*98*	4	8
Other NZ	*0*	0	*7*	0	2
	89	100	*2289*	100	100

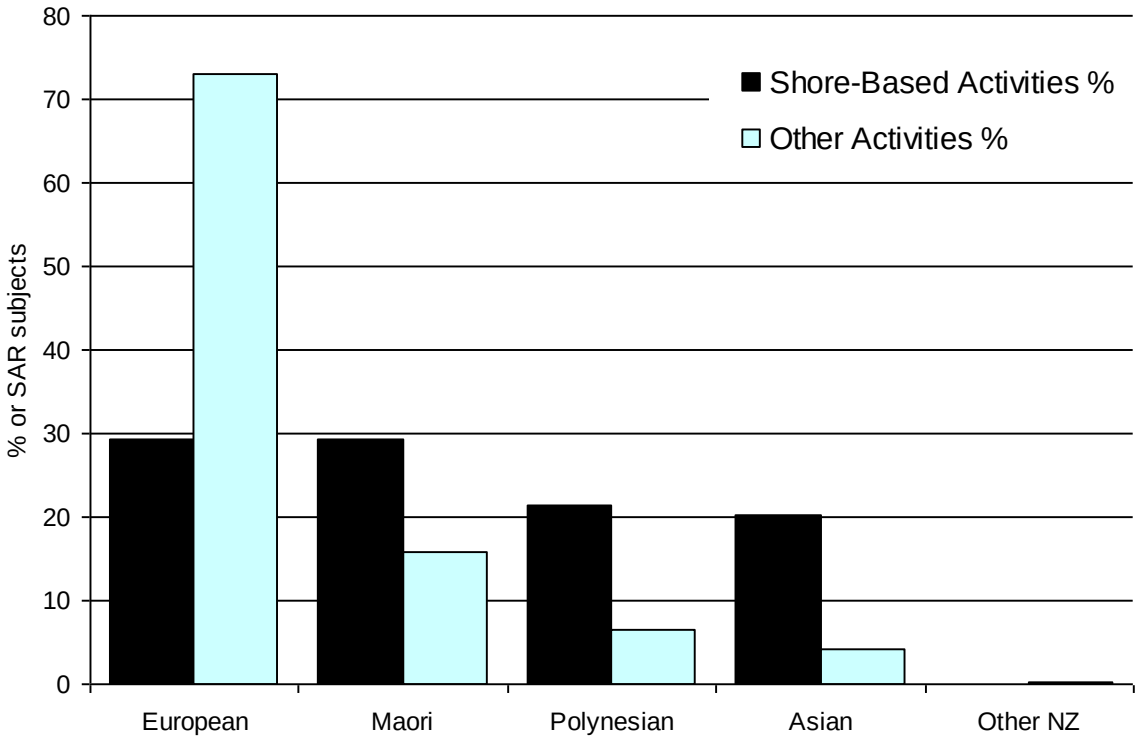


Figure 66. Shore-based SAR Subjects - Ethnicity (Shore-based vs. Other Activities)

Shore-based SAR Subject – NZ vs. Tourist

Marine SAR subjects include very few Tourists overall (6%), and this pattern is consistent for Shore-based subjects (3%, Table 122).

Table 122. Shore-based SAR Subjects – NZ by Tourists (vs. Non-Shore-based Subjects)

	Shore Fishing-Gathering freq	Shore Fishing-Gathering %	*Other Marine Activities freq*	Other Marine Activities %	Land SAR Subjects %
NZ	*102*	97	*2877*	94	78
Tourist	*3*	3	*188*	6	22
n=	*105*	100	*3065*	100	100

Shore-based SAR Subjects – Incident Locations

Shore-based SAR subjects are over-represented in Auckland (40%) relative to its population proportion (32% - Table 123) – this is the only of the profiles completed where Auckland appears over-represented in an incidents type. Other regions show over-representation, such as Wellington (19% vs. 11%) and Northland (8% vs. 4%), whereas Canterbury (7% vs. 13% population) is notably under-represented.

Table 123. Shore-based SAR Incident Locations – Shore-based vs. Other Marine Activities

	Shore Fishing-Gathering freq	Shore Fishing-Gathering %	*Other Marine Activities freq*	Other Marine Activities %	NZ Population %
Auckland	*57*	40	*977*	23	32
BOP	*5*	3	*212*	5	6
Canterbury	*10*	7	*360*	8	13
Gisborne	*2*	1	*26*	1	1
Hawkes Bay	*1*	1	*81*	2	4
Manawatu-Wanganui	*3*	2	*100*	2	6
Marlborough	*5*	3	*99*	2	1
Nelson	*1*	1	*47*	1	1
Northland	*12*	8	*310*	7	4
Otago	*8*	6	*171*	4	5
Southland	*1*	1	*216*	5	2
Taranaki	*1*	1	*102*	2	3
Tasman	*1*	1	*125*	3	1
Waikato	*8*	6	*411*	10	9
Wellington	*27*	19	*957*	23	11
West Coast	*2*	1	*45*	1	1
n=	*144*	100	*4239*	100	100

Shore-based SAR Subjects – Home Locations

The distribution of Home locations for Shore-based SAR subjects closely matches the Incident locations. Comparison of home location vs. incident location revealed that 92% of Shore-based incidents happened in the Home region of the subject. Auckland is the predominant home location of Shore-based subjects (43%, Table 124).

Table 124. Shore-based SAR Home Locations – Shore-based vs. Other Marine Activities

	Shore Fishing-Gathering freq	Shore Fishing-Gathering %	*Other Marine Activities freq*	Other Marine Activities %	NZ Population %
Auckland	39	43	665	24	32
BOP	4	4	117	4	6
Canterbury	6	7	285	10	13
Gisborne	2	2	16	1	1
Hawkes Bay	1	1	75	3	4
Manawatu-Wanganui	2	2	128	5	6
Marlborough	4	4	25	1	1
Nelson	1	1	69	3	1
Northland	3	3	66	2	4
Otago	6	7	107	4	5
Southland	0	0	156	6	2
Taranaki	2	2	70	3	3
Tasman	0	0	37	1	1
Waikato	4	4	204	7	9
Wellington	16	18	678	25	11
West Coast	1	1	24	1	1
n=	91	100	2722	100	100

5.3.8. Subject Profile – Tourists

This profile aims to identify characteristic socio-demographic features of SAR subjects who were overseas Tourists (excluding NZ participants in the same activities). This has been prepared as a baseline profile, and to enable future projections.

Data Source:

SAR Tourist subjects were extracted from the P130 databases for Land and Marine SAR incidents. Differences in the databases meant it was necessary to undertake primary analyses on Land-based and Marine-based Tourist subjects separately, but data were combined where possible for comparisons. This resulted in two subsets of 710 Land Tourist subjects and 157 Marine Tourist subjects. Selected results for both are presented. Note some Tourist vs. Non-Tourist comparisons are also made in the Tramper profile (refer Section 5.3.4), which has the highest proportion of Tourist subjects.

Tourists represented 22% of Land-based SAR subjects but only 5% of Marine SAR incidents (Table 125 & Figure 67). It is also likely that the proportion of Marine SAR subjects is even lower than 5%, as some minor mis-coding of NZ residents as Tourists was apparent. In this study the term Tourists applies to overseas visitors to New Zealand.

Table 125. Tourist SAR Subjects – Land and Marine vs. NZ Subjects

	Marine SAR Subjects freq	Marine SAR Subjects %	*Land SAR Subjects freq*	Land SAR Subjects %
NZ Subjects %	*2979*	95	*2571*	78
Tourist Subjects %	*157*	5	*710*	22
	3136	100	*3281*	100

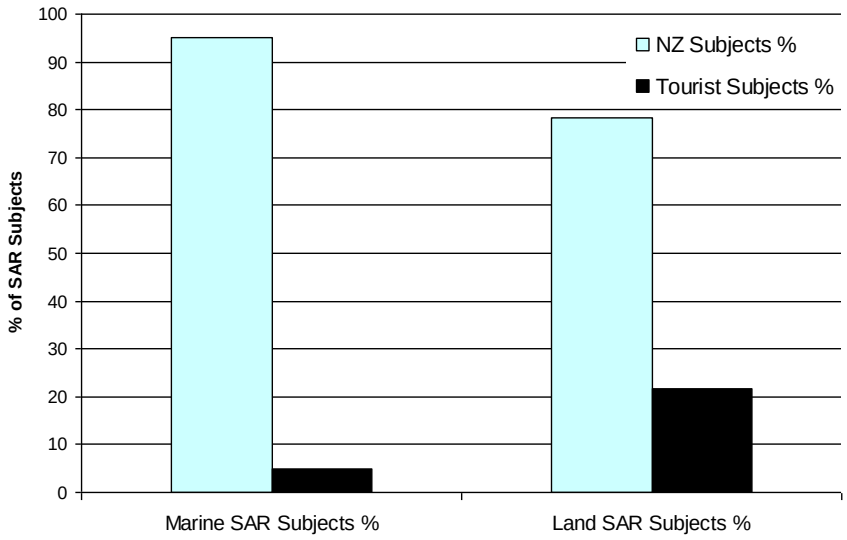


Figure 67. Tourist SAR Subjects – Land and Marine vs. NZ Subjects

Tourist SAR Subjects - Nationality

Tourist Land and Marine SAR subjects – nationalities

Only a few tourism nationalities are highly represented among SAR subjects. For Tourist Land-based SAR subjects the main nationalities (>10%) are North America, Australia, UK, Other Europe and Germany (Table 126 & Figure 68). Also present notably is Israel (8%). For Tourist Marine SAR subjects the main nationalities are much the same, although Israel is much lower. The relative impact of different nationalities can be seen overleaf where they are compared with their respective NZ Tourist arrival levels.

Table 126. Tourist Subjects – nationality

	Land Tourist Subjects freq	Land Tourist Subjects %	*MarineTourist Subjects freq*	Marine Tourist Subjects %
UK	*92*	16	*20*	21
Australia	*97*	17	*19*	20
Other Europe	*74*	13	*16*	17
North America	*104*	18	*13*	14
Germany	*69*	12	*11*	11
South America	*11*	2	*3*	3
Israel	*44*	8	*1*	1
Asia	*40*	7	*1*	1
Other	*32*	6	*12*	13
n=	*563*	100	*96*	100

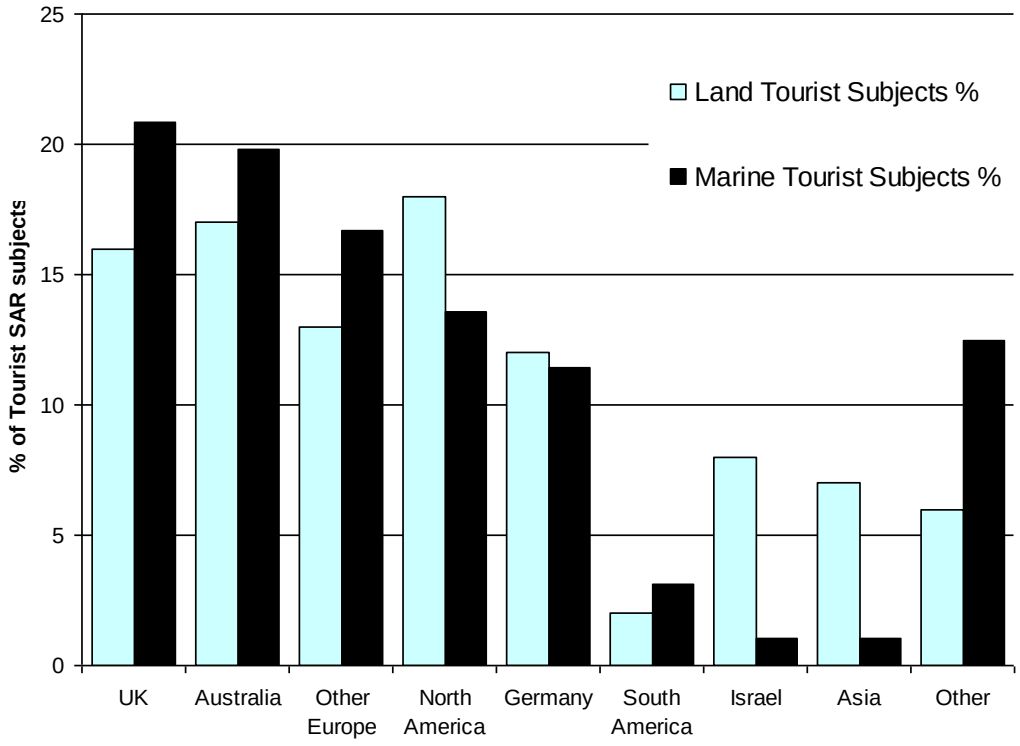


Figure 68. Tourist Subjects – nationality

Tourist Land and Marine SAR subjects – Nationalities vs. NZ Tourist arrivals

National Tourist arrival nationalities were summarised from Statistics NZ data. The figures represent those Tourists arriving in NZ for holiday purposes (excluding visits for business or for Visiting Friends and Relations) to the year ending June 2009.

In some cases the arrival nationalities are much higher that the relative Tourist SAR nationalities, showing under-representation in SAR Tourist levels. For example, Australian visitors comprised 35% of NZ visitors but only 17% of Land-based SAR subjects and 20% of Marine SAR subjects (Table 127 & Figure 69). The other main under-represented group are Asian visitors (22% All visitors, 7% Land-based SAR subjects, and 12% Marine SAR subjects).

By contrast German (4% arrivals, but 12% Land-based SAR subjects and 11% Marine), Israel (1% All, 8% Land & 1% Marine) and Other Europe visitors (9% All, 13% Land & 17% Marine) are all relatively over-represented in SAR subjects (Israel notably only for Land-based SAR). These patterns are noted here as they have implications in terms of the potential impact from future growth of certain offshore markets.

Table 127. SAR Tourist Nationalities vs. NZ Tourist Arrival Nationalities (2009)

	Land Tourist Subjects %	Marine Tourist Subjects %	All NZ Tourists 2009
UK	16	21	11
Australia	17	20	35
Other Europe	13	17	9
North America	18	14	13
Germany	12	11	4
South America	2	3	1
Israel	8	1	1
Asia	7	1	22
Other	6	13	5
n=	100	100	100

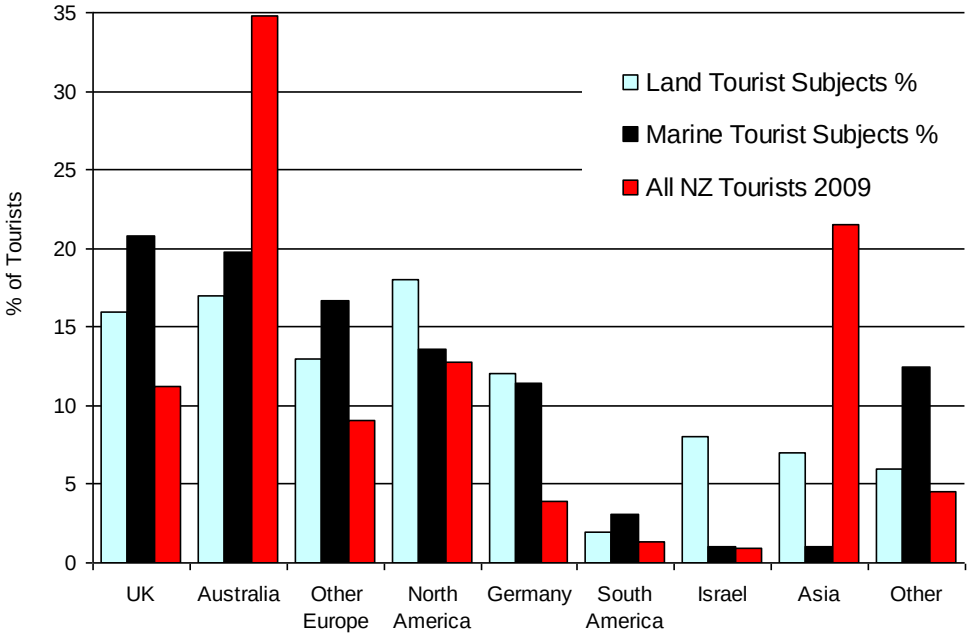


Figure 69. SAR Tourist Nationalities vs. NZ Tourist Arrival Nationalities (2009)

Tourist Land-based SAR Subjects – Gender

Tourists Land-based SAR subjects were more gender balanced (59M:41F) than NZ Land-based SAR subjects (71:28 - Table 128 & Figure 70). They were also more gender balanced that Tourist Marine SAR subjects (76:34) as shown overleaf (Table 129 & Figure 71).

Table 128. Tourist Land-based SAR subject – Gender

	Male	Female	n=
Tourist Subjects	59	41	710
NZ Subjects	71	28	2571
All Subjects	69	31	3281

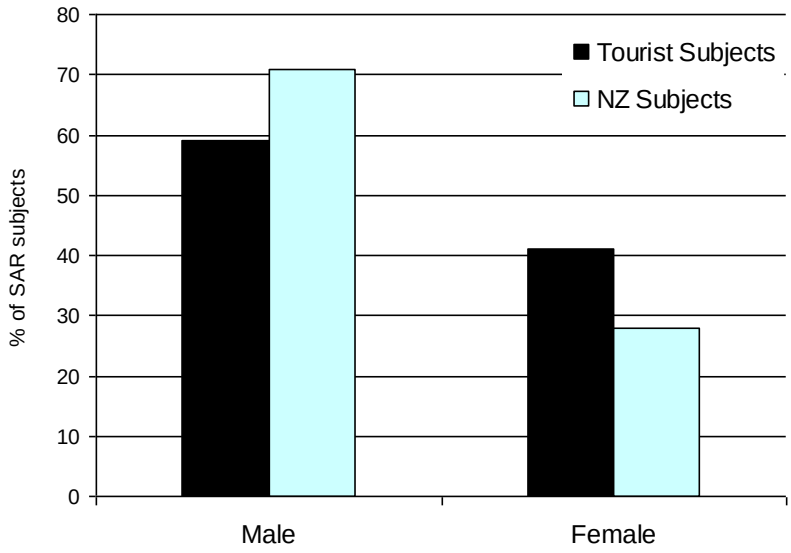


Figure 70. Tourist Land-based SAR Subject – Gender

Tourist Marine SAR Subjects – Gender

Tourists Marine SAR subjects were much less gender balanced than Tourist Land-based SAR subjects – Marine is 76M:34F (Table 129 & Figure 71) vs. Land at 59:41 (Table 128). The NZ subjects' male bias is much stronger in Marine SAR incidents than Land-based SAR incidents - 86% NZ in Marine (Table 129) vs. 71% NZ in Land (Table 128).

Table 129. Tourist Marine SAR subject – Gender

	Male	Female	n=
Tourist Subjects	76	34	710
NZ Subjects	86	14	2571
All Subjects	85	15	3281

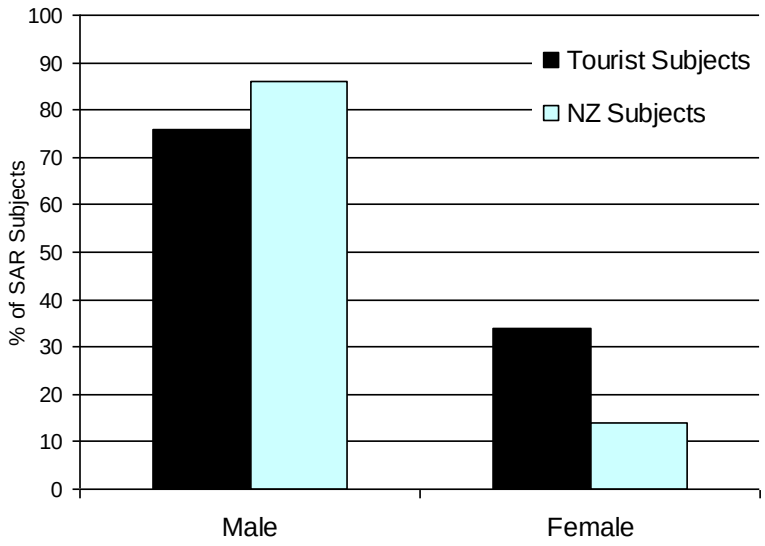


Figure 71. Tourist Marine SAR subject – Gender

Tourist SAR Subjects - Gender by Age group (10yr)

The gender balance for Tourist SAR subjects (approximately 60M:40F overall) is similar to that for the Tramper profile (refer Section 5.3.4) and overall for Land-based SAR subjects (refer Section 5.2.2). There appears to be a slight increase in the proportion of male subjects from 40-70 then a large switch to female subjects in the 70+ group (Table 130 & Figure 72).

Table 130. Tourist SAR Subject Gender by Age group (10yr)

	Male %	Female %	n=
Under 10	51	49	53
20-29	58	42	278
30-39	55	45	97
40-49	67	33	48
50-59	62	38	71
60-69	68	32	63
70+	43	57	14
All ages	59	41	624

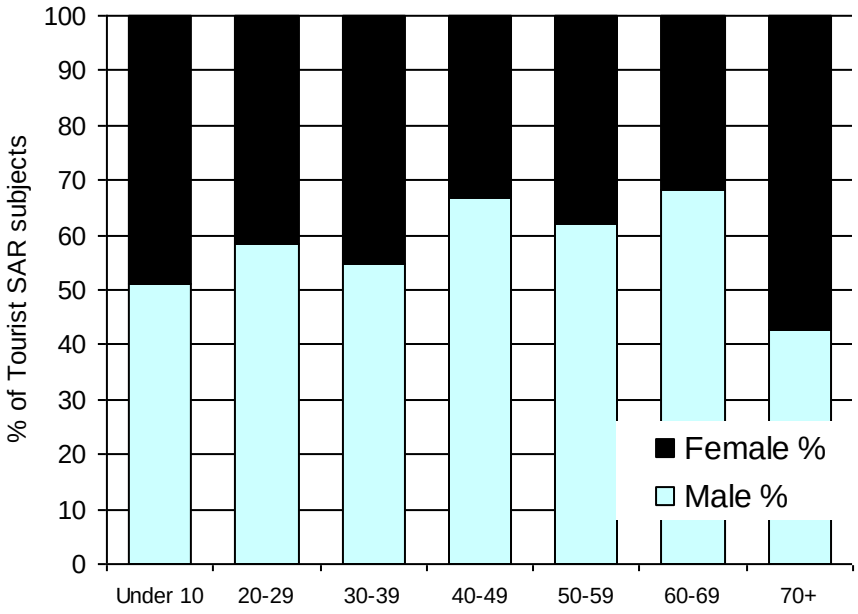


Figure 72. Tourist SAR Subject Gender by Age group (10yr)

Tourist Subjects – Age

AGE 4 Way (for projections)

The 4-way age profile shows a notable peak in the 15-39 age bracket, where Tourist SAR subjects (66%) are over-represented relative to NZ SAR subjects (45%), and under-represented in both older and younger age-groups (Table 131 & Figure 73).

Table 131. Tourist Subjects – Age (4 way)

	Tourist Subjects freq	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %	NZ Population %
0-14	16	3	*255*	10	14
15-39	412	66	*1095*	45	15
40-64	160	26	*789*	32	13
65+	36	6	*314*	13	14
n=	624	100	*2453*	100	100

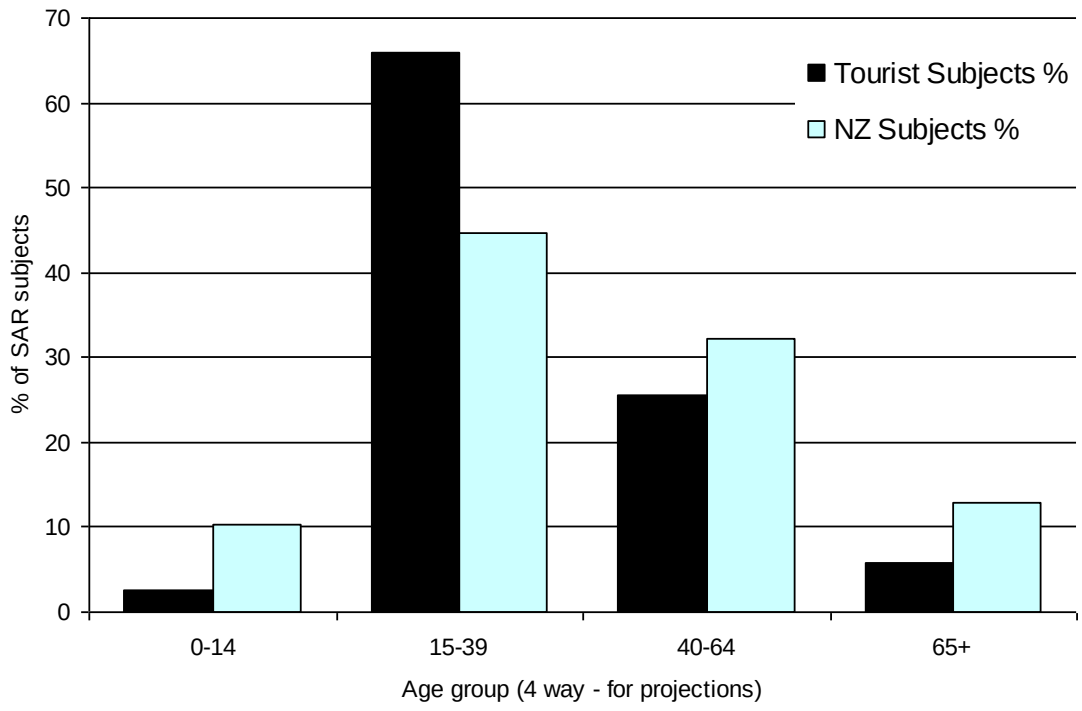


Figure 73. Tourist Subjects – Age (4 way)

AGE Groups – 5 year

The main differences between Tourist and NZ subjects 5-year age profile are in the 15-19yr (22%) and 20-24yr (25%) brackets where Tourists are twice over-represented in these categories (NZ: 10%, 9% - Table 132 & Figure 74).

Table 132. Tourist SAR Subjects – Age group (5yr) vs. NZ Subjects

	Tourist Subjects freq	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %	NZ Population %
0-4	1	0	44	2	7
5-9	10	2	134	5	7
10-14	37	6	244	10	8
15-19	136	22	249	10	7
20-24	142	23	220	9	7
25-29	56	9	186	8	6
30-34	41	7	196	8	7
35-39	21	3	180	7	7
40-44	27	4	198	8	8
45-49	38	6	184	8	7
50-54	33	5	125	5	6
55-59	5	1	77	3	6
60-64	41	7	102	4	4
65-69	22	4	74	3	4
70-74	11	2	77	3	3
75-79	2	0	59	2	3
80 +	1	0	107	4	3
n=	624	100	2456	101	100

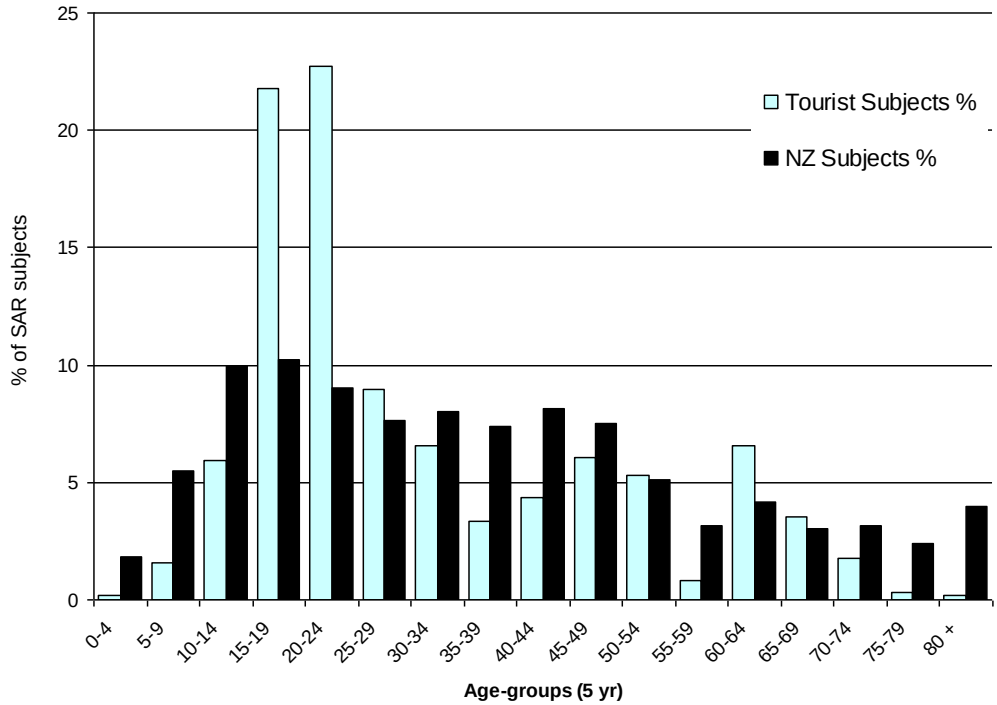


Figure 74. Tourist SAR Subjects – Age group (5yr) vs. NZ Subjects

AGE Groups – 10 year

Tourist Subjects were highly over-represented in the 20-29yr age-group (45%) in comparison with NZ Subjects (19%) and relatively less represented in the under-20 (9% vs. 20%) and the over-40 age group (31% vs. 46% - Table 133 & Figure 75).

Table 133. Tourist SAR Subject Age-groups (10yr) – vs. Land-based SAR subjects and NZ Pop

	Tourist Subjects freq	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %	NZ Population %
Under 10	*6*	1	*121*	5	14
10-19	*47*	8	*378*	15	15
20 - 29	*278*	45	*469*	19	13
30 - 39	*97*	16	*382*	16	14
40 - 49	*48*	8	*378*	15	15
50 - 59	*71*	11	*309*	13	12
60 - 69	*63*	10	*176*	7	8
70+	*14*	2	*240*	11	8
n=	*624*	100	*2213*	100	100

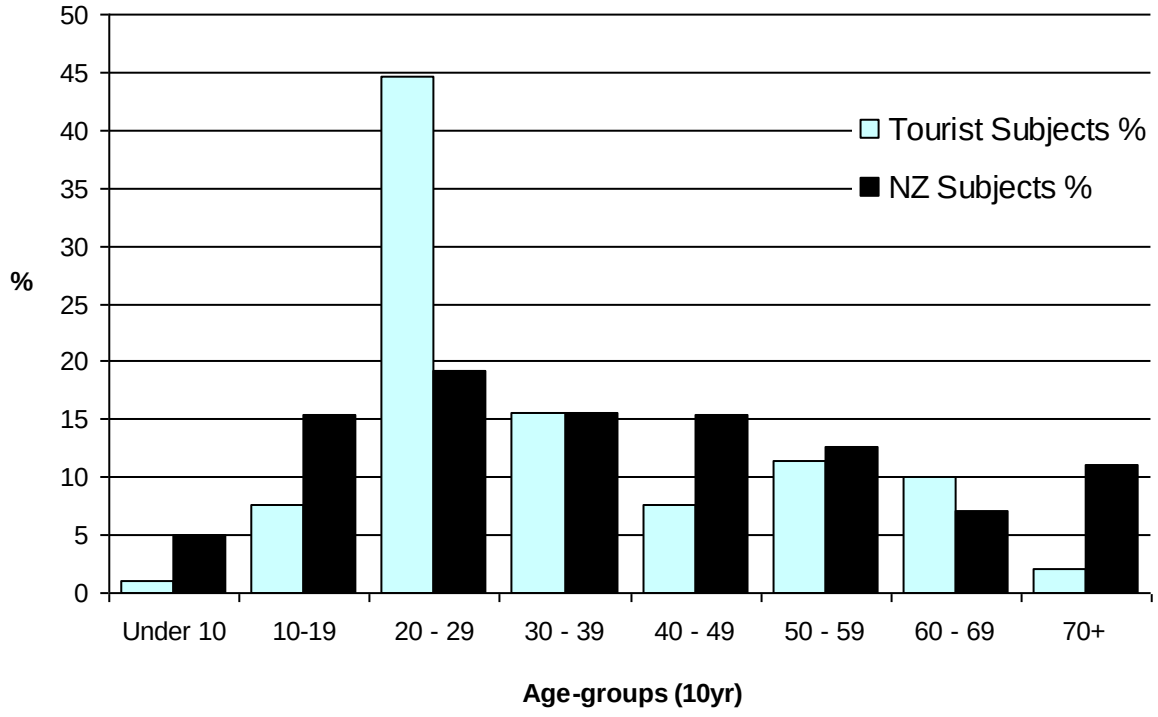


Figure 75. Tourist SAR Subject Age-groups (10yr) – vs. Land-based SAR subjects

Tourist SAR Subjects – Incident Types

Incident type

Virtually all Tourist subject incidents (97%) were recreation based. Comparatively fewer NZ subject incidents were recreation based (73%, Table 134 & Figure 76).

Table 134. Tourist SAR Subjects - SAR Incident type

	Tourist Subjects freq	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %
Recreation Incidents	*672*	97	*1837*	73
Non-Recreation Incidents	*19*	3	*662*	27
n=	*691*	100	*2499*	100

Figure 76. Tourist SAR Subjects - SAR Incident type

Recreation Activity types

Tourist recreation incidents are most focussed around Tramping (58%), followed by Walking (21%) and Climbing (7%, Table 135 & Figure 77). These activities are the main areas of risk for Tourist related SAR (which present quite defined areas of focus for prevention initiatives). This is a simpler pattern than for NZ subjects, for whom Tramping incidents are highest, but at a much lower level (36%), with 'Other' activities are next (22%), then walking (15%) and Hunting Deer (10%).

Table 135. Tourist SAR Subjects – Top 10 Recreation Activity types (vs. NZ subjects)

	Tourist Subjects freq	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %
Tramping	388	58	681	36
Walking	143	21	287	15
Climbing	48	7	85	4
Mountain Biking	14	2	73	4
Fishing	12	2	56	3
Rafting	12	2	26	1
SkiingBoarding	10	1	17	1
Hunting Deer	6	1	199	10
Kayaking	6	1	56	3
Flying activities	6	1	7	0
Other	27	4	410	22
n=	672	100	1897	100

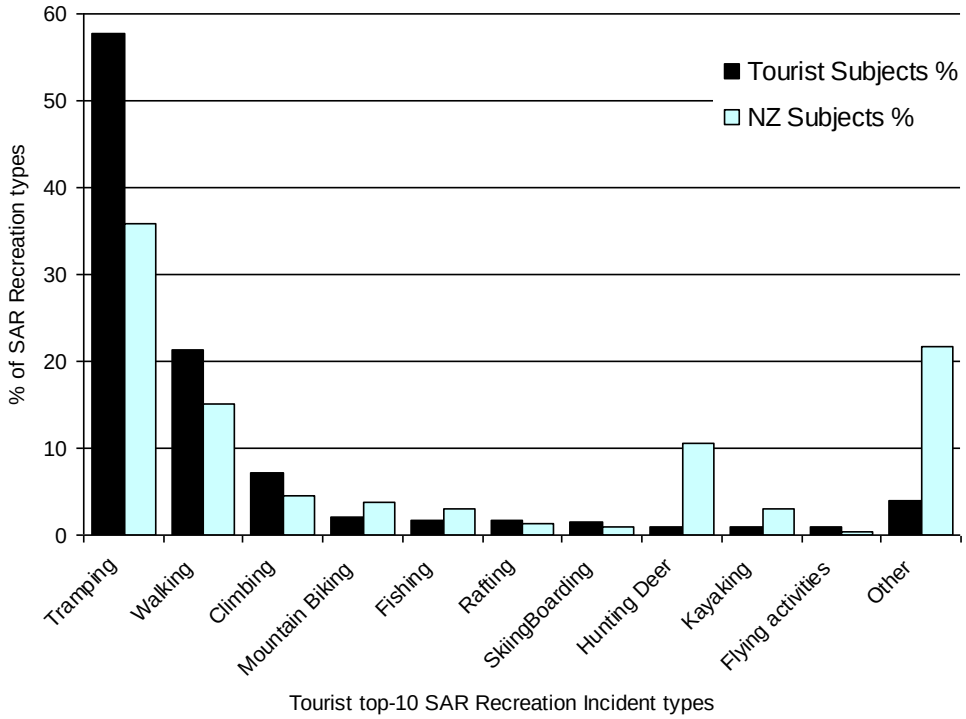


Figure 77. Tourist SAR Subjects – Top 10 Recreation Activity types (vs. NZ Subjects)

Relative SAR incident proportions in Activities

Tourist SAR subjects are most highly represented in Skiing/Snow-boarding incidents (37% of these types of incidents relate to Tourist subjects), followed by Tramping and Climbing (36% each), Walking (33%) and Fishing (18%, Table 136 & Figure 78). NZ SAR subjects had higher proportions overall in all activities, but most extremely so in a wide range of 'Other' activities compared with Tourist subjects (94% vs. 6%)

Table 136. Tourist SAR Subjects – Top 10 Activity proportions (vs. NZ subjects)
(Nb. read rows across)

	Tourist Subjects freq	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %	n=
SkiingBoarding	*10*	37	*17*	63	27
Tramping	*388*	36	*681*	64	1069
Climbing	*48*	36	*85*	64	133
Walking	*143*	33	*287*	67	430
Rafting	*12*	32	*26*	68	38
Fishing	*12*	18	*56*	82	68
MountainBiking	*14*	16	*73*	84	87
ExtremeSports	*3*	14	*19*	86	22
4WD	*5*	12	*38*	88	43
Kayaking	*6*	10	*56*	90	62
Other Activites	*28*	6	*450*	94	478

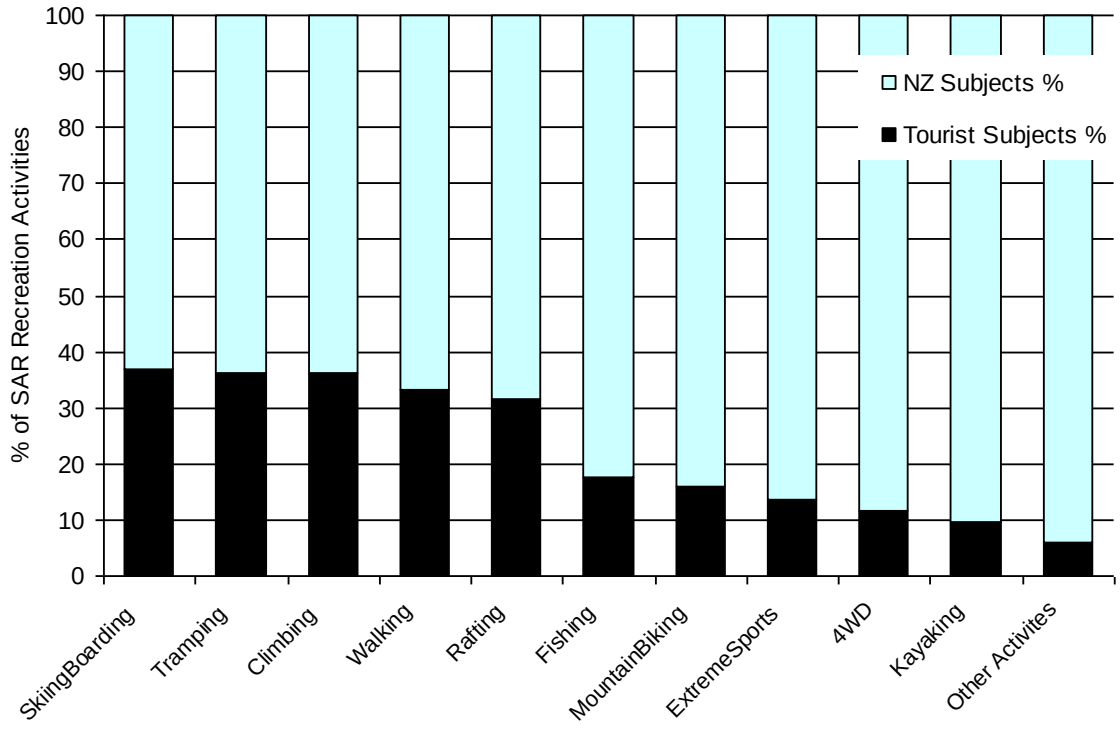


Figure 78. Tourist SAR Subjects – Top 10 Activity proportions (vs. NZ subjects)

Tourist Land-based SAR Subjects – Incident locations (across different regions)

Tourist Land-based SAR subjects had most of their incidents in Otago (20%) and Southland (18%); Canterbury (13%) and West Coast (12%) also feature strongly (Table 137 & Figure 79). NZ subjects had a wider spread of incidents locations and at different levels – Wellington (13% NZ vs. 2% Tourist) and Auckland (6% NZ vs. 1% Tourist) are notable contrasts to the Tourist profile.

Table 137. Tourist Land-based SAR Subjects – Incident Locations (vs. NZ Subjects)

Incident Region	*Tourist Subjects freq*	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %
Otago	*139*	20	*222*	9
Southland	*122*	18	*194*	8
WestCoast	*91*	13	*158*	6
Canterbury	*85*	12	*249*	10
Waikato	*63*	9	*307*	12
Tasman	*52*	7	*157*	6
Taranaki	*37*	5	*108*	4
ManawatuWanganui	*36*	5	*218*	9
Marlborough	*18*	3	*104*	4
Wellington	*17*	2	*342*	13
BOP	*13*	2	*178*	7
Auckland	*10*	1	*153*	6
Northland	*6*	1	*46*	2
Nelson	*5*	1	*29*	1
HawkesBay	*2*	0	*64*	3
Gisborne	*1*	0	*20*	1
n=	*697*	100	*2549*	100

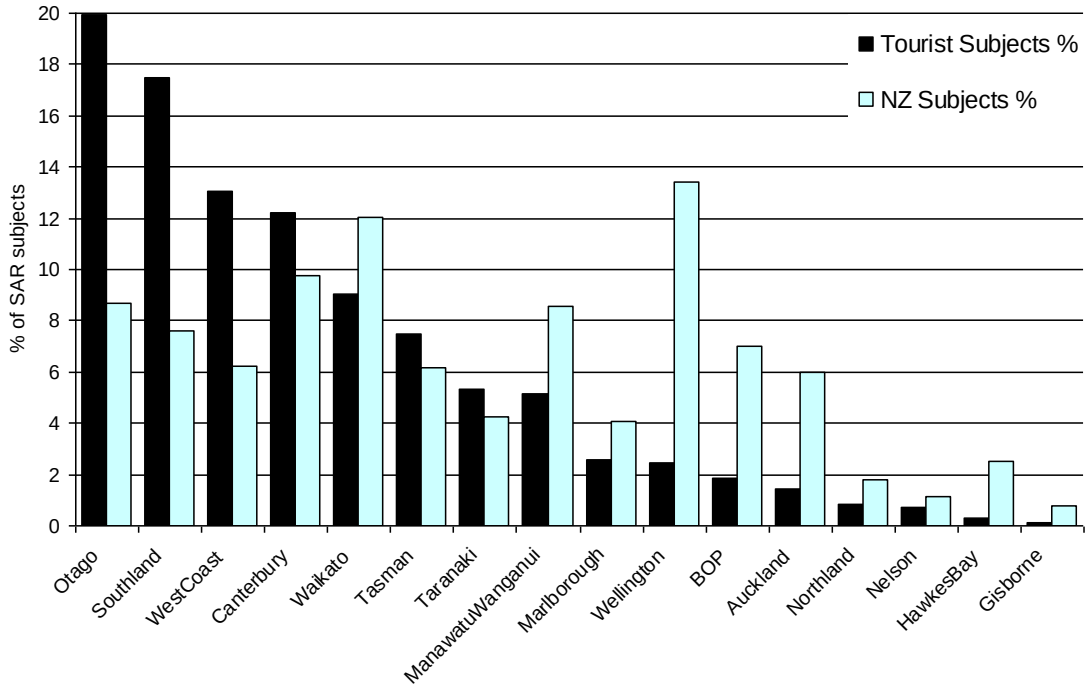


Figure 79. Tourist Land-based SAR Subjects – Incident Locations (vs. NZ Subjects)

Tourist Land-based SAR Subjects – Proportion of incidents within regions

Tourist Land-based SAR subjects comprised highest proportions of all SAR subjects in Otago (39%), Southland (39%) and West Coast (37%), and the lowest proportions in Bay of Plenty, Auckland, Wellington, Gisborne and Hawke's Bay (Table 138 & Figure 80).

Table 138. Tourist Land-based SAR Subjects – Proportion of Incidents per region (vs. NZ Subjects)

Incident Region	*Tourist Subjects freq*	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %	n=
Southland	*122*	39	*194*	61	316
Otago	*139*	39	*222*	61	361
WestCoast	*91*	37	*158*	63	249
Taranaki	*37*	26	*108*	74	145
Canterbury	*85*	25	*249*	75	334
Tasman	*52*	25	*157*	75	209
ALL NZ REGIONS	*697*	21	*2549*	79	3246
Waikato	*63*	17	*307*	83	370
Marlborough	*18*	15	*104*	85	122
Nelson	*5*	15	*29*	85	34
ManawatuWanganui	*36*	14	*218*	86	254
Northland	*6*	12	*46*	88	52
BOP	*13*	7	*178*	93	191
Auckland	*10*	6	*153*	94	163
Gisborne	*1*	5	*20*	95	21
Wellington	*17*	5	*342*	95	359
HawkesBay	*2*	3	*64*	97	66

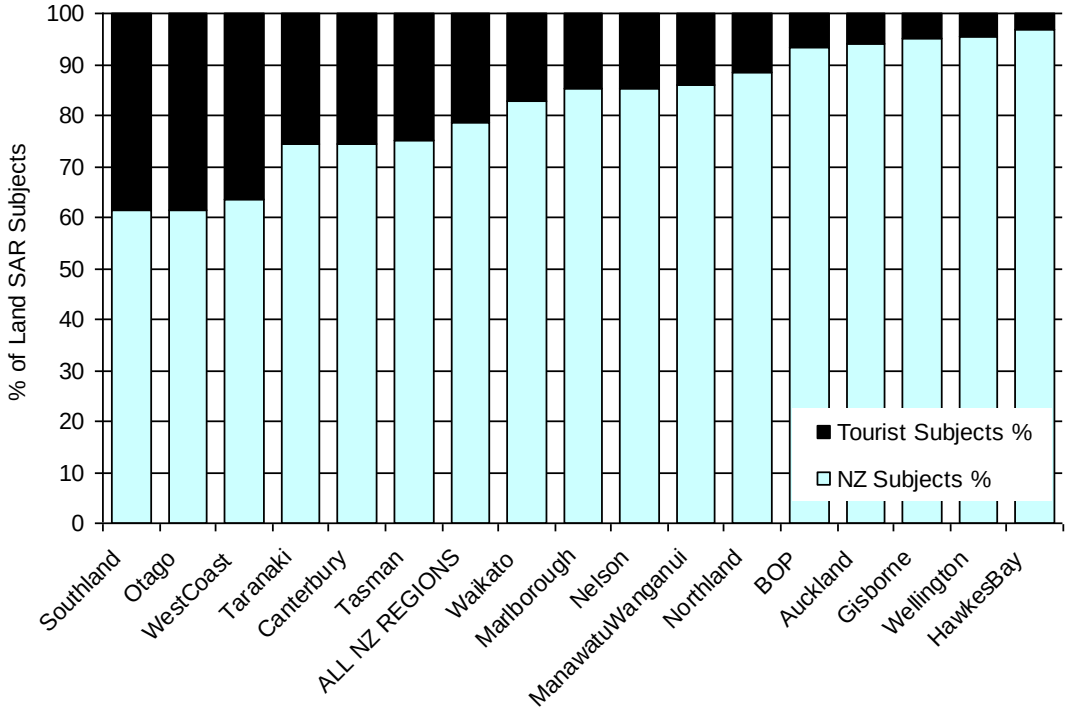


Figure 80. Tourist Land-based SAR Subjects – Proportion of Incidents per region (vs. NZ Subjects)

Tourist Marine SAR Subjects – Incident locations (across different regions)

Tourist Marine SAR subjects tend to have most of their incidents in Otago (16%), Auckland (11%) and Bay of Plenty (10%, Table 139 & Figure 81). NZ subjects have a wider spread of incident locations and at different levels – predominantly in Wellington (27%) and Auckland (25%) regions.

Table 139. Tourist Marine SAR Subjects – Incident Locations (vs. NZ Subjects)

	Tourist Subjects freq	Tourist Subjects %	NZ Subjects freq	NZ Subjects %
Otago	31	16	97	4
Auckland	21	11	682	25
BOP	19	10	124	5
Canterbury	18	9	263	10
Waikato	17	9	324	12
Wellington	14	7	737	27
Southland	13	7	186	7
Tasman	12	6	77	3
Marlborough	10	5	71	3
Manawatu-Wanganui	10	5	82	3
West Coast	7	4	26	1
Nelson	7	4	27	1
Northland	7	4	121	4
Taranaki	4	2	69	3
Hawkes Bay	1	1	59	2
Gisborne	0	0	22	1
n=	191	100	2697	100

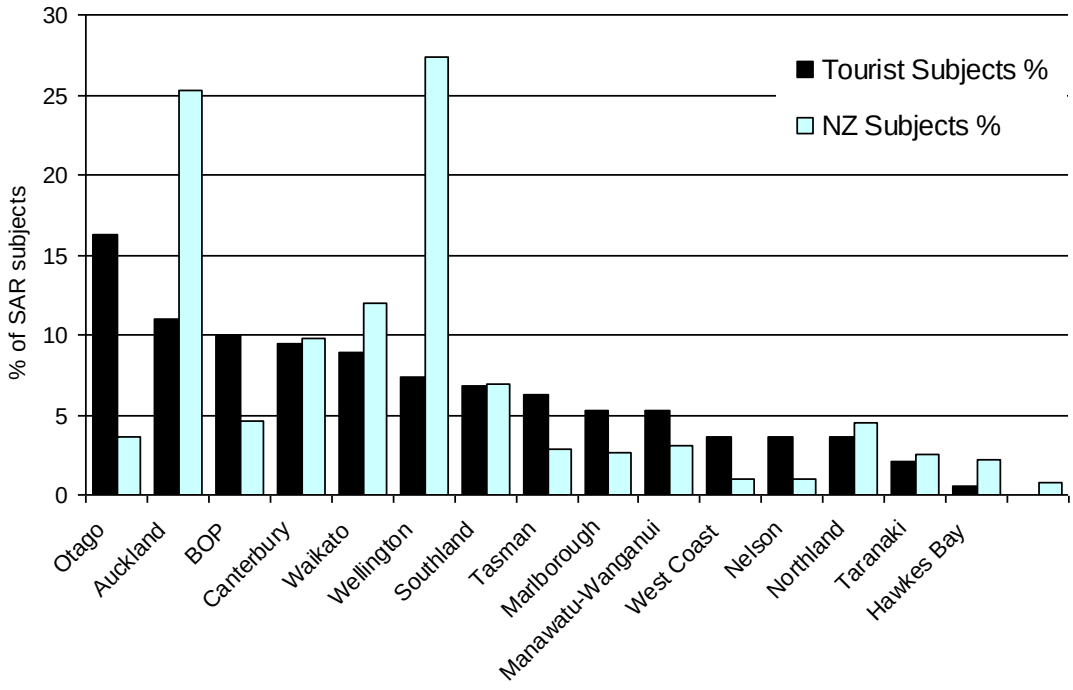


Figure 81. Tourist Marine SAR Subjects – Incident Locations (vs. NZ Subjects)

Tourist Marine SAR Subjects – Proportion of incidents within regions

Tourist Marine SAR subjects comprised the highest proportions of all SAR subjects in Otago (24%), West Coast and Nelson (21%), Tasman and Bay of Plenty (13% each, Table 140 & Figure 82).

Table 140. Tourist Marine SAR Subjects – Regional incident proportions (vs. NZ Subjects)

	Tourist Subjects freq	Tourist Subjects %	NZ Subjects freq	NZ Subjects %	n=
Otago	31	24	97	76	128
West Coast	7	21	26	79	33
Nelson	7	21	27	79	34
Tasman	12	13	77	87	89
BOP	19	13	124	87	143
Marlborough	10	12	71	88	81
Manawatu-Wanganui	10	11	82	89	92
Southland	13	7	186	93	199
Canterbury	18	6	263	94	281
ALL NZ REGIONS	191	6	2697	94	3157
Taranaki	4	5	69	95	73
Northland	7	5	121	95	128
Waikato	17	5	324	95	341
Auckland	21	3	682	97	703
Wellington	14	2	737	98	750
Hawkes Bay	1	2	59	98	60
Gisborne	0	0	22	100	22

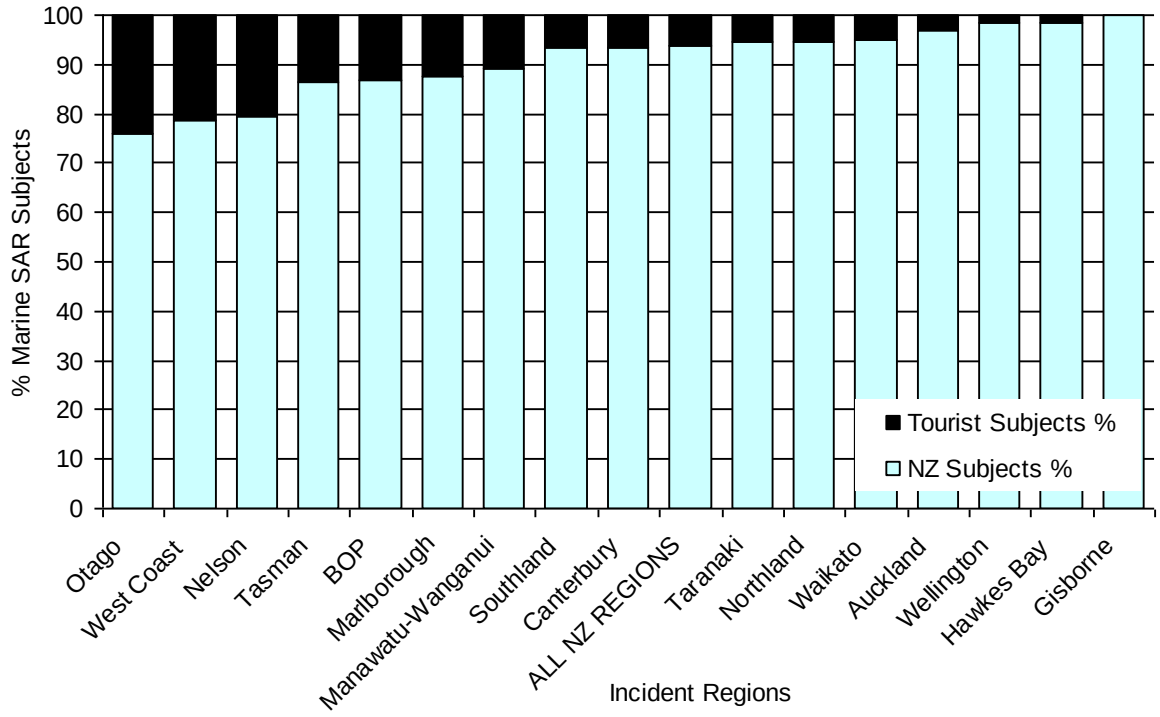


Figure 82. Tourist Marine SAR Subjects – Regional incident proportions (vs. NZ Subjects)

Tourist Land-based SAR Subjects – Incident Location Type

Tourist subjects incident locations tend to focus strongly on Remote Natural Areas/Parks (78% - Table 141 & Figure 83). The predominance of this area reflects the recreation orientation of Tourist Land-based SAR subject activity. There appears to be few Tourist Land-based SAR issues in any other landscape type (e.g. Rural Natural, Urban Fringe). There may be implications here in terms of SAR response capabilities and resourcing for Tourist based incidents (as incidents in remote locations may be more resource intensive).

Table 141. Tourist Land-based SAR Subjects – Incident Area Type

	Tourist Subjects freq	Tourist Subjects %	*NZ Subjects freq*	NZ Subjects %
Remote Natural Areas/Parks	*557*	78	*1318*	51
Urban Fringe	*64*	9	*244*	10
Rural Natural Areas	*63*	9	*442*	17
Urban Areas	*14*	2	*402*	16
Rural Town	*11*	2	*133*	5
Rural Farmland	*1*	0	*25*	1
n=	*710*	100	*2564*	100

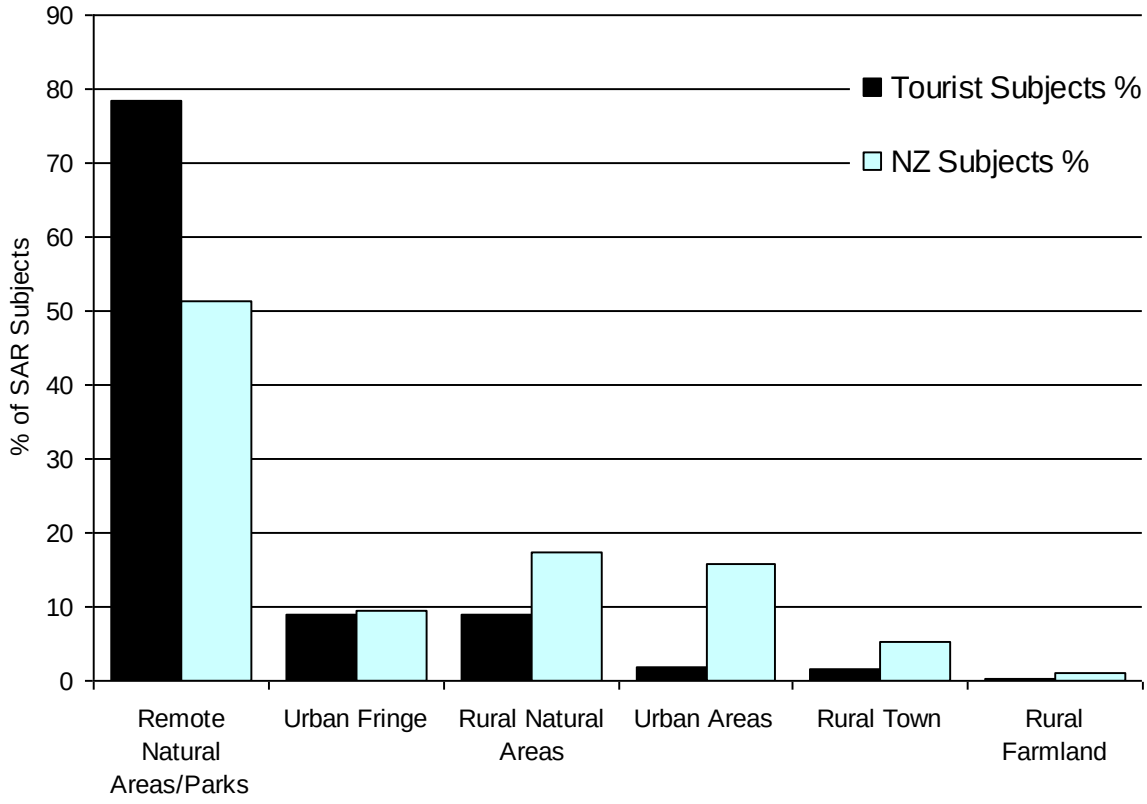


Figure 83. Tourist SAR Land Subjects – Incident Area Type

6. Projection sources

6.1. NZ population projections

6.1.1. Regional age profile

Regions within the Western and Northern parts of the South Island are expected to have consistently higher median ages than the rest of the country (Figure 84), well above the national median (35.8 years in 2006, and 40.2 in 2031).

In contrast, Auckland, Wellington and Waikato regions are the only regions projected to median ages at or less than the national median (for 2031).

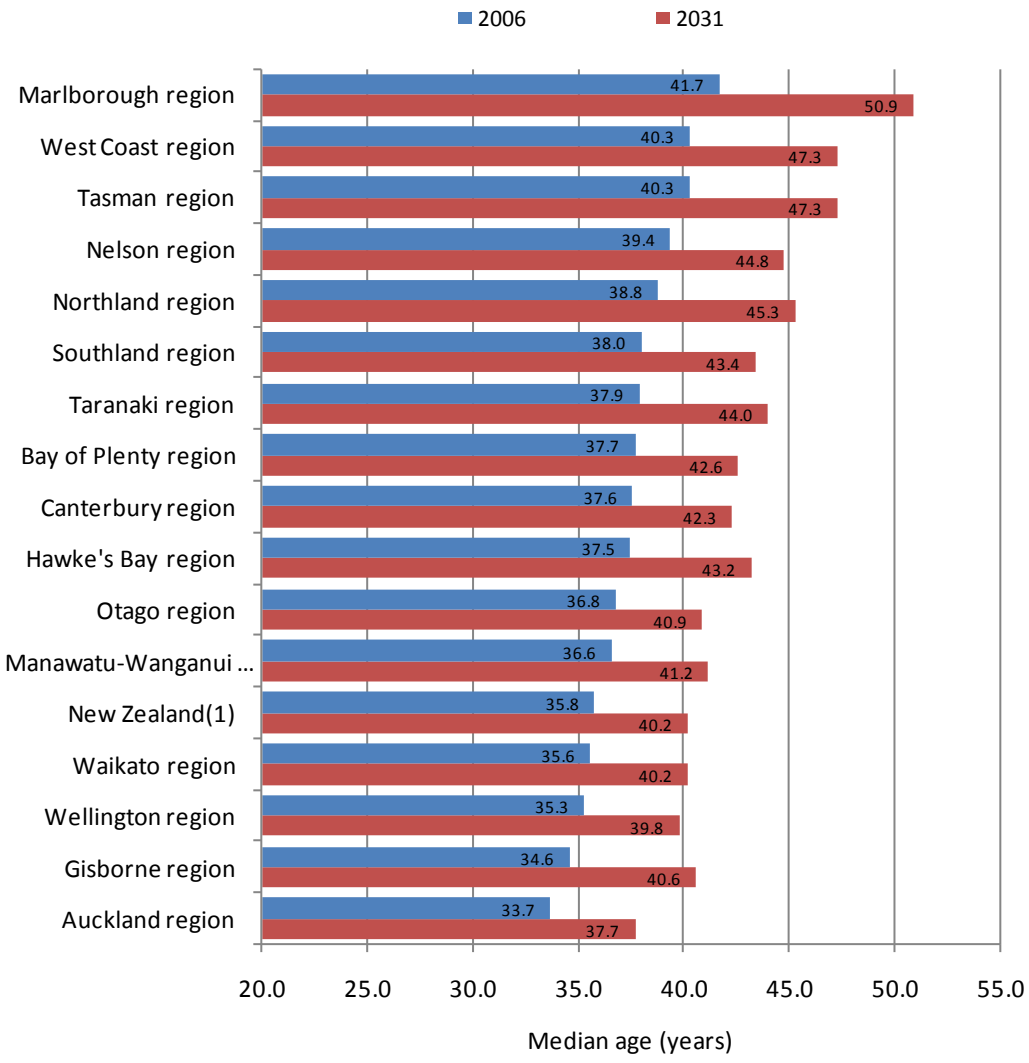


Figure 84. Median age projection – by region (2006-2031)

Age and dependency ratios

Projections forward to 2031 are for an increasingly aged population. The median age for New Zealand was 35.9 in 2006, and this is projected to reach 40.2 in 2031.

Demographic dependency ratios relate the number of people in dependent age groups (such as 0-14 years and 65 years and over) to the working age population (15-64 years; Khawaja and Dunstan, 2000). Although there are some limitations to how dependency ratios should be used (because they do not recognise that some people aged 15-64 years may not be in the workforce and that some people aged 65 years and over may still be in the workforce, ibid), they are a useful means of examining macro-level demographic changes over a medium to long term.

The young dependency ratios (i.e., the ratio of 0-14 year olds to 15-64 year olds) for New Zealand (and within regions) are not expected to change dramatically during the next twenty years. They are projected to decrease nationally overall by 2% from 32% in 2006 to 30% in 2010. However, the aged dependency ratio (i.e., ratio of those aged 65+ years to 15-64 year olds) is expected to change markedly over that same period. The aged dependency ratio is expected to almost double in size, from 18% in 2006 to 34% in 2031 (Figure 85). This is the main factor influencing the increase in total dependency ratio from 50% to 64% over the same period (Figure 86).

The aged dependency ratio nationally is expected to continue to increase to 43 per 100 in 2040 (Figure 87) after which its continued increase will slow to reach a level of 47 per 100 in the early 2060's, and then remain steady (ibid).

The implications from the increased aged dependency ratio can be far-reaching. As Khawaja and Dunstan, (2000) point out:

> 'The 65+ group will not only grow substantially in size, but it will also get older, mainly as a result of the ageing of the baby boomers and further improvements in longevity group will surge from 45,000 in 1999 to 293,000 in 2051, and thereafter hover around that level. The number of centenarians is projected to climb from 300 in 1999 to 12,000 in 2051 and 18,000 by 2101. These changes have direct implications for health expenditure because of the significant rise of disability with age, and the increased need for health treatment and social services.' (pp. 9-10)

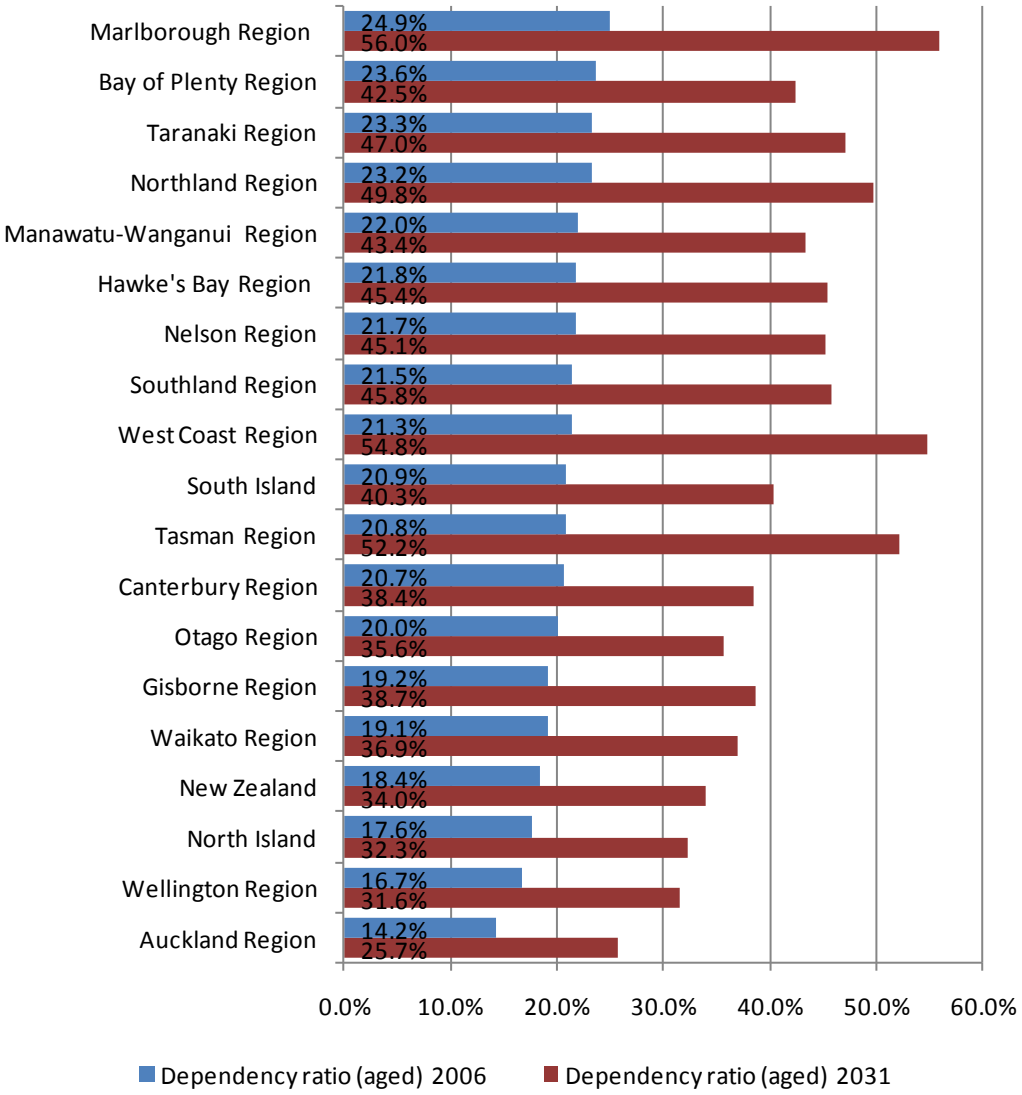


Figure 85. Dependency ratio (aged) by region (2006 census data and 2031 projection based on updated 2010 data)

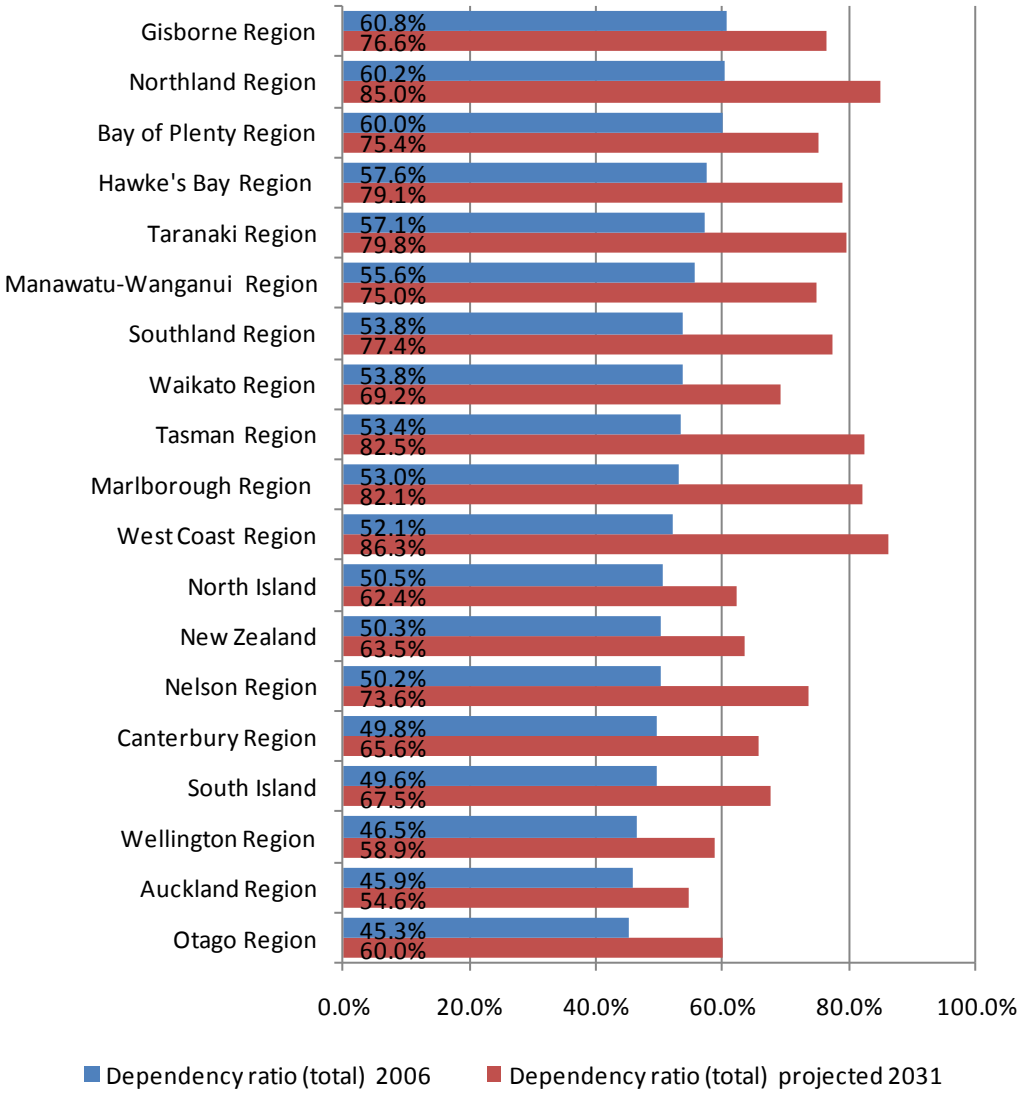


Figure 86. Dependency ratio (total) by region (2006 census data and 2031 projection based on updated 2010 data)

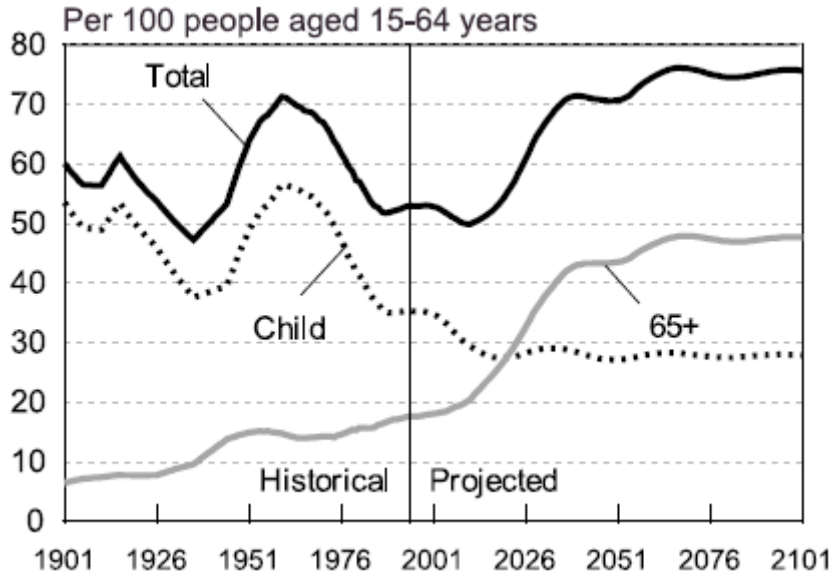


Figure 87. Demographic dependency ratios 1901-2101 for New Zealand (source from Khawaja and Dunstan, 2000: 10)

Regional variations in dependency ratios (both total and aged) are quite evident (refer Figure 85 & Figure 86). Large increases in dependency ratios (total) are expected over the next 20 years for several of the relatively smaller regional populations, such as the West Coast, Marlborough, Taranaki and Gisborne (some of which having dependency ratios above the current average).

The case of West Coast region is one that illustrates this change most clearly. Its dependency ratio (total) is expected to increase from 52% in 2006 to 86% in 2031 (Figure 88). Its aged dependency ratio is projected to more than double during this period, from 21% to 55%. Over time, the shrinking working aged population group is anticipated to feel greater strain from maintaining and service proportionately higher levels of dependents. It is expected that populations such as the West Coast will confront some challenges maintaining essential social services (particularly those reliant on some degree of volunteer capacity - such as SAR). Its dependency ratio (total) is projected to be the highest of all regions nationally by 2031 (Figure 86). The population make up for this region (Figure 89) and projections forward indicate a numeric decline in the population of this region over the next 20 years.

The geographical area within this region is large (e.g., the West Coast *Tai Poutini* Conservancy boundary includes 2.27 million hectares of land, Department of Conservation 2007:39), especially when considered relative to its small resident population. Much of this region is in public ownership and administered by the Department of Conservation (1.912m ha within the West Coast *Tai Poutini* Conservancy). It has proportionately the largest area of land in DOC management of all regions nationally (at 84% of the total land area within the West Coast *Tai Poutini* Conservancy (DOC, 2007:39). Although mostly all of this land is legally accessible to the public (and some is developed for easily access for recreation and tourism purposes) much is less accessible (in bush covered or mountainous terrain). This region is one that will be exposed to increasing recreation and tourism visits (particularly from international tourists – refer West Coast case study in Section 7.2).

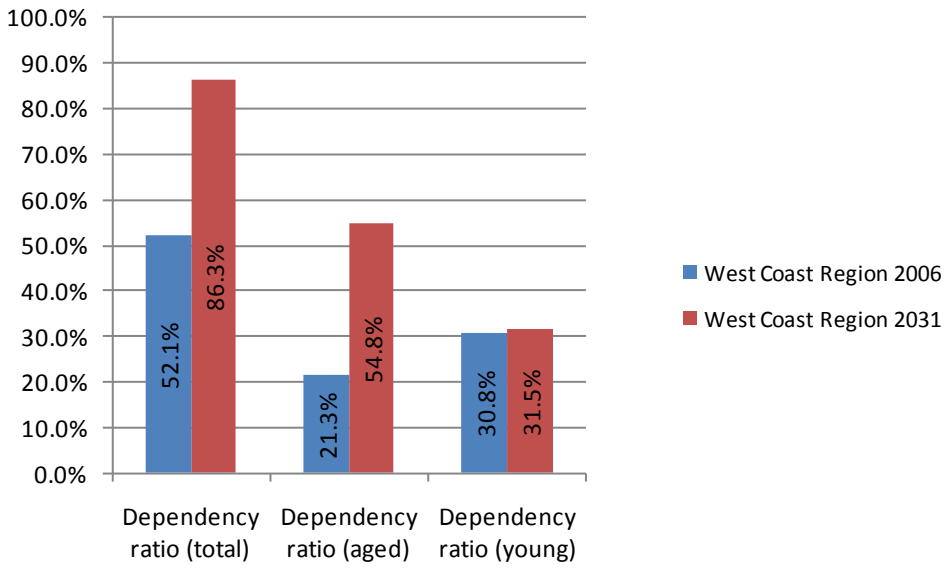


Figure 88. Dependency ratios for West Coast region (2006 and 2031 projection based on 2010 updated data)

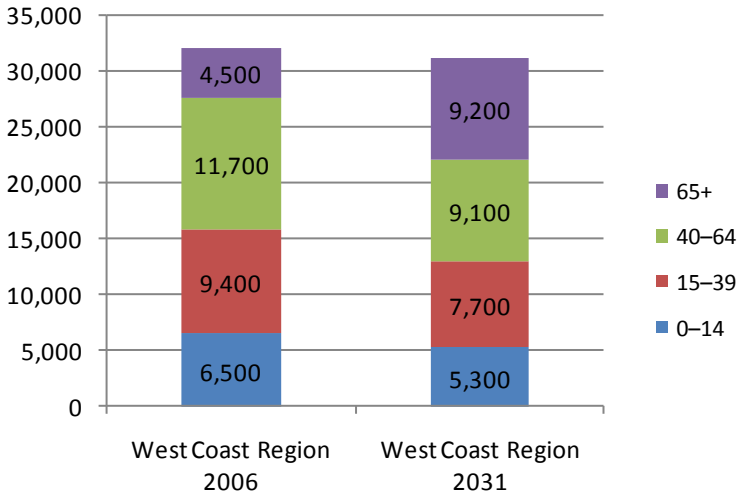


Figure 89. Population size and age structure of West Coast region (2006 and 2031 projection based on updated 2010 data)

At the other extreme, the projections for Auckland region in respect of age structure and dependency, shows a very different, but similarly alarming picture. Despite having a relatively small projected increase in dependency ratio (total) from 2006 to 2031 (from 46% to 55%, Figure 90), the numerical count of population in the 65+ category is projected to increase (Figure 91) from 133,800 people (or, roughly the size of Dunedin's current population in total of approx. 122,000) to 323,700 (not far off the size of Christchurch's present population of approx. 361,000). While the growth in aged population should be adequately supported by growth in its younger age categories, Auckland's growing 65+ age category will present its own challenges for SAR (as this age group is the most 'at risk' for Dementia related incidents). If it can be assumed that the risk of Dementia incidents will increase proportionate to the projected growth in this age category, then this risk will be 142% larger by 2031.

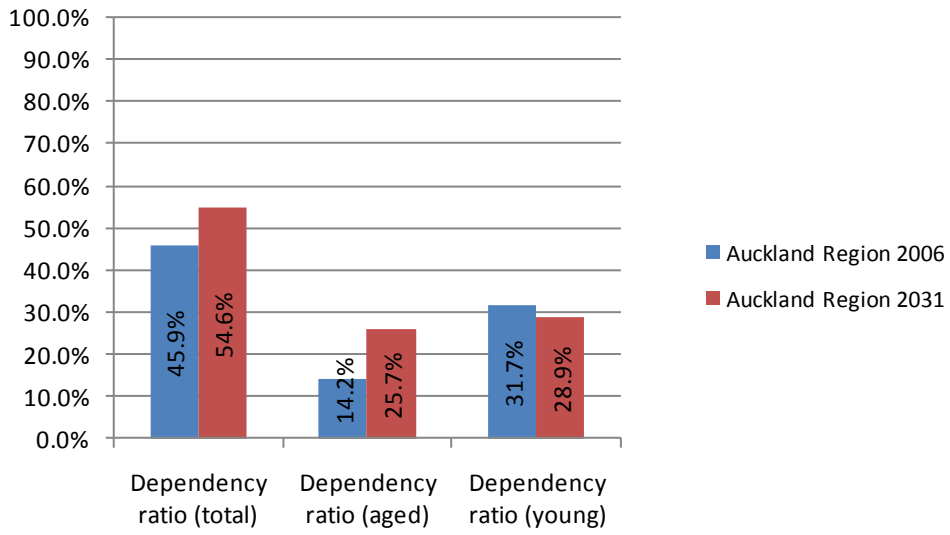


Figure 90. Dependency ratios for Auckland region (2006 and 2031 projection based on 2010 updated data)

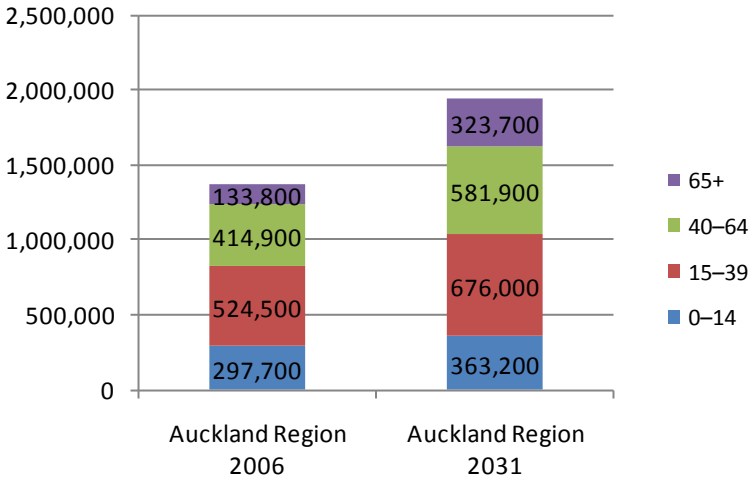


Figure 91. Population size and age structure of Auckland region (2006 and 2031 projection based on updated 2010 data)

6.1.2. Urban-rural patterns of internal migration

Overall, New Zealand's population is highly urbanised with the vast majority of its population (86%) living in main, secondary or minor urban areas in 2006 (Statistics New Zealand, 2006). The amount of the overall population living in main urban areas has increased slowly, but steadily, from 70 percent in 1991 to 72 percent in 2006 (ibid). Corresponding data for secondary and minor urban areas and rural centres or rural areas showed a different pattern (of decline – for example, the population living in rural centres or rural areas comprised a slowly declining proportion of the population, from 15 percent in 1991 to 14 percent in 2006).

In terms of internal migration over the four most recent census periods, the NZ resident population showed net gains in the rural and other population category, whereas the urban area categories generally showed net losses (Figure 92). The rate of growth in the urban population noted earlier (overall) is not a result of internal migration, rather it is due largely to higher rates of natural increase (i.e., the excess of number of births over deaths) combined with gains from international immigration. These patterns are taken into account in Statistics New Zealand's national and regional population projections (specified in more detail in the following section).

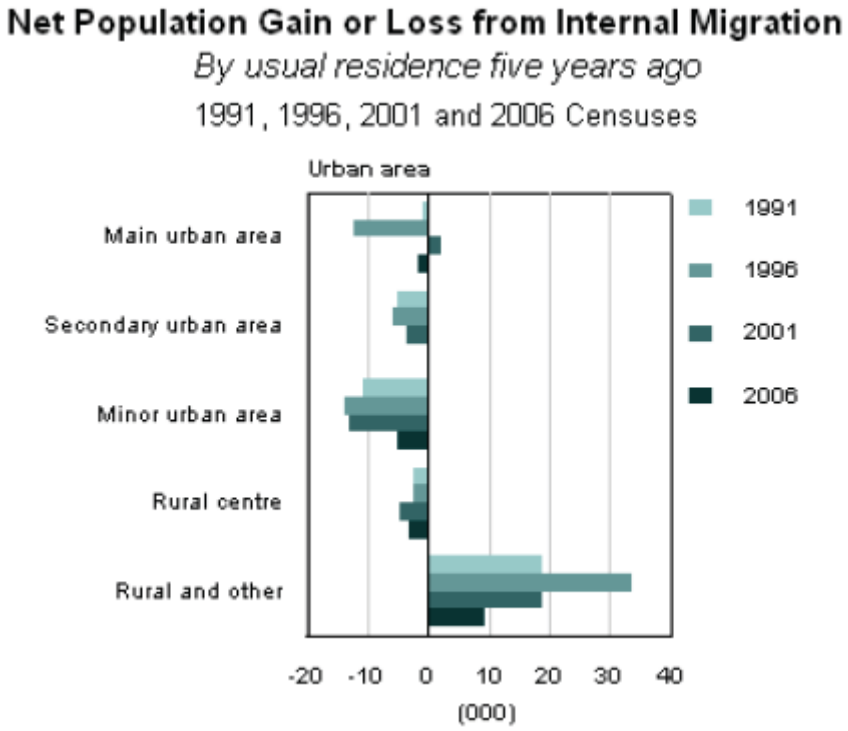


Figure 92. Internal migration over four census periods (source: Statistics New Zealand 2006: 6)

6.1.3. Projected overall population size to 2031

New Zealand's population is projected to increase an average of 0.8 percent per annum over the period 2006-2031, to 5.15 million by 2031 (an increase of 23 percent over this period). Regionally, the growth is largely due to projected increase in Auckland's population (573,700 – refer Figure 93 and Table 142) which alone accounts for 60% of the projected national increase. The larger North Island population (approximately 3.2million in 2006) is projected to increase at a faster rate, 26%, than the South Island (approximately 1 million in 2006, expected to increase 15% by 2031, Figure 94). Auckland is projected to increase at the fastest rate (42% from 2006 to 2031,Table 142). This is the only region projected to grow as a proportion of the national population over this period – from 33 percent in 2006 to 38 percent in 2031.

The growth New Zealand's projected population is based primarily on the excess of births over deaths – enabling the population to grow with a positive (although declining) natural increase augmented by constant net migration (Figure 95). The median age for New Zealand is projected to increase from 35.8 years in 2006, to 40.2 in 2031.

The national population is projected to have greater ethnic diversity in the future, as indicated by growing proportions of Mäori, Asian and Pacific people, and a similar pattern is projected for all regional populations (Figure 96). Numerically, the Asian population is expected to grow by the largest amount during this period (383800 people), followed by European (216100), Mäori (193400) and Pacific (180700). The European ethnicity group is expected to increase by 7% from 2006-2026, at a rate significantly less than all other ethnicity groups: Mäori 31%; Pacific 60%; Asian 95%.

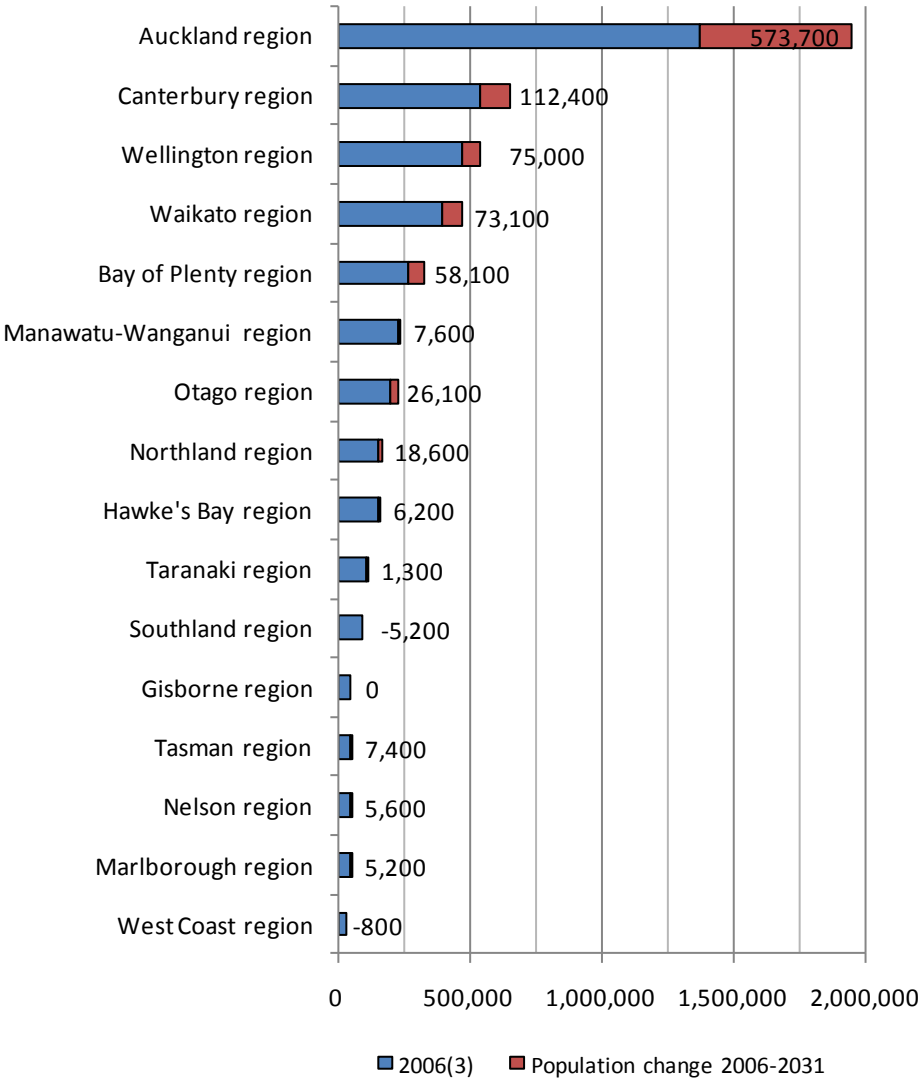


Figure 93. Regional population sizes, including projected changes (2006-2031) based on updates 2010 projections data

Notes:

1. Labels denote projected change to region population (2006-2031).
2. Total length of each bar denotes projected population size by 2031.
3. These projections have as a base the estimated resident population of each area at 30 June 2006.

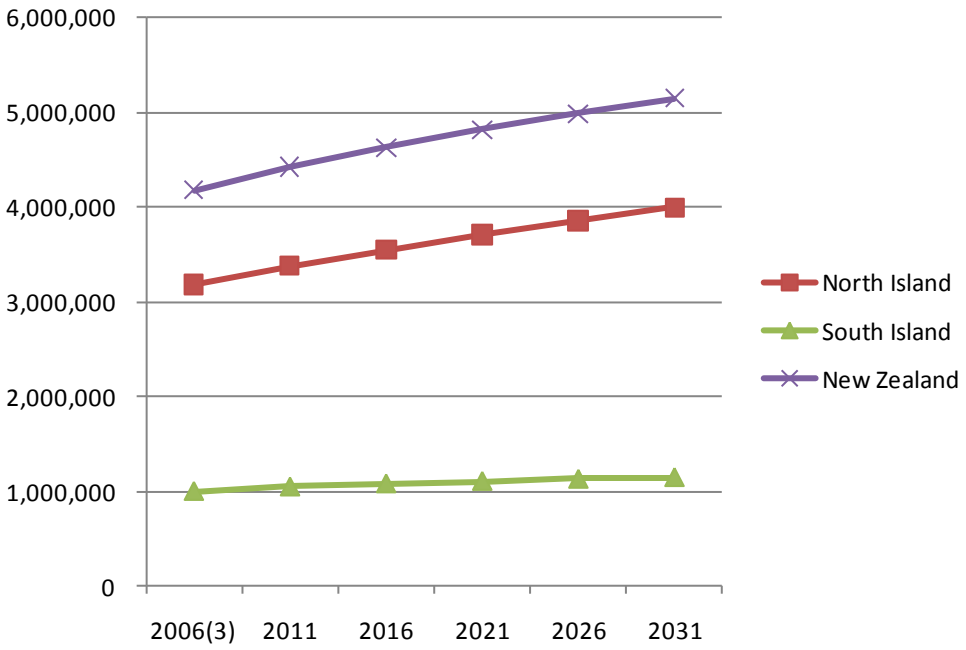


Figure 94. Projected population size for New Zealand and for the North Island and South Island sub-populations (medium level projection).

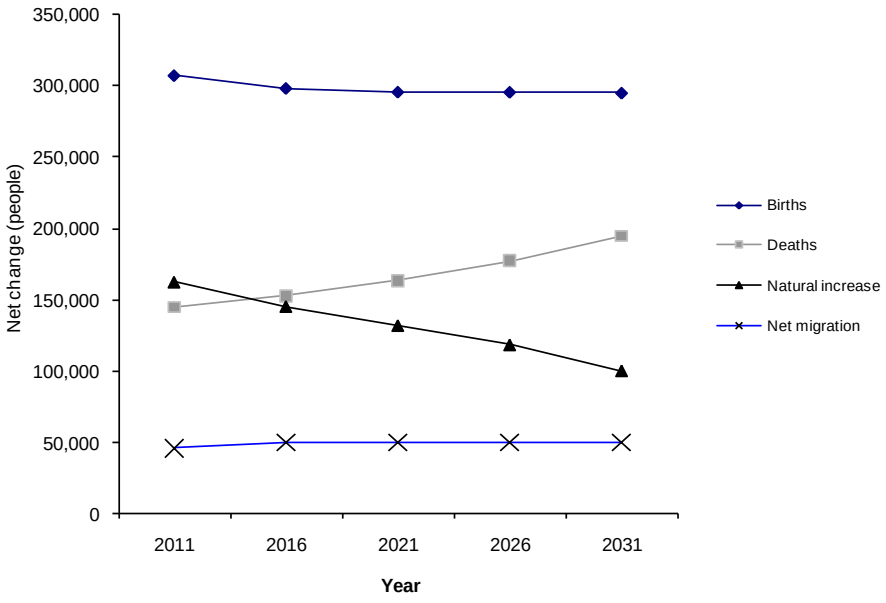


Figure 95.Characteristics of projected population change for New Zealand

(1) All data are for periods ending 30 June based on 2006 Census data (medium level projection).

Table 142. Regional and national population projections (medium series) 2006-2031 based on updated 2010 projections data

Regional council area(1)	2006[3]	2011	2016	2021	2026	2031	Population change 2006-2031	Population change 2006-2031 (%)	Average annual[4] change 2006-2031 (percent)	Proportion of NZ population 2006	Proportion of NZ population projected by 2031
Northland region	152,700	159,100	163,700	167,200	169,900	171,300	18,600	12.18%	0.5	3.65%	3.33%
Auckland region	1,371,000	1,488,000	1,604,000	1,719,200	1,833,300	1,944,700	573,700	41.85%	1.4	32.76%	37.77%
Waikato region	395,100	416,600	432,600	446,200	458,100	468,200	73,100	18.50%	0.7	9.44%	9.09%
Bay of Plenty region	265,300	279,600	292,100	303,600	314,100	323,400	58,100	21.90%	0.8	6.34%	6.28%
Gisborne region	46,000	46,900	47,100	47,000	46,700	45,900	0	0.00%	0.0	1.10%	0.89%
Hawke's Bay region	152,100	155,300	157,300	158,400	158,800	158,300	6,200	4.08%	0.2	3.63%	3.07%
Taranaki region	107,300	109,600	110,400	110,400	109,800	108,500	1,300	1.21%	0.0	2.56%	2.11%
Manawatu-Wanganui region	229,400	233,500	236,000	237,400	237,800	236,900	7,600	3.31%	0.1	5.48%	4.60%
Wellington region	466,300	489,100	506,100	519,900	531,700	541,200	75,000	16.08%	0.6	11.14%	10.51%
Tasman region	45,800	47,900	49,600	51,100	52,300	53,200	7,400	16.16%	0.6	1.09%	1.03%
Nelson region	44,300	45,900	47,200	48,300	49,200	49,900	5,600	12.64%	0.5	1.06%	0.97%
Marlborough region	43,600	45,800	47,100	48,000	48,600	48,700	5,200	11.93%	0.5	1.04%	0.95%
West Coast region	32,100	33,100	33,000	32,600	32,100	31,300	-800	-2.49%	-0.1	0.77%	0.61%
Canterbury region	540,000	571,800	596,000	616,600	635,500	652,400	112,400	20.81%	0.8	12.90%	12.67%
Otago region	199,800	208,500	214,100	218,700	222,700	225,900	26,100	13.06%	0.5	4.77%	4.39%
Southland region	93,200	94,200	93,900	92,600	90,600	87,900	-5,200	-5.58%	-0.2	2.23%	1.71%
North Island	3,185,100	3,377,600	3,549,300	3,709,400	3,860,400	3,998,600	813,500	25.54%	0.9	76.11%	77.67%
South Island	998,800	1,047,100	1,080,900	1,107,900	1,130,900	1,149,400	150,600	15.08%	0.6	23.87%	22.32%
New Zealand[5]	4,184,600	4,425,400	4,630,800	4,817,900	4,991,900	5,148,500	964,000	23.04%	0.8	100.00%	100.00%

(1) Boundaries at 30 June 2009.
(2) This is the medium series population projection.
(3) These projections have as a base the estimated resident population of each area at 30 June 2006.
(4) Calculated as a constant rate of population change over the period.
(5) New Zealand comprises the North Island and South Island regions plus areas not included in a region (e.g. Chatham Islands territory).
Notes: All derived figures have been calculated using data of greater precision than published.
Owing to rounding, individual figures may not sum to stated totals.

6.1.4. Ethnicity projections - overall

New Zealand's population is expected to increase in size overall, while at the same time experiencing a change in its ethnic mix (Figure 96).

Medium level projections (series 6) were used for the following section.

European and the 'Other' ethnic group (including New Zealander), currently making up 77% of the New Zealand population, is expected to remain the largest of the four main ethnic groupings, although it will grow at considerably lower rates than those of the other three (7% between 2006-2026). By 2026, this group is expected to make up 69% of the population overall.

Mäori is currently the second largest ethnic group (15%). Mäori is expected to grow at the third lowest rate (31% between 2006 to 2026), and is projected to be increase in its share of the population overall (to reach 16 % by 2026).

The Asian ethnic group is the next largest (10%), however, this is the group projected to increase in size at the fastest rate (increasing by 95% between 2006 to 2026), to reach 16% of the NZ population overall by 2026.

The Pacific group is the smallest overall (7%). This group is projected to increase at the second fastest rate (60% between 2006 to 2026) reaching 10% of NZ's population by 2026.

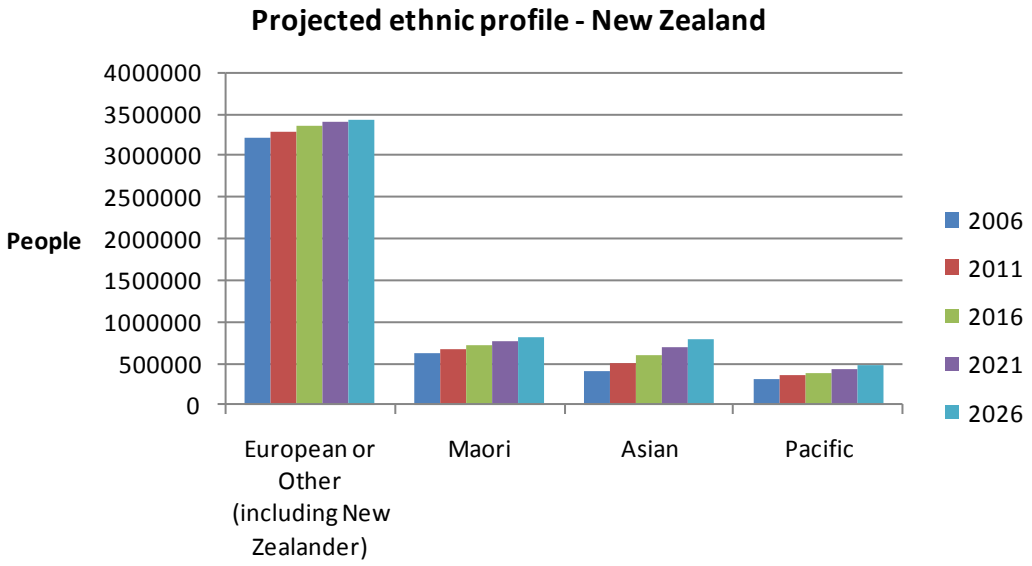


Figure 96. Ethnicity projections for the New Zealand population (2006-2026)

(1) Source: 2006 base data projections

6.1.5. Ethnicity-age projections

The four ethnic groups shows variation by age class, which is represented clearly by median age (Figure 97). The European or Other (including New Zealander) category is and will remain the oldest. The Mäori and Pacific ethnicities are the youngest. The Asian group is the third oldest. While the median age of all ethnic groups is expected to increase from 2006-2026, the Asian group is expected to age at the fast rate (from 28.5 yrs in 2006 to 34.6 in 2026). The corresponding increase in median ages for the Mäori and Pacific groups is considerably less.

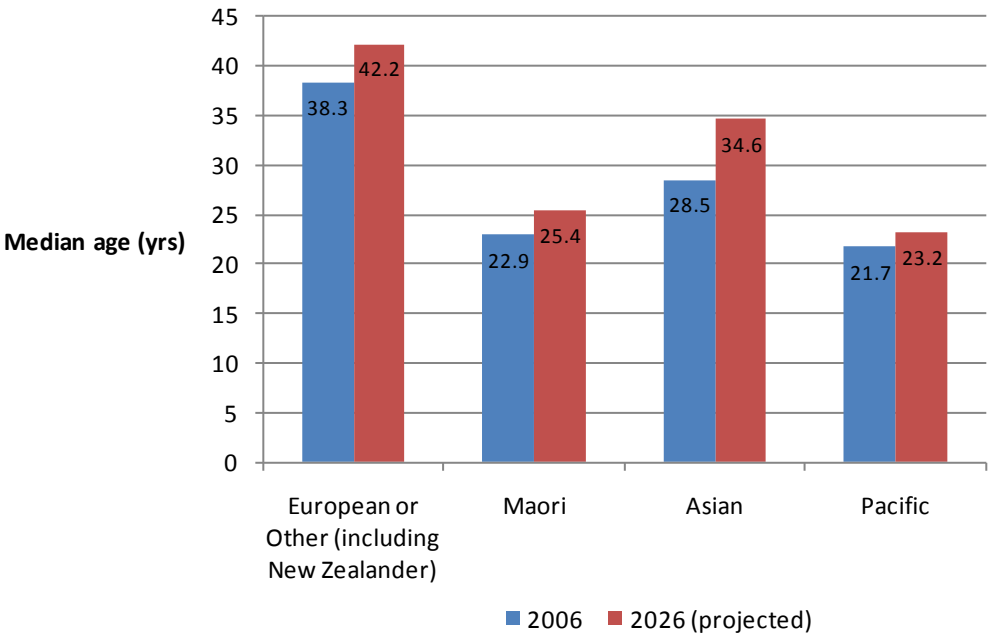


Figure 97. Median age by ethnicity for New Zealand's population (2006 and 2026 projection)

European (including 'New Zealander')

The European ethnic group is the oldest of the four ethnic groups, and is expected to age at a moderate rate. The proportion of Europeans in the 65+ age category is projected to increase from 14% in 2006 to 23% in 2026 (Figure 98). The proportion within the 65+ age group is the largest of all four of the ethnic groups examined. Notable is the numerical decline in the 0-14 year category over this period.

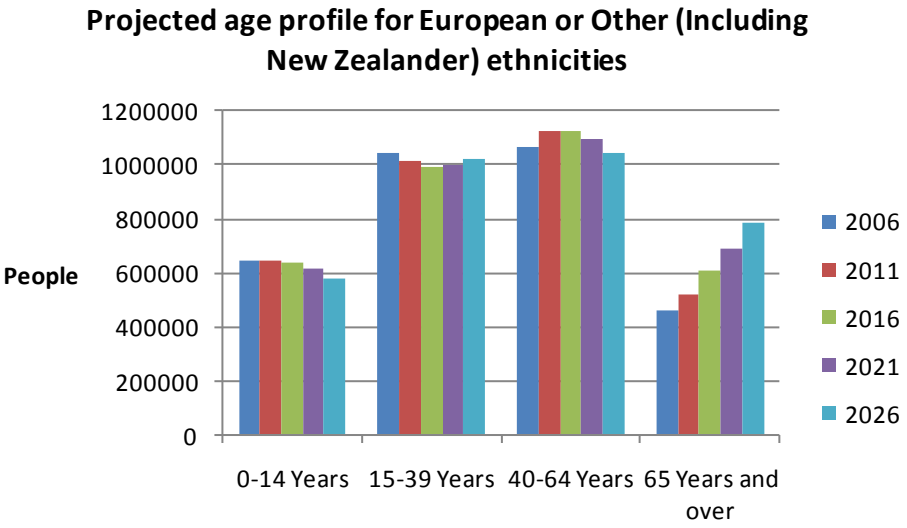


Figure 98. Age profile projections – European or Other (including New Zealander)

Mäori

The Mäori population is expected to age at a relatively slow rate, and continue to be the second youngest of the four ethnic groups. The growth in the 65+ age category is considerable (more than doubling in proportion between 2006 (4%) and 2026 (9%), although this is counterbalanced by growth in the 0-14 yr category (Figure 99).

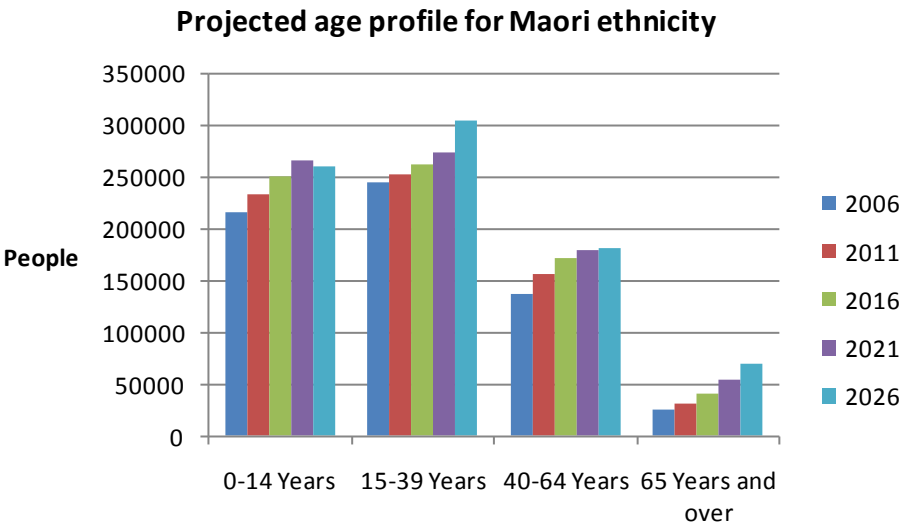


Figure 99. Age profile projections – Mäori

Asian

The Asian population is expected to age at the fastest rate. The growth in the 65+ age category is the highest (more than doubling in proportion between 2006 (5%) and 2026 (12%) (Figure 100). All other age categories show strong increases over that period.

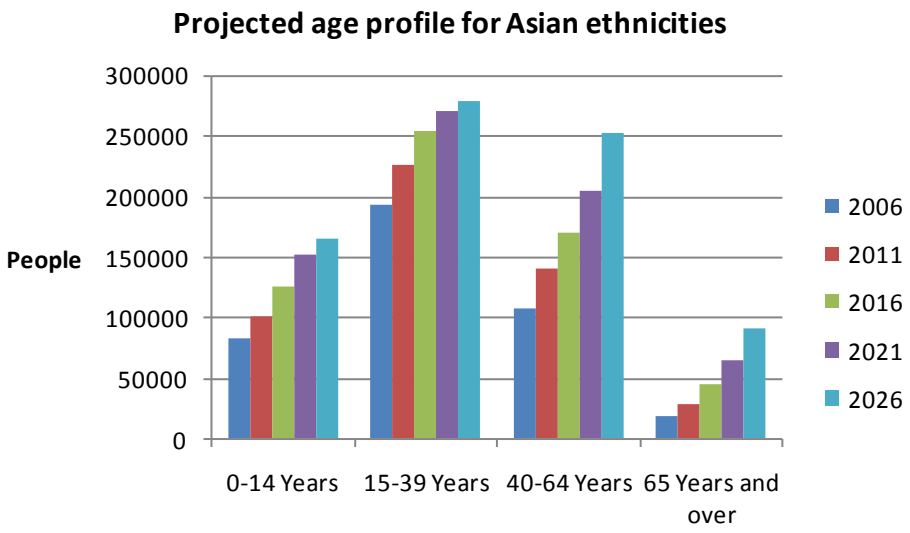


Figure 100. Age profile projections – Asian

Pacific

The Pacific population is expected to age at a very slow rate. The growth in the 65+ age category is the least (increasing in proportion between 2006 (4%) and 2026 (7%, Figure 101) of all four ethnic groups. All other age categories show strong increases over that period.

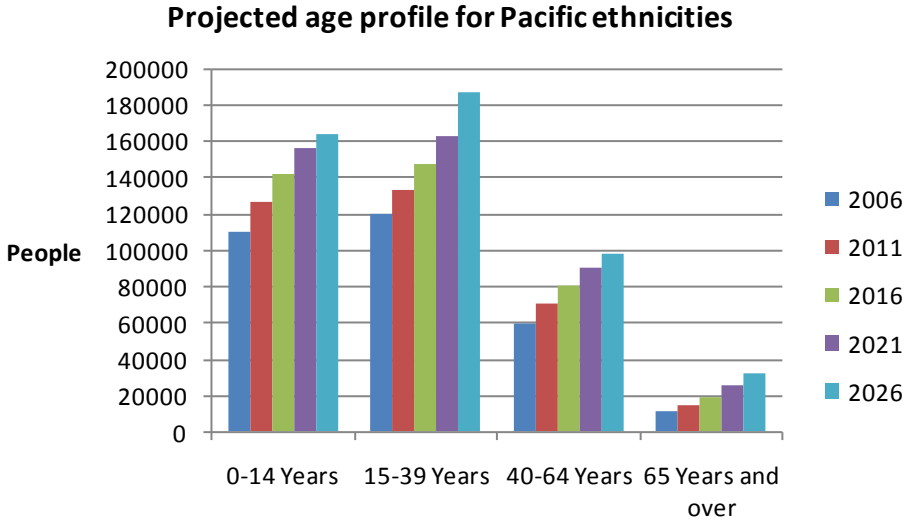


Figure 101. Age profile projections – Pacific

The aged category and ethnicities

The European 65+ age category is numerically the largest of all four ethnic groups, and has the highest numerical increase over the period 2006-2026 (Figure 102). The size of the Asian 65+ year category is expected grow and eclipse Mäori by 2016.

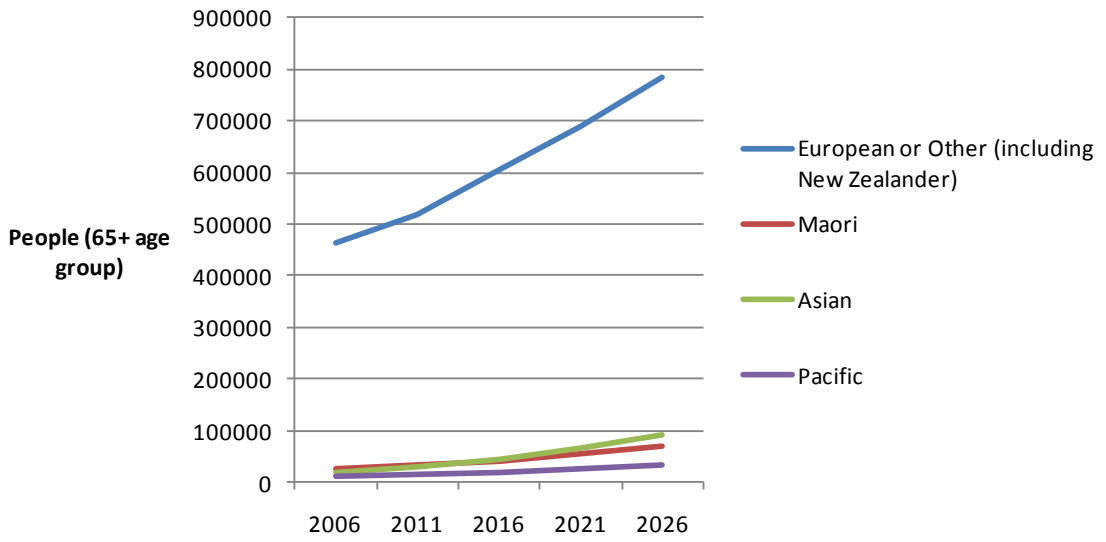


Figure 102. Ethnicity projections for 65+ age category

Implications: the pattern noted have greatest implications on age/ethnicity related SAR profiles such as Dementia.

6.2. Tourism projections

International tourism

Key indicator figures:

- Arrivals (yr ended Feb 2010): 2,482,300
- Up 2.4% on previous year
- Average intended length of stay: 20.4 nights

Source: International Visitor Survey data reported in Ministry of Tourism (2010).

Table 143. International tourism key indicator data

Purpose of visit	Number of arrivals (yr ending Feb 2010)	Annual growth on previous year
Holiday	1,198,055	3.3%
Visiting Friends and Relatives (VFR)	792,153	6.6%
Business	234,757	-5.0%

Source: International Visitor Survey data reported in Ministry of Tourism (2010).

Table 144. International tourism forecasts to 2015

International	Estimate for 2015 year	Annual Growth
International Visitor Arrivals	2.9m	2.5%
Visitor nights	55.8m	1.9%

Source: Ministry of Tourism (2010).

Domestic tourism

Table 145. Domestic tourism key indicator data

Type of visit	Number of arrivals (yr ending Dec 2008)	Annual growth on previous year
Day trip	28.3m	3.6%
Overnight trip	15.1m	1.1%
Total nights	44.5m	0.4%

Source: Domestic Travel Survey data reported in Ministry of Tourism (2010).

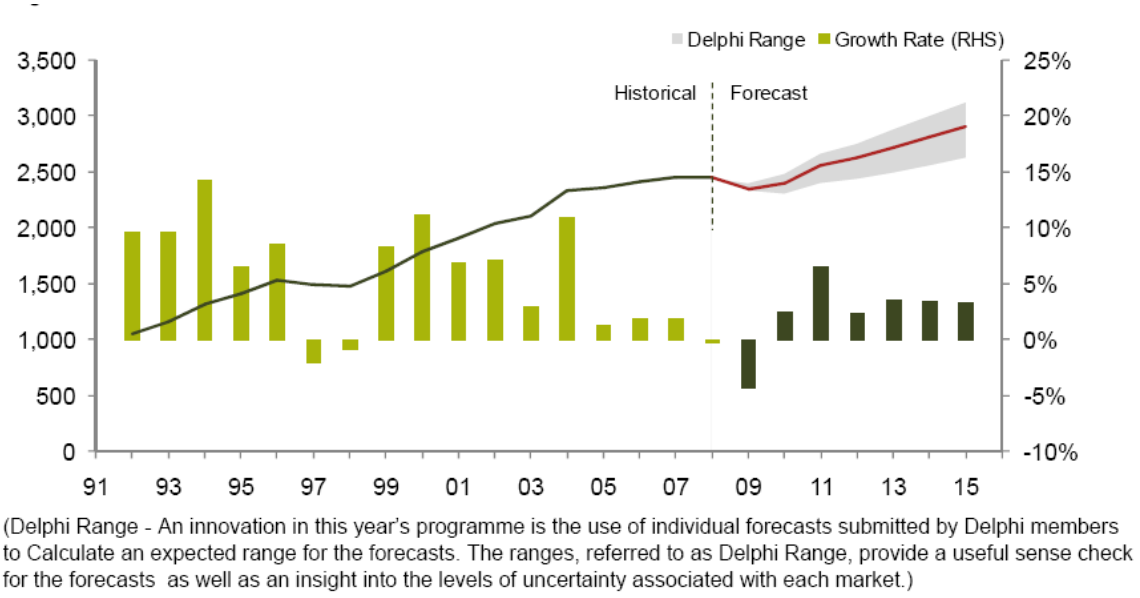
Table 146. Domestic tourism forecasts to 2015

Domestic	Estimate for 2015 year	Annual Growth
Overnight trips	18.6m	0.5%
Day trips	35.1m	0.8%
Visitor nights	55.0m	0.4%

Source: Ministry of Tourism (2010).

Key points:

- Rates of projected international tourism growth are higher than those reported for domestic tourism (refer tables above, and Figure 103 and Figure 104). The projected annual growth in international visitor arrivals (2.5% p.a.) is larger than that for visitor nights (1.9% p.a.).
- Rates of projected domestic tourism growth (in terms of day trips – 0.8% p.a.) are the same as the projected annual increase in NZ population (0.8% annual growth through to 2031, Table 142). The corresponding rates for both overnight trips, and visitor nights are both increasing, but at a lower rate (0.5% and 0.4% p.a. respectively).
- This predicts constant rates of growth in activities that are of the 'day trip' type, with a sustained, yet lower, rate of growth in overnight activities.



(Delphi Range - An innovation in this year's programme is the use of individual forecasts submitted by Delphi members to Calculate an expected range for the forecasts. The ranges, referred to as Delphi Range, provide a useful sense check for the forecasts as well as an insight into the levels of uncertainty associated with each market.)

Figure 103. International visitor arrivals to NZ (including projections to 2015)
Sourced from Ministry of Tourism (2010a:2).

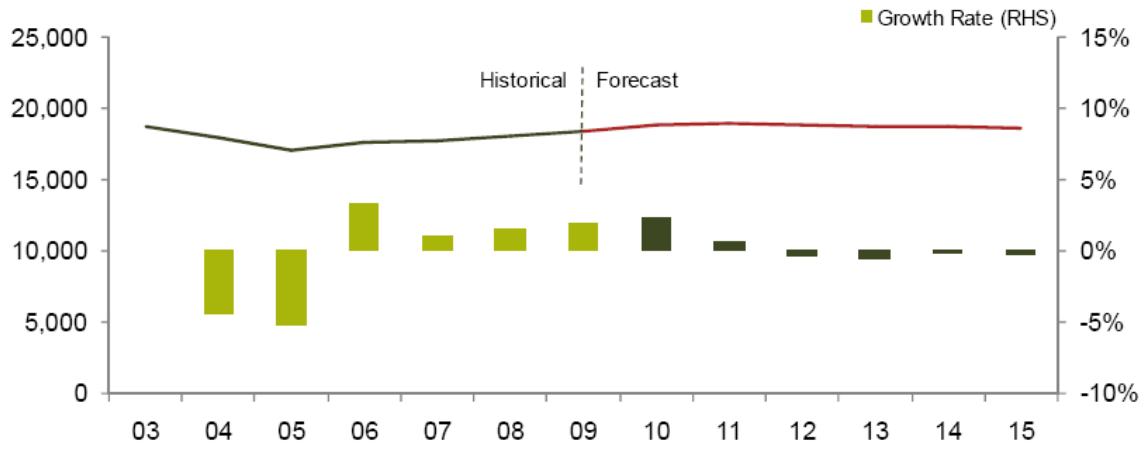


Figure 104. New Zealand domestic overnight trips (including projections to 2015).
Sourced from Ministry of Tourism (2010a:2).

Data indicate an increasing proportion of total tourism activity originating from the international market (based on higher rates of annual growth in relation to visitor nights). The higher rates of increases reported in the holiday and Visiting Friends and Relatives (VFR) international visitor market would also point towards a higher rate of growth in types of activities that may create demand for SAR.

6.3. NZ recreation activity

The baseline profiles presented in this study demonstrate a clear predominance of recreation activities in terms of the total number of both Land-based and Marine incidents. Recreation activities account for 73 % of Land-based incidents (Table 11, p. 49) and almost all (90%) of Marine-based incidents (Table 36, p. 74).

Outdoor recreation participation rates overall show a reasonably static pattern in relation to population size. For example, Dignan & Cessford (2009: 7) cite tramping a having 'relatively stable participation levels' and relate growth in site specific usage to Overseas Tourists. Tramping is the activity that contributes most to the number of recreation related LandSAR incidents (39% of all recreation incidents – refer Table 12, p.50), with over 1/3rd involving Tourists – higher than average for all Land-based SAR incidents (refer Table 83, p.121). Dignan & Cessford (2009:7) predict that, based on review of a range of participation data, Tramping participation levels are 'likely to remain static in the short term but decline in relative terms in the medium to long term', with a geographic shift in concentration away from backcountry areas to more accessible front country. Walking is the next largest Land-based recreation SAR incident activity type (17% of recreation incidents, Table 12, p.50), followed by Hunting (15%). Hunting is predicted to decline in relative terms in the medium to long term, in a broadly similar pattern to Freshwater Fishing (Dignan & Cessford 2009). Those authors expect participation in saltwater fishing, on the other-hand, to be more stable or perhaps increasing in the future due to its broader ethnic base. Broader level trends were identified also by Dignan & Cessford (refer Table 147).

Other recreation activities are comparatively smaller in scale (in terms of the number of Land-based SAR incidents), and their influence in terms of total number of incidents in the future would likely reflect their scale. New and emerging activities and, more importantly, technologies will have some influence on the number and types of incidents (nb. the expert opinion canvassed as part of this study rated technology as having the most likely and most important impact on the future of SAR). In terms of Marine incidents, there is less in the way of useable participation data available.

While rates of participation and incidents vary, the rates of change generally appear to be synchronous with demographic patterns (that is to say it would be predicted that as the population grows then rates of outdoor recreation activity will grow at a similar level). Participation rates do not appear to be changing significantly (i.e., the activity level per-head of the population), however it must be noted that most of the research in this particular area in NZ has concluded with pleas for more and better longitudinal activity participation research. Overall population trends believed to influence outdoor recreation participation rates are summarised in Table 147.

Table 147. Overall Population Trends (Source: Dignan and Cessford, 2009:6)

The overall population trends most affecting the current and likely future outdoor recreation participation and activity patterns appear most related to:
• Progressive aging of the population, especially in much of rural and regional New Zealand
• Increasing urbanization of the overall New Zealand population
• Increasing concentration of population in and around Auckland
• Increasing ethnic mix, especially focused in and around Auckland
• Increasing urban and ethnically diverse population of youth, especially focused on the Auckland region
• A consistent under-representation in active outdoor recreation among the young, non European ethnic groups, and urban residents.
• Increasing preference for more passive home-based activities, and if interested in more active outdoor activities, being most involved in those able to be done closer to home and in a shorter time.
Those sectors of society least inclined towards active outdoor recreation or less easily able to participate in it appear to be those where most population growth is projected.

6.4. Expert prediction of key trends for future of SAR

Sample characteristics

A total of 24 responses were received, which represented 52% of the original list or 46 emailed by SARINZ. Brief profile information is summarised here to outline the scope of their experience.

The respondents included 16 New Zealand SAR experts, 2 each from Australia and Canada, and 1 each from USA, UK, Iceland and Sweden.

Most indicated that Land-based SAR was their main area of expertise (88%), with some (16%) indicating Marine SAR was their main area, and others (also 16%) indicating specialist SAR (e.g. alpine terrain, cliff, cave and urban etc). Some indicated multiple areas of main expertise (e.g. land and marine, land and specialist etc.).

Combined they had over 650 years of SAR experience between them, representing approximately 28 years each.

The predominant types of SAR roles they had were Operational SAR (33%), Management/Administration (33%), Training (17%) and Research (8%). Most did indicate they also had secondary roles across many of these types.

6.4.1. Overall Importance of Trends

Table 148 summarises the mean scores (and related statistics[26]) given for the overall importance of the six future trends addressed here. This is based on respondent scores from a 5-point importance scale (where 1 = Unimportant to 5 = Extremely Important).

Table 148. Importance ratings for trends overall

TRENDS	Mean score	*SE*	*95% conf interval*
Increased use of technology	4.5	*0.10*	*(4.2 to 4.7)*
Increased tourism and recreation activities	4.3	*0.11*	*(4.0 to 4.5)*
Aging overall population	4.0	*0.15*	*(3.7 to 4.4)*
Increased population and urbanisation	4.0	*0.13*	*(3.7 to 4.2)*
Different funding/resourcing arrangements	3.9	*0.19*	*(3.5 to 4.3)*
Increased cost of travel/transport	3.0	*0.22*	*(2.5 to 3.4)*

6.4.2. Overall Likelihood of Trends

Table 149 summarises the scores given for the overall likelihood respondents considered that the specified Trend would affect SAR over the next 20 years. Likelihood was assessed using a 5-point response scale (from 1 = Extremely Unlikely to Occur to 5 = Extremely Likely to Occur).

[26] All Tables in Section 0 include standard errors for statistical means (SEM) which are used to estimate confidence intervals (95% level). In simple terms, lower standard errors represent higher degrees of consensus (or certainty) amongst respondents.

Table 149. Likelihood ratings for trends overall

TRENDS	Mean score	*SE*	*95% conf interval*
Increased use of technology	4.1	*0.18*	*(3.7 to 4.5)*
Aging overall population	3.9	*0.17*	*(3.5 to 4.2)*
Increased tourism and recreation activities	3.8	*0.16*	*(3.5 to 4.1)*
Different funding/resourcing arrangements	3.4	*0.22*	*(3.0 to 3.9)*
Increased population and urbanisation	3.3	*0.18*	*(2.9 to 3.7)*
Increased cost of travel/transport	2.5	*0.22*	*(2.1 to 3.0)*

6.4.3. Most Prominent Trends

Figure 105 summarises the combined likelihood and importance scores to illustrate which trends may be the most important for priority attention.

The overall Trends associated with Technology, Tourism and Aging were the most highly rated for importance and likelihood overall.

Details of the specific change scenarios/issues within each of these trends are summarised on following pages, and highlight some of the more specific issues that may require priority attention. While representing a summary of qualitative opinions, given the SAR sector expertise of the expert group involved, these findings do rate critical attention.

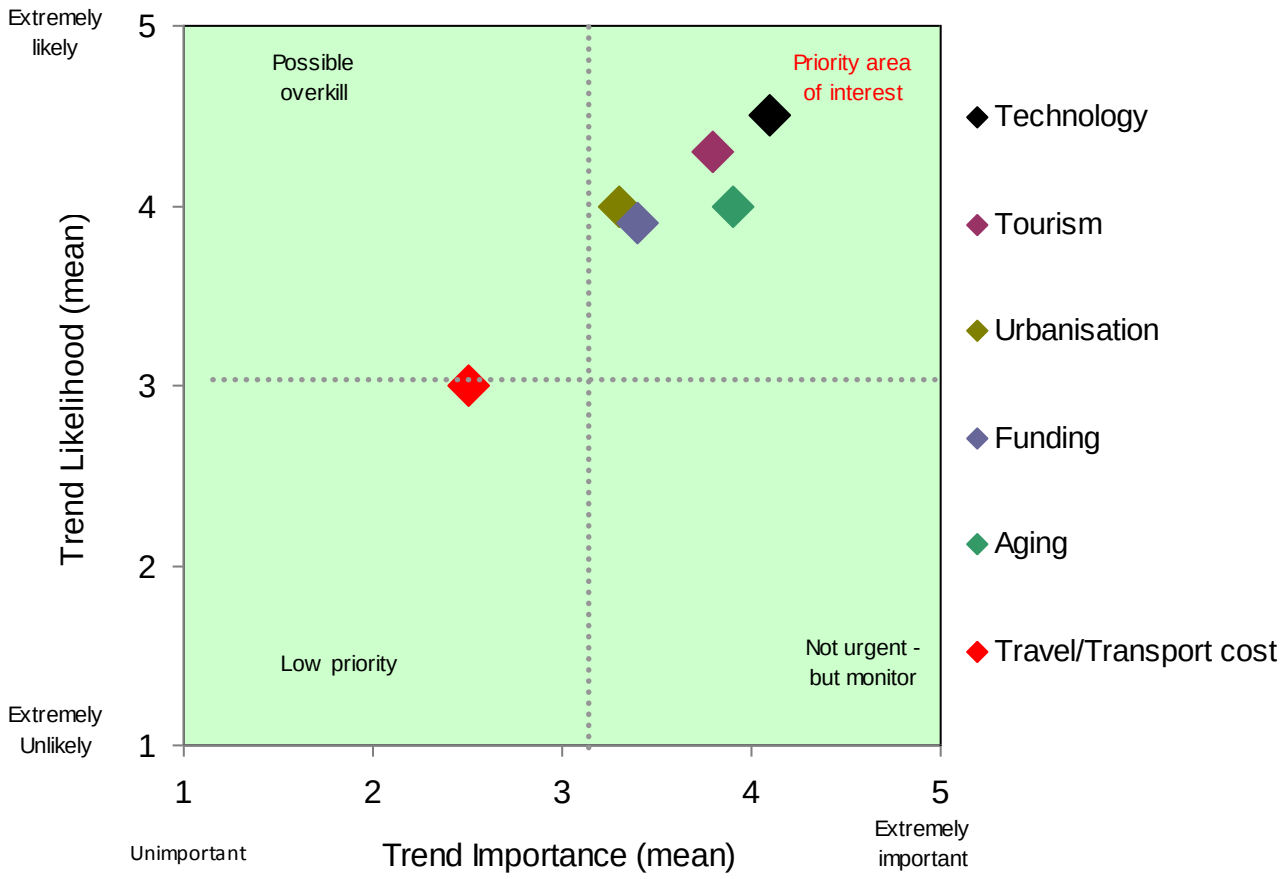


Figure 105. Importance and likelihood of trends for SAR.

Most prominent Change Scenarios

All of the individual change scenarios were individually scored using the same likelihood scales overall. Mean scores and summary statistics (e.g. standard errors and 95% confidence intervals) were then calculated from the combined responses.

These results were interpreted as indicators about what the expert group thought about each scenario, and these brief notes help with interpreting the results:

1. Scenarios with lower means = considered less likely by the group
2. Scenarios with higher means = considered more likely by the group
3. Scenarios with mid-range means = no clear distinction

The standard errors also indicated that the degree of opinion consensus within the expert group did differ between different scenarios. The low standard errors for some scenarios indicated that expert group opinion was relatively more consistent for those scenarios. Others with high standard errors suggested less consensus of opinion.

The results below are organised to highlight those scenarios that the expert group considered most un-likely (Section 6.4.4), those considered most likely (Section 6.4.5), and those where the expert group's likelihood consideration was unclear between either high or low likelihood (Section6.4.6).

6.4.4. The Most Unlikely Change Scenarios

The change scenarios where the lower mean scores of around 1 and 2 (taking standard errors and confidence intervals in to account) were judged to be highly un-likely (Table 150).

Table 150. Unlikely change scenarios

Change Scenarios - those considered less likely	Mean score	*SE*	*95% conf interval*
There will be decreased recreation in more remote areas, with decrease in related SAR demand	2.2	*0.190*	*(1.81 to 2.60)*
SAR incidents will decrease overall as people engage in more urban-based recreation types	2.3	*0.173*	*(1.89 to 2.61)*
Fewer recreation SAR incidents overall as people use the more accessible and less remote areas	2.4	*0.208*	*(1.99 to 2.85)*
Compulsory 'user-pays' types of insurance systems will be introduced as a requirement for anyone using more remote locations (i.e. backcountry or backwaters) in order to cover SAR costs	2.5	*0.217*	*(2.01 to 2.91)*

Among these scenarios considered less likely, the scenario with the highest consensus of expert opinion was: SAR incidents will decrease overall as people engage in more urban-based recreation types (SE = 0.173).

6.4.5. The Most Likely Change Scenarios

The change scenarios with high mean scores (i.e., between 3.8 and 5.0) were judged to be highly likely (Table 151).

Table 151. Likely change scenarios

Change Scenarios - those considered more likely	Mean score	*SE*	*95% conf interval*
There will be greater public expectations for immediate and successful SAR response	4.5	*0.120*	*(4.29 to 4.79)*
There will be increasing proportions of non-recreation SAR incidents (e.g. Dementia, Despondent, Missing)	4.4	*0.101*	*(4.17 to 4.58)*
Increased numbers of people visiting natural outdoor areas and parks	4.3	*0.115*	*(4.09 to 4.57)*
Increased SAR callouts due to increased numbers of tourists	4.2	*0.120*	*(3.96 to 4.46)*
People will live longer and remain more active, with sustained increase in SAR demands in some areas	4.1	*0.103*	*(3.87 to 4.30)*
Increased numbers of people engaged in marine recreation	4.1	*0.110*	*(3.90 to 4.35)*
Increased costs for SAR operations, training and support	4.1	*0.174*	*(3.77 to 4.48)*
There will be increasing reliance on professional SAR response agencies instead of volunteers	4.1	*0.174*	*(3.77 to 4.48)*
There will be reduction in the 'search' component of many SAR call-out due to better beacons, communications and location technology	4.1	*0.262*	*(3.81 to 4.36)*
Increased SAR callouts from people in easily accessible natural areas	4.0	*0.085*	*(3.82 to 4.18)*
There will be increased recreation closer to home and in more accessible areas, with an increase in related SAR demand	4.0	*0.095*	*(3.76 to 4.15)*
There will be increased diversity in SAR subjects/victims, from greater variety in ethnic and interest groups	4.0	*0.175*	*(3.60 to 4.32)*
Increased costs for volunteers involved in SAR	4.0	*0.195*	*(3.56 to4.36)*
There will be pressures in specific regions such as 'retirement belts' where volunteer SAR capacity declines while non-recreation SAR demands increase (e.g. dementia-related SAR demand)	3.9	*0.184*	*(3.50 to 4.25)*
Some people will put themselves at more risk because of over-dependence on technological devices - resulting in increased SAR callouts	3.8	*0.133*	*(3.68 to 4.23)*

Among these scenarios considered more likely, the highest expert consensus was demonstrated for the following scenarios:

- Increased SAR callouts from people in easily accessible natural areas (SE = 0.085)
- There will be increased recreation closer to home and in more accessible areas, with an increase in related SAR demand (SE = 0.95)
- There will be increasing proportions of non-recreation SAR incidents (e.g. Dementia, Despondent, Missing) (SE = 0.101)

6.4.6. Uncertain Scenarios

The change scenarios with middle-level mean scores (between 2.7 and 3.7) were judged to be neither highly likely nor highly unlikely (Table 152). The choice of 2.7-3.7 was arbitrary for indicative purposes, as it was felt that mean scores falling in to this range largely represented those scenarios around which the expert group was in relatively least consensus – with some clearly considering the scenario likely, some unlikely and some I the middle – with a result of a mean score very close to 3 (the mid-point). Note that in the table the scenarios are ranked according to how close their means scores are to 3, which is the most central score on the 1-5 response scale.

Table 152: Change scenarios adjudged neither highly likely nor highly unlikely

Change Scenarios - not considered very likely or unlikely	Mean score	*SE*	*95% conf interval*
Increasing 'professionalisation' of SAR will require increased funding sources	3.0	*0.252*	*(2.44 to 3.48)*
As there will be relatively more aged people to be supported by relatively fewer in the 'working-age' sector, SAR will suffer because of increased competition for scarcer public funding	3.1	*0.225*	*(2.56 to 3.61)*
There will be reduced demand for SAR overall as people will have better technology for self-location and way-finding (e.g. GPS/phone/map interfaces)	2.9	*0.262*	*(2.38 to 3.46)*
There will be reduced need for active SAR volunteers because of fewer call outs.	2.8	*0.233*	*(2.31 to 3.27)*
People travel less often for recreation purposes	2.7	*0.213*	*(2.27 to 3.15)*
There will be decreased numbers of active volunteers available for SAR response and support	2.7	*0.221*	*(2.25 to 3.17)*
There will be greater reliance on publically funded agencies due to reduced availability of charitable and sponsorship funds	3.3	*0.215*	*(2.94 to 3.84)*
There will be little change in overall SAR incident numbers, but locations will shift closer to major population centres	3.3	*0.202*	*(2.83 to 3.67)*
There will be greater reliance on sponsorship funding due to reduced public funding options	3.4	*0.216*	*(2.97 to 3.86)*
People travel shorter distances for recreation - using areas closer to home and less remote	3.4	*0.158*	*(3.09 to 3.74)*
There will be increased numbers of active volunteers available for SAR response and support	3.4	*0.180*	*(3.04 to 3.79)*
Increased SAR callouts from people in remote natural areas	3.5	*0.170*	*(3.15 to 3.85)*
There will be increased numbers of people in remote areas with lower outdoor skills, resulting in more remote recreation SAR call-outs	3.5	*0.190*	*(3.11 to 3.89)*
It will be harder to maintain volunteer skills and motivations due to fewer call-outs	3.5	*0.233*	*(3.02 to3.98)*
An increased proportion of SAR incidents will occur in the more accessible and less remote areas	3.6	*0.158*	*(3.26 to 3.91)*
There will be greater reliance on volunteers and charitable funding due to reduced public funding options	3.6	*0.157*	*(3.30 to 3.93)*

6.4.7. Detailed tables

TREND 1 - Increased cost of travel/transport

Mean Scores from Likelihood scale – from:
(**1** = Extremely Unlikely to occur TO **5** = Extremely Likely to occur)

Change issues/scenarios	Mean scores
1. Increased costs for SAR operations, training and support	4.1
2. Increased costs for volunteers involved in SAR	4.0
3. People travel less often for recreation purposes	2.7
4. People travel shorter distances for recreation - using areas closer to home and less remote	3.4
5. An increased proportion of SAR incidents will occur in the more accessible and less remote areas	3.6
6. Fewer recreation SAR incidents overall as people use the more accessible and less remote areas	2.4

Likelihood of no change for SAR – 2.8

OVERALL

How likely is it that the TREND '*Increased cost for travel/transport*' will affect SAR over the next 20 years?	3.0

OTHER

Are there any other likely changes from the trend '*Increased cost for travel/transport*'?

Other suggested changes or general comments	Score
Because of increased transport cost people are likely to be more organized and trying to get more out of each trip - resulting in setting the bar to high without sufficient experience (pushing for the summit because the drive over was so expensive.	4
People will not be dissuaded from taking their recreational time despite the cost or expense. *However a following trend might be that outdoor users will become increasingly less and less prepared for outdoor activities as we move away from an existence that is close to the land.* *Less likely prepared means SAR will have to respond more quickly to insure survival in the harsher environments. Instant relief and rescue. It will be expected in this push button society.*	5
People still want a holiday so are turning back to outdoor activities they see as less costly - camping, hiking, fishing even snowmobiling - putting themselves in situations where SAR may be needed.	4

Cost of air travel will affect domestic use of helicopters/light aircraft for access to remote areas for hunting, fishing and climbing.	4
The relative costs of travel, particularly air travel will decrease over time but with inflation, the costs are bound to increase.	0
People will go less often - skills will drop (4). *People will go when they can - less regard for weather (4).* *Therefore a possible increase in SAR activity, but in a more front country setting*	4
With people likely to be travelling to "big country" for recreation less often, when they do go there, they are likely to be less experienced in those conditions than they are at present, so there is the potential for more serious SAR incidents.	4
It is most likely that the increased costs of providing SAR services will continue to be borne by SAR volunteers, as they are now.	0
Trend for recreation pursuits to be in less remote areas does not necessarily make them less hazardous therefore the influence on SAR operations is not necessarily a reduction in same. *Increased cost of travel can make operational options time critical and therefore a tendency for safety margins to be compromised (i.e., tendency to take greater risks due to cost of travel and time).* *Cost of travel also closely associated with cost of individuals "time pressure" in their recreation trips, wanting to do more in less time.*	0

TREND 2 - Increased tourism and recreation activities

Mean Scores from Likelihood scale – from:
(1 = Extremely Unlikely to occur TO **5** = Extremely Likely to occur)

Change issues/scenarios	Mean scores
1. Increased numbers of people visiting natural outdoor areas and parks	4.3
2. Increased numbers of people engaged in marine recreation	4.1
3. Increased SAR callouts due to increased numbers of tourists	4.2
4. Increased SAR callouts from people in easily accessible natural areas	4.0
5. Increased SAR callouts from people in remote natural areas	3.5

Likelihood of no change for SAR – 1.8

OVERALL

How likely is it that the TREND '*Increased tourism and recreation activities*' will affect SAR over the next 20 years?	4.3

OTHER

Are there any other likely changes from the TREND '*Increased tourism and recreation activities*'?

Other suggested changes or general comments	Score
Personal finance problems negating distant recreation locations	1
Mission numbers are going to increase in categories not even considered important now as new activities and ways to kill one's self in the outdoors increase.	5
Increased numbers on quick road end/tourist walks by tourists and older people *Increase in middle-older age people joining groups and or individually taking to walking/tramping"*	0
I would expect that with improvements in technology, less people will find themselves lost in remote areas and people will be able to "self-rescue" more without relying on SAR assistance.	0
Increased pressure to extract a levy from tourists for SAR, due to increased percentage of SAR costs being spent on incidents involving non-NZ tax-payers = 4	4
We note a change to more Helicopter "pick up "jobs which seen to come from the Ambo comms rather than the search & rescue jobs *Therefore this a 5 on scale*	5

TREND 3 – Aging overall population

Mean Scores from Likelihood scale – from:
(1 = Extremely Unlikely to occur TO **5** = Extremely Likely to occur)

Change issues/scenarios	Mean scores
1. People will live longer and remain more active, with sustained increase in SAR demands in some areas	4.1
2. There will be increased recreation closer to home and in more accessible areas, with an increase in related SAR demand	4.0
3. There will be decreased recreation in more remote areas, with decrease in related SAR demand	2.2
4. There will be decreased numbers of active volunteers available for SAR response and support	2.7
5. There will be increased numbers of active volunteers available for SAR response and support	3.4
6. As there will be relatively more aged people to be supported by relatively fewer in the 'working-age' sector, SAR will suffer because of increased competition for scarcer public funding	3.1
7. There will be pressures in specific regions such as 'retirement belts' where volunteer SAR capacity declines while non-recreation SAR demands increase (e.g. Dementia-related SAR demand)	3.9
8. There will be increasing reliance on professional SAR response agencies instead of volunteers	3.0

Likelihood of no change for SAR – 2.1

OVERALL

How likely is it that the TREND '*Aging overall population*' will affect SAR over the next 20 years?	4.2

OTHER

Are there any other likely changes from the TREND '*Aging overall population*'?

Other suggested changes or general comments	Score
The trend for conducting Search Operations in the Urban environment is going to increase substantially. The likelihood that this will affect training for urban search is extremely likely. That is going to mean some real research and development on searching effectively in urban areas. It is not the same as the rural environment.	5
SAR teams may need to develop new methods to look for Dementia patients especially in urban and urban interface environments.	5
Less remote areas, more old active SAR volunteers, to support SAR needs of elderly. Quite likely.	4

An aging volunteer base may not have the fitness and skills to complete demanding SAR activities. (4) *The increased need for specialisation in SAR may not occur in the volunteers due to shortage of time necessary for training.* (4) *The lack of outdoor skill level will affect the baseline entry level of SAR volunteers*. (5)	5
While there are likely to be more volunteers wanting to be involved in SAR, there will be fewer than at present who have solid backcountry skills. This may mean an increased need for bushcraft training, or more likely a heavier workload on the remaining few thoroughly capable people. (SAR skills can be taught, but backcountry skills and nous have to evolve through time.)"	4
Ageing population does not necessarily equate to a huge increase in Dementia related operations - in some areas such as vascular Dementia rates are actually declining due to better management of co morbidities such as high blood pressure and other cardio vascular risk factors. Research is currently very close to identifying a "marker" for Alzheimer's which could well further reduce operations for same	0

TREND 4 – Increased use of technology

Mean Scores from Likelihood scale – from:
(1 = Extremely Unlikely to occur TO **5** = Extremely Likely to occur)

Change issues/scenarios	Mean scores
1. There will be reduced demand for SAR overall as people will have better technology for self-location and way-finding (e.g. GPS/phone/map interfaces)	2.9
2. Some people will put themselves at more risk because of over-dependence on technological devices - resulting in increased SAR callouts	3.8
3. There will be reduction in the 'search' component of many SAR call-outs due to better beacons, communications and location technology	4.1
4. There will be reduced need for active SAR volunteers because of fewer call outs.	2.8
5. It will be harder to maintain volunteer skills and motivations due to fewer call-outs	3.5
6. There will be greater public expectations for immediate and successful SAR response	4.5

Likelihood of no change for SAR – 1.8

OVERALL

How likely is it that the TREND '*Increased use of technology*' will affect SAR over the next 20 years?	4.5

OTHER

Are there any other likely changes from the TREND '*Increased use of technology*'?

Other suggested changes or general comments	Score
Technology is going to increase in other areas than beacons and navigation. ATV's and snowmobiles are getting more powerful and reliable, all outdoor gear is getting lighter and better enabling people to go further, faster and steeper. So while one technology might make travelling safer another one will make it more dangerous.	4
Over dependence on technological devices has characteristically resulted in major cock-up's at every level. SAR responders are still going to have to do it the old fashioned way. I don't think we are ever are going to get away from "boots on the ground." The trend has still got to provide the basics necessary for the front line responder! That is very likely to occur	5
GPS based beacon systems for at risk groups from Alzheimer's, autistics, IHC will mean the intervention of self find, family find or agency find without alerting SAR authorities. *Electronic recording systems such as used on ski fields could apply to wider areas such as tracks or in at risk activities*.	0

Attempted Friend/family rescues of lost party due to ability to notify them as well. *People lost due to "flat Battery" situations*	0
SAR respondents will need to be more techno-savvy to use the new technologies that will become available for SAR.	4

TREND 5 – Increased population and urbanisation

Mean Scores from Likelihood scale – from:
(1 = Extremely Unlikely to occur TO **5** = Extremely Likely to occur)

Change issues/scenarios	Mean scores
1. SAR incidents will decrease overall as people engage in more urban-based recreation types	2.3
2. There will be little change in overall SAR incident numbers, but locations will shift closer to major population centres	3.3
3. There will be increasing proportions on non-recreation SAR incidents (e.g. Dementia, Despondent, Missing)	4.4
4. There will be increased diversity in SAR subjects/victims, from greater variety in ethnic and interest groups	4.0
5. There will be increased numbers of people in remote areas with lower outdoor skills, resulting in more remote recreation SAR call-outs	3.5

Likelihood of no change for SAR – 2.0

OVERALL

How likely is it that the TREND '*Increased population and urbanisation*' will affect SAR over the next 20 years?	4.0

OTHER

Are there any other likely changes from the TREND '*Increased population and urbanisation*'?

Other suggested changes or general comments	Score
More research and development on effective searching in the urban environment. *Experimentation and practical methodology will be developed for more efficient and consistently run operations that are reliable.* Extremely likely.	5
The increase in crime or even present level in such crimes as homicide will mean more prolonged and difficult searches which require large amounts of resources. *Searching for certain categories such as missing children, abduction, Alzheimer's will require specialised training.* *There will be a lower skill and equipment level when the urban people access remote areas resulting in more severe incidents.*	0

TREND 6 – Different funding/resourcing arrangements

Mean Scores from Likelihood scale – from:
(**1** = Extremely Unlikely to occur TO **5** = Extremely Likely to occur)

Change issues/scenarios	Mean scores
1. Increasing 'professionalisation' of SAR will require increased funding sources	4.1
2. Compulsory 'user-pays' types of insurance systems will be introduced as a requirement for anyone using more remote locations (i.e., backcountry or backwaters) in order to cover SAR costs	2.5
3. There will be greater reliance on volunteers and charitable funding due to reduced public funding options	3.6
4. There will be greater reliance on sponsorship funding due to reduced public funding options	3.4
5. There will be greater reliance on publically funded agencies due to reduced availability of charitable and sponsorship funds	3.3

Likelihood of no change for SAR – 2.4

OVERALL

How likely is it that the TREND '*Different funding/resourcing arrangements*' will affect SAR over the next 20 years?	3.9

OTHER

Are there any other likely changes from the TREND '*Different funding/resourcing arrangements*'?

Other suggested changes or general comments	Score
I think the trend will be for some type of insurance or bonding arrangement ultimately having to be developed as a scheme to pay for the more expensive operations. We can't continue to offload the cost of SAR onto to the general public through tax dollars or just outdoor user fees. They won't stand for it. I think that this is extremely likely.	5
The Police and RCC are responsible for SAR and there is a high public expectation. This will mean more professional people involved to meet the desired standard. It is already happening in NZ with a 24 hour staffed RCC and appointment of more Police SAR Coordinators. *The public will contribute to specialist projects such as local radios or equipment.*	0

7. Projections for key incident profiles

This section contains specific application of the SAR supply/demand model (refer Section 4.2, p.14), using data sources and projections customised to each particular incident/subject types.

The outcomes in terms of the balance between supply and demand are noted – with a simplified colour coding (darker shades of red denote likely excess of demand, whereas green shades indicate likely excess supply).

Implications for SAR are noted for each specific projection. Incident types and specific case-studies were selectively chosen to illustrate the range of extent projected change (and likely implications for SAR agencies).

Caution is emphasised when using and interpreting specific results (refer Section 4.5 (p. 23) for guidance).

7.1. Modelling incident projections – sources and application

For the purpose of this study, the general Statistics NZ regional population projection rates have been used as a default for modelling (as it is expected that supply and demand variables will be mutually influenced by the overriding rates of demographic change characterised by these projections).

Where incident types show more distinctive demographic characteristics, more detailed projections were applied. In relation to Land-based SAR incidents, it is apparent that the bulk of these are recreation or tourism related, therefore, the incident projection used was an extrapolation of the domestic and international tourism projection (Visitor Night series); whereas, for Alzheimer's/Dementia incidents, the at-risk 65+ age group projection was used. For Shore-based marine incidents, the ethnicity projection series was used. For each of these, the projections used had closer correspondence to these types of incidents than the more general population projections. The type of projection used is specified with each individual incident projection.

Likewise, in respect of supply factors, more specific demographic projections have been used where deemed appropriate (e.g., for certain regions where age dependency is expected to change significantly, this has been used as the basis for considering likely impacts on SAR supply).

7.2. Projected Land-based SAR incident callouts*

* Based on recreation/tourism visitor nights projections

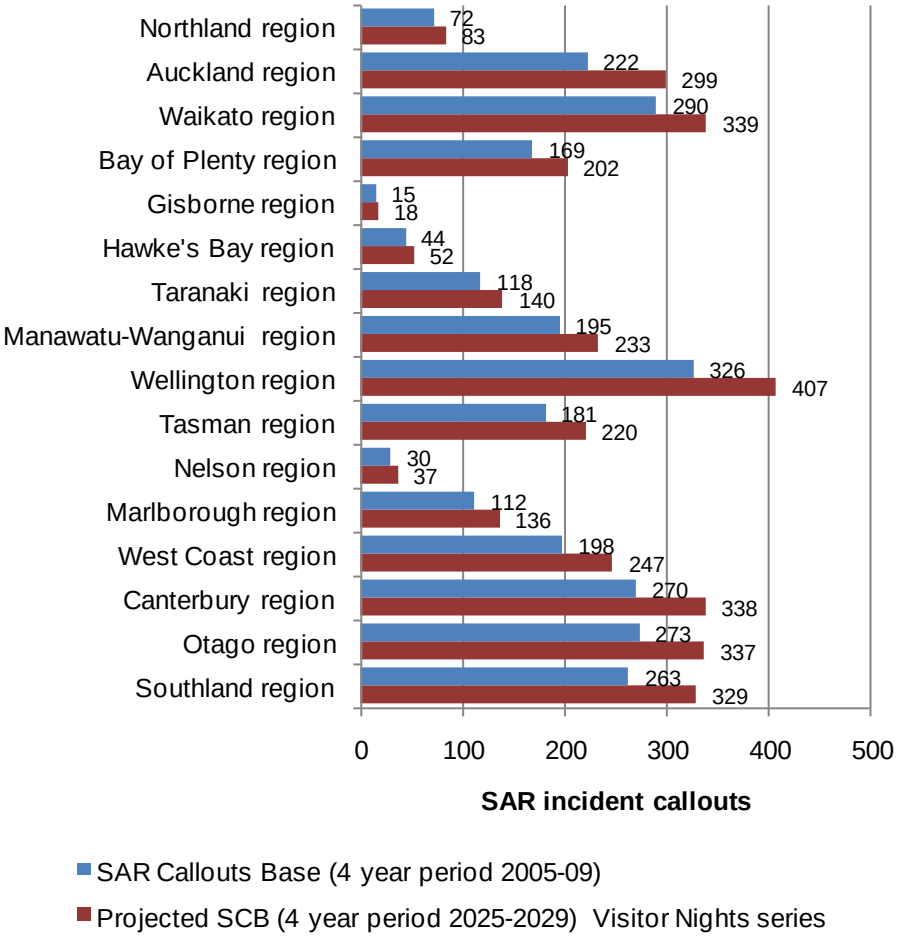


Figure 106. Land-based SAR incidents – present vs. estimated future

Notes:

- Figure 106 shows the projected increase in the total number of SAR incidents (over two four-year periods – firstly, the period leading up to 2010, secondly for period leading up to 2030).
- Projections suggest that all regions will have at least some increase in SAR incidents and may experience some resource strains in future.
- Large numerical increases shown in West Coast, Auckland, Canterbury, Otago and Southland. Data would point to these regions as the most likely candidates to experience resource strains in the future.
- Minimal change for Gisborne, Northland and Nelson.
- Moderate increases elsewhere.

Projected Land-based SAR incident callouts based on recreation/tourism projections* (adjusted by resident population sizes for 2006 and 2026 based on Census Medium level projections)

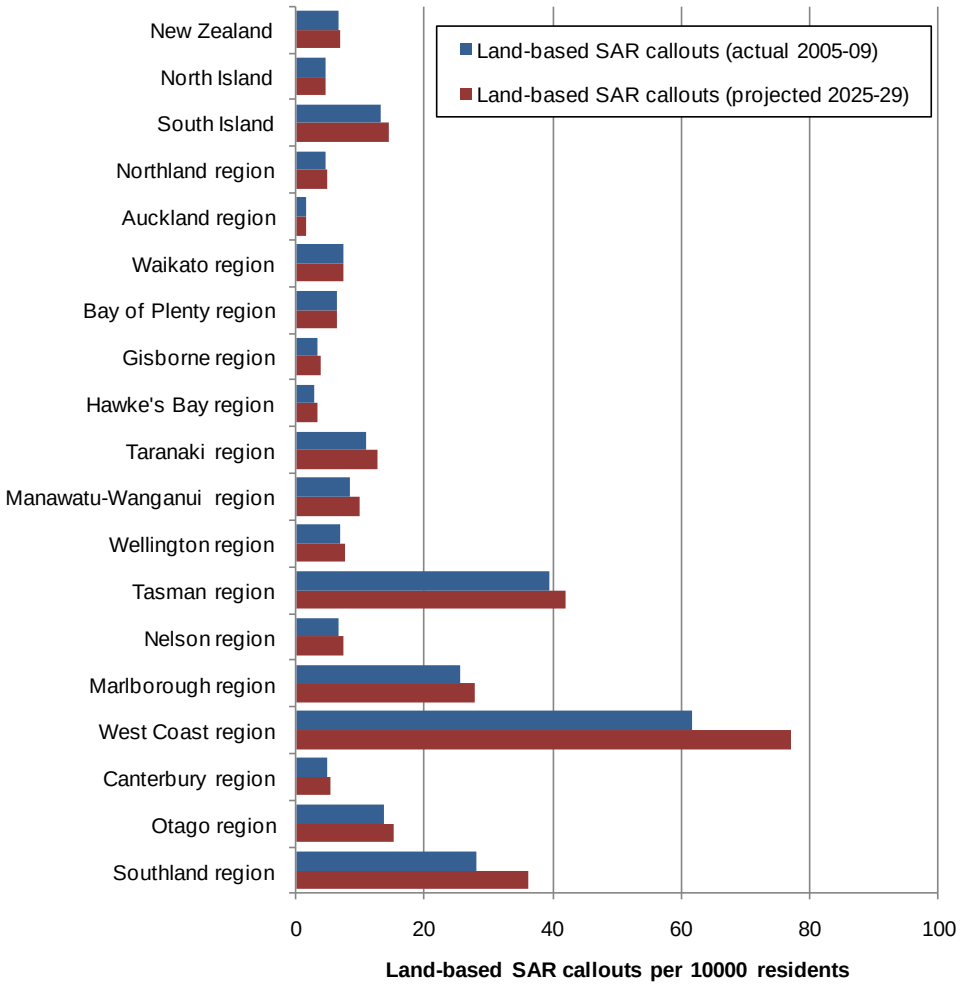


Figure 107. Land-based SAR incidents per 10000 residents – present vs. estimated future
* Based on recreation/tourism visitor nights projections

Notes:

- Data presented in Figure 107 are incidents per 10000 residents over two four-year periods – firstly, the period leading up to 2010, secondly for period leading up to 2030 (adjusted to size of regional population for 2006 and 2026 projected population).
- Note very high rates of increase for West Coast region (due in part to projected decline in population size) and Southland region. These are regions most likely to experience strain based on interplay between growth in visitor activity and projected resident population trends.
- Some other regions show moderate growth (Otago, Marlborough, Tasman, Taranaki).
- Most regions show static projection.
- North Island regions (combined) show static result. South Island regions, on the other hand, show moderate increase.

KEY PROFILE REPORT: Land-based incidents using recreation/tourism projections for New Zealand

This report examines a single incident profile type at the national level.

FOCUS: New Zealand

INCIDENT TYPE: Total land-based incidents (recreation and tourism based projection)

CURRENT BASELINE LEVELS CONSIDERED:

POPULATION:
Number of people resident (2006): 4.2m

INCIDENTS (Land based):
Number of incidents: 2778
Ratio of incidents per 10000 residents: 6.64

DEMAND:
Number of visitor nights (total) 99.8m (2009 data)

SUPPLY:
LandSAR volunteer capacity: 2805 people (median age 45 yrs)

FACTORS CONSIDERED, PROJECTIONS (WHERE AVAILABLE) AND DIRECTION/MAGNITUDE OF CHANGE:

Demand		**Supply**	
Number of visitor nights	Strong increase of 24% from 2009-2029	Total population growth for region	Strong increase of 23% from 2006-2031
		Total dependency ratio (including aged and young)	Strong increase from 50% (2006) to 64% (2031) – will place some strains on all resourcing.
		LandSAR capacity	Assumed moderate increase (due to growth in total population moderated by a reduced proportion of working age population relative to dependent)
		Median age	Projected to increase from 36 years (2006) to 40 years (2031).
Overall magnitude of change	**Strong Increase**		**Moderate increase**

Incident patterns			
	2010	**2030 (projected)**	**Increase (2010-30)**
Number of incidents (land based)	2778	3453	24% **(strong)**
Incidents (land based) per 10,000 residents	6.64	6.92	4% **(minor)**

MODEL OUTCOME: Demand> Supply

Commentary:

The projected rate of increase in tourism/recreation activity nationally is similar in scale to projected increase in the NZ population. The projection is for 25% increase in the number of incidents over the next 20 years (whereas there is only a minor growth expected in the number per 10000 residents – of 4% during that period). The effect of an aging regional population is likely to have a negative effect on SAR supply. Regional variations are considerable, with South Island regions (particularly West Coast and Southland) being most in tension as a result of projected recreation/tourism changes and local population dynamics.

EXCEPTION REPORT: West Coast land-based incidents
This report highlights a regional-incident profile that contrasts with the national level incident profile. The outcome for this region is considered significant at a national level.

REGION: West Coast

INCIDENT TYPE: Total incidents (recreation and tourism based projection)

CURRENT BASELINE LEVELS CONSIDERED:

POPULATION: Number of people resident: 32,100

INCIDENTS (Land based):
Number of incidents: 198
Ratio of incidents per 10000 residents: 62

DEMAND:
Number of visitor nights (total) 2.3m (2009 data)

SUPPLY:
LandSAR volunteer capacity: 83 people (median age 40 yrs)

FACTORS CONSIDERED, PROJECTIONS (WHERE AVAILABLE) AND DIRECTION/MAGNITUDE OF CHANGE:

Demand		**Supply**	
Number of visitor nights	Strong increase of 25% for 2009-2029	Total population growth for region	Decrease or static
		Total dependency ratio (including aged and young)	Dramatic increase from 52% (2006) to 86% (2031) – will place strain on all resourcing.
		LandSAR capacity	Strong decrease (due to reduced/static regional population, and shrinking of working age population relative to dependent population).
		Median age (for West Coast regional population)	Projected to increase from 40 years (2006) to 47 years (2031).
Overall magnitude of change	**Strong Increase**		**Strong decrease**

Incident patterns			
	2010	**2030 (projected)**	**Increase (2010-30)**
Number of incidents (land based)	198	247	25% **(strong)**
Incidents (land based) per 10,000 residents	62	77	25% **(strong)**

MODEL OUTCOME: Demand> >> Supply

Commentary:

The projected rate of increase in tourism/recreation activity in the West Coast is considerable. This is expected to increase the number of incidents (and the rate per 10000 residents) by 25% in the next 20 years. The effect of an aging regional population is likely to have a profound effect on SAR capacity/capability over the next 20 years. The pressures on resourcing SAR and other volunteer dependent services will be considerable. A large proportion of incidents in West Coast are tourism related (70% based on current data).

Table 153. Projected Land-based SAR incident callouts* source data

Regional council area	Pop. 2006	Pop. projected 2026	Population change 2006-2026	Population change 2006-2026 (%)	SAR Callouts Base (4 year period 2005-09)	SCB index (per 10000 residents based on 2006 pop)	Projected SCB (4 year period 2025-2029) Visitor Night series	SCBI (per 10000 residents based on 2026 pop) Visitor Night series	**Projection Variable:** Recreation rate of change (Visitor Nights projected 20 yr period 2009-2029)
Northland region	152,700	169,900	17,200	11.3%	72	4.72	83	4.90	15.6%
Auckland region	1,371,000	1,833,300	462,300	33.7%	222	1.62	299	1.63	34.6%
Waikato region	395,100	458,100	63,000	15.9%	290	7.34	339	7.40	16.9%
Bay of Plenty region	265,300	314,100	48,800	18.4%	169	6.37	202	6.45	19.8%
Gisborne region	46,000	46,700	700	1.5%	15	3.26	18	3.75	16.9%
Hawke's Bay region	152,100	158,800	6,700	4.4%	44	2.89	52	3.30	19.0%
Taranaki region	107,300	109,800	2,500	2.3%	118	11.00	140	12.72	18.4%
Manawatu-Wanganui region	229,400	237,800	8,400	3.7%	195	8.50	233	9.82	19.7%
Wellington region	466,300	531,700	65,400	14.0%	326	6.99	407	7.65	24.8%
Tasman region	45,800	52,300	6,500	14.2%	181	39.52	220	42.12	21.7%
Nelson region	44,300	49,200	4,900	11.1%	30	6.77	37	7.42	21.7%
Marlborough region	43,600	48,600	5,000	11.5%	112	25.69	136	27.98	21.4%
West Coast region	32,100	32,100	0	0.0%	198	61.68	247	77.04	24.9%
Canterbury region	540,000	635,500	95,500	17.7%	270	5.00	338	5.32	25.1%
Otago region	199,800	222,700	22,900	11.5%	273	13.66	337	15.11	23.3%
Southland region	93,200	90,600	-2,600	-2.8%	263	28.22	329	36.29	25.0%
North Island	3,185,100	3,860,400	675,300	21.2%	1,451	4.56	1773	4.59	
South Island	998,800	1,130,900	132,100	13.2%	1,327	13.29	1643	14.53	
New Zealand	4,184,600	4,991,900	807,300	19.3%	2,778	6.64	3453	6.92	24.3%

* Based on recreation/tourism visitor night projections .

7.3. Projected SAR incidents - Alzheimer's/Dementia

Projected SAR Dementia incident callouts based on Census Demographic Projection (for at risk 65yr+ age group).

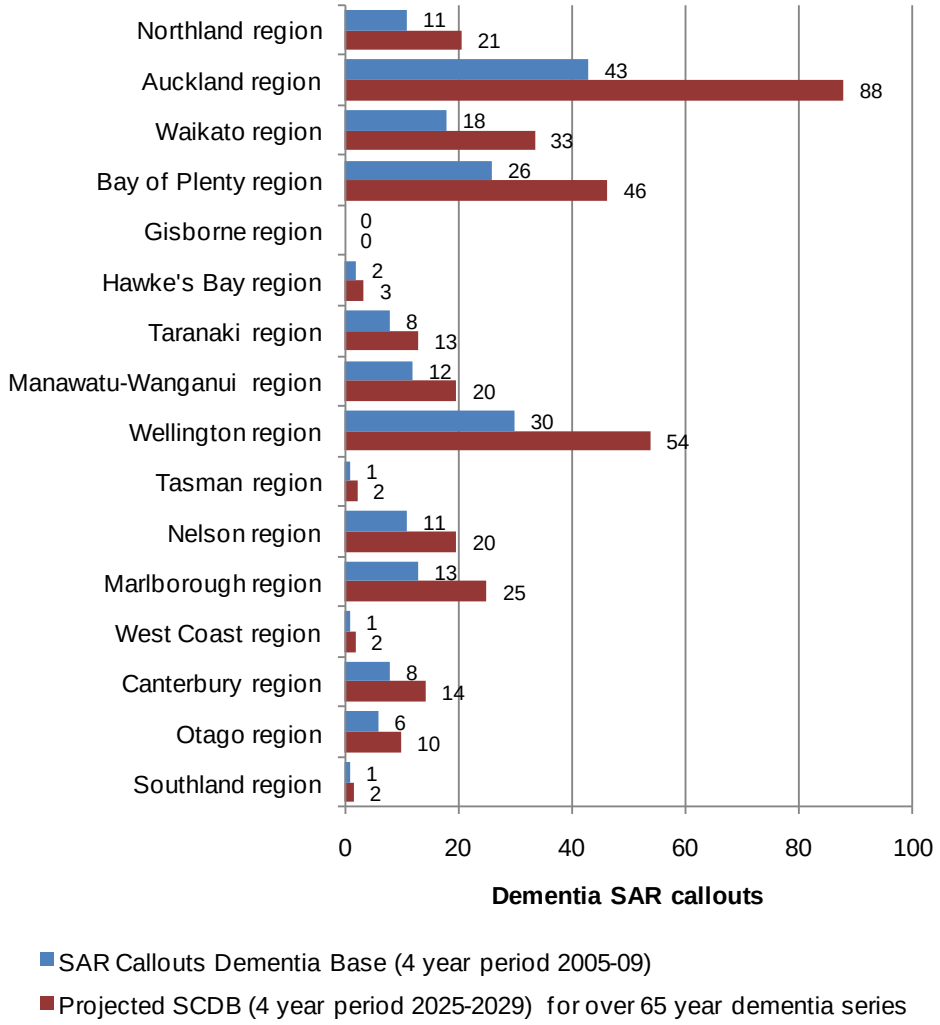


Figure 108. Dementia SAR incidents – present vs. estimated future

Notes:

- Figure 108 shows projected increases in the total number of SAR Dementia type incidents (over two four-year periods – firstly, the period leading up to 2010, secondly for period leading up to 2030).
- Large numerical increases predicted for Auckland, Bay of Plenty, Wellington, Northland, Nelson and Marlborough. Data would point to these regions as the most likely candidates to experience resource strains in the future.
- Moderate increases elsewhere.
- Projections suggest that most regions will have at moderate to large numerical increase in Dementia related SAR incidents. Certain regions will need to go 'up a cog' in terms of how they respond and resource this type of incident.
- No data for Gisborne.

Projected SAR Dementia incident callouts based on Census Demographic projections (for the at-risk 65+ age group, adjusted by resident population sizes for 2006 and 2026 based on Census Medium level projections).

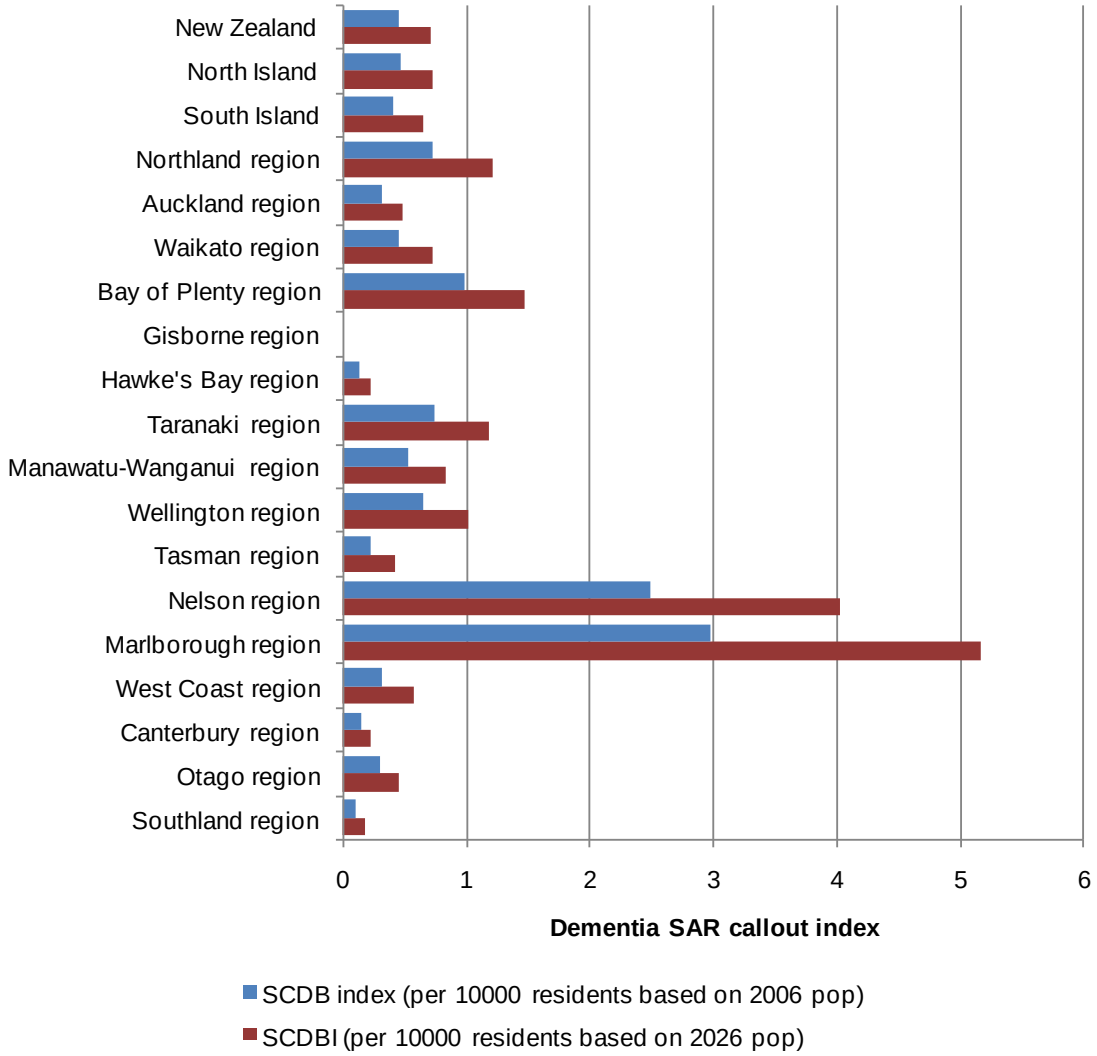


Figure 109. Dementia SAR incidents per 10000 residents – present vs. estimated future

Notes:

- Data presented in Figure 109 are incidents per 10000 residents over two four-year periods – firstly, the period leading up to 2010, secondly for period leading up to 2030 (adjusted to size of regional population for 2006 and 2026 projected population).
- Note very high rates of increase for Marlborough, Nelson, Taranaki, Bay of Plenty and Northland regions. These are regions most likely to experience strain based on interplay between growth in at risk 65yr+ age category and projected resident population trends.
- Some other regions show moderate growth (Hawke's Bay, Southland).
- Most regions show growth in Dementia based on this projection (hence North and South Island both show increases).

EXCEPTION REPORT: Auckland Alzheimer's/Dementia incidents
This report highlights a regional-incident profile that contrasts with the national level incident profile. The outcome for this region is considered significant at a national level.

REGION: Auckland

INCIDENT TYPE: Alzheimer's/Dementia

CURRENT BASELINE LEVELS CONSIDERED:

POPULATION:
Number of people resident: 1.37m

INCIDENTS:
Number of incidents: 43
Ratio of incidents per 10000 residents: 0.31

DEMAND:
Age dependency ratio: 14.2%

SUPPLY:
LandSAR volunteer capacity: 59 people

FACTORS CONSIDERED, PROJECTIONS (WHERE AVAILABLE) AND DIRECTION/MAGNITUDE OF CHANGE:

Demand (Auckland region)		**Supply (Auckland region)**	
Total population growth for region	Strong increase of 34% from 2006 to 2031	Total population growth for region	Strong increase
Age dependency ratio	Strong increase from 14% (2006) to 26% (2031)	Total dependency ratio (including aged and young)	Increase by from 46% (2006) to 55% (2031).
Size of 65yr+ age category	Strong increase of 142% from 134,000 (2006) to 324,000 (2031)	LandSAR capacity	Increase (assumed to increase at same rate as total regional population growth)
Median age	33.9yrs	Median age	44yrs
Changing ethnic profile of 65yr+ category	Shifting – increasingly diverse, although predominantly European		
Overall magnitude of change	**Strong Increase**		**Moderate increase**

Incident patterns			
	2010	**2030 (projected)**	**Increase (2010-30)**
Number of incidents	43	88	104% **(strong)**
Incidents per 10,000 residents	0.31	0.48	53% **(strong)**

MODEL OUTCOME: Demand >> Supply

Commentary:
Dementia incidents in Auckland are projected to double in number between 2010-30. Incidents per 10000 residents are projected to increase by 53% over that period. Increased demand for SAR services for this incident type will increase at a rate exceeding expected growth in supply – tension is the projected result.

Table 154. Projected Alzheimer's/Dementia SAR incident callouts*

	Total population size				Incident location data used				Population size (65+ age group)		**Projection variables**			
Regional council area	2006	2026	Pop change 2006-2026	Pop change 2006-2026 (%)	SAR Callouts Dementia Base (4 year period 2005-09)	SCDB index (per 10000 residents based on 2006 pop)	Projected SCDB (4 year period 2025-2029) for over 65 year Dementia series	SCDBI (per 10000 residents based on 2026 pop)	2006	2026	Population change in 65 yr + category 2006-2026	Population change 2006-2026 OVER 65 YRS (%)	SCDB % increase 2006-26	SCDBI % increase 2006-26
Northland region	152,700	169,900	17,200	11.3%	11	0.72	21	1.22	22,100	41,500	19,400	87.8%	87.8%	68.8%
Auckland region	1,371,000	1,833,300	462,300	33.7%	43	0.31	88	0.48	133,800	273,500	139,700	104.4%	104.4%	52.9%
Waikato region	395,100	458,100	63,000	15.9%	18	0.46	33	0.73	49,000	91,100	42,100	85.9%	85.9%	60.4%
Bay of Plenty region	265,300	314,100	48,800	18.4%	26	0.98	46	1.48	39,200	69,900	30,700	78.3%	78.3%	50.6%
Gisborne region	46,000	46,700	700	1.5%	0	0.00	0	0.00	5,500	9,200	3,700	67.3%	0.0%	0.0%
Hawke's Bay region	152,100	158,800	6,700	4.4%	2	0.13	3	0.22	21,000	36,300	15,300	72.9%	72.9%	65.6%
Taranaki region	107,300	109,800	2,500	2.3%	8	0.75	13	1.19	15,900	25,900	10,000	62.9%	62.9%	59.2%
Manawatu-Wanganui region	229,400	237,800	8,400	3.7%	12	0.52	20	0.83	32,500	53,600	21,100	64.9%	64.9%	59.1%
Wellington region	466,300	531,700	65,400	14.0%	30	0.64	54	1.01	53,100	95,300	42,200	79.5%	79.5%	57.4%
Tasman region	45,800	52,300	6,500	14.2%	1	0.22	2	0.42	6,200	13,600	7,400	119.4%	119.4%	92.1%
Nelson region	44,300	49,200	4,900	11.1%	11	2.48	20	4.02	6,400	11,500	5,100	79.7%	79.7%	61.8%
Marlborough region	43,600	48,600	5,000	11.5%	13	2.98	25	5.16	7,100	13,700	6,600	93.0%	93.0%	73.1%
West Coast region	32,100	32,100	0	0.0%	1	0.31	2	0.57	4,500	8,300	3,800	84.4%	84.4%	84.4%
Canterbury region	540,000	635,500	95,500	17.7%	8	0.15	14	0.23	74,700	133,900	59,200	79.3%	79.3%	52.3%
Otago region	199,800	222,700	22,900	11.5%	6	0.30	10	0.45	27,500	45,800	18,300	66.5%	66.5%	49.4%
Southland region	93,200	90,600	-2,600	-2.8%	1	0.11	2	0.18	13,000	20,800	7,800	60.0%	60.0%	64.6%
North Island	3,185,100	3,860,400	675,300	21.2%	150	0.47	281	0.73	372,200	696,300	324,100	87.1%	87.1%	54.4%
South Island	998,800	1,130,900	132,100	13.2%	41	0.41	73	0.64	139,400	247,700	108,300	77.7%	77.7%	56.9%
New Zealand	4,184,600	4,991,900	807,300	19.3%	191	0.46	352	0.71	511,600	944,100	432,500	84.5%	84.5%	54.7%

* Based on Census Demographic Projection (for at risk 65yr+ age group).

7.4. Projected SAR Marine incidents

Projected SAR Marine-based incident callouts based on domestic day visit projections.

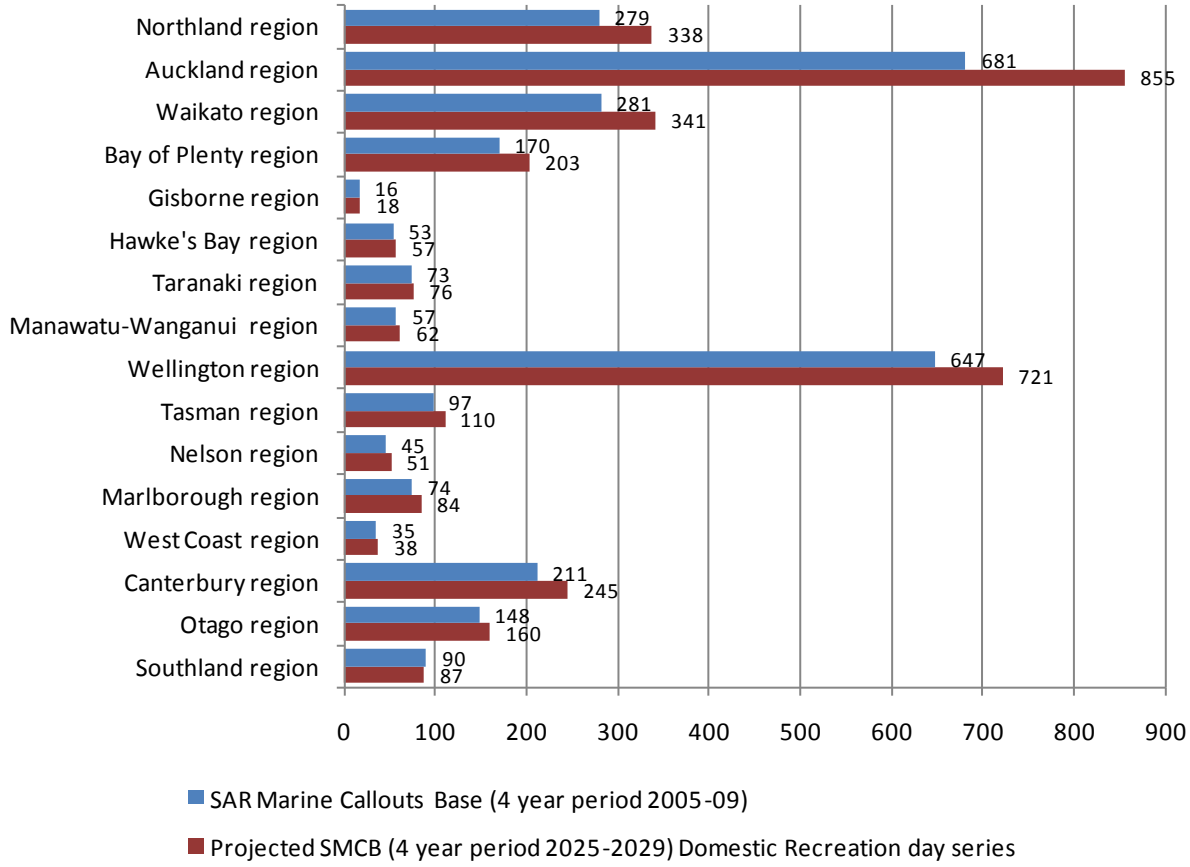


Figure 110. Marine SAR incidents – present vs. estimated future

Notes:

- Figure 110 shows projected increases in the total number of SAR incidents (over two four-year periods – firstly, the period leading up to 2010, secondly for period leading up to 2030).
- Minimal change most regions.
- Moderate numerical increases shown in Auckland, Wellington, Waikato and Northland.
- Projections suggest that most regions will have minor increases in SAR Marine incidents, however some will experience a static pattern (e.g., Hawke's Bay) or decline (e.g., Southland).

Projected SAR Marine-based incident callouts based on domestic day visit projections (adjusted by resident population sizes for 2006 and 2026 based on Census Medium level projections).

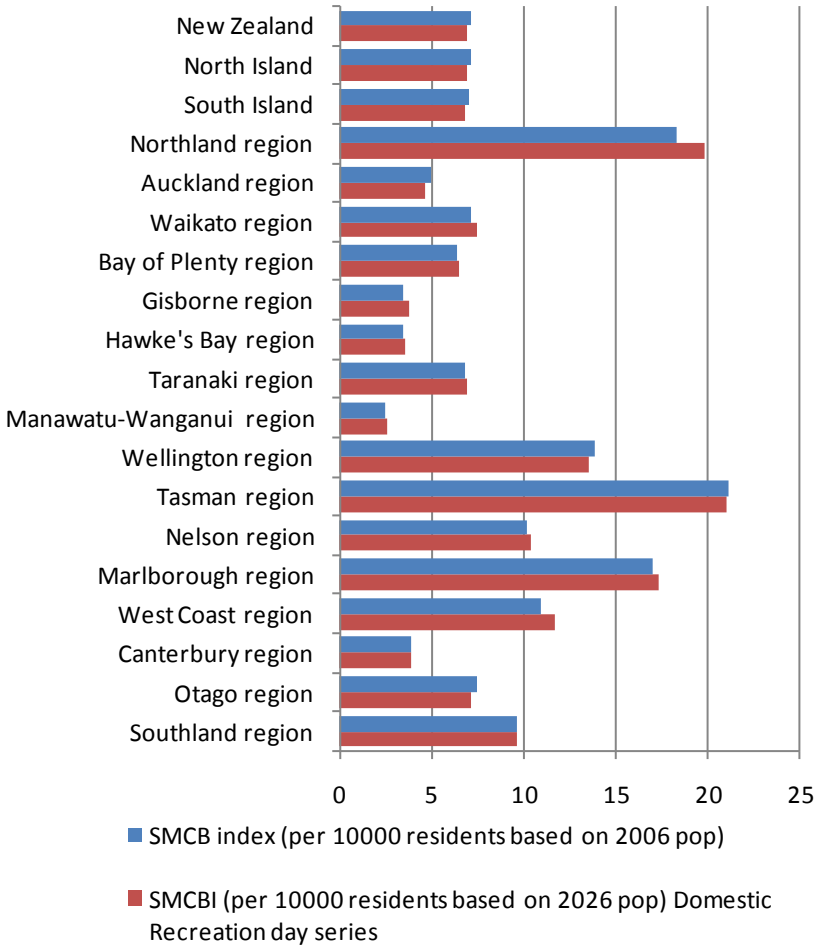


Figure 111. Marine SAR incidents per 10000 residents – present vs. estimated future

Notes:

- Data presented in Figure 111 are incidents per 10000 residents over two four-year periods – firstly, the period leading up to 2010, secondly for period leading up to 2030 (adjusted to size of regional population for 2006 and 2026 projected population).
- At a national level, the projection is for a slight reduction in incidents per 10000 residents.
- Most regions show a static projection.
- Large populated regions (such as Auckland and Wellington) are projected to have reductions in index figures – due in part to higher than average population growth.
- Note the high rate of increase for Northland region. This is the most likely of the regions to experience strain based on interplay between growth in domestic recreation activity and projected resident population trends.

KEY PROFILE REPORT: Marine based incidents for New Zealand
This report examines a single incident profile type at the national level.

FOCUS: New Zealand

INCIDENT TYPE: Total Marine based incidents

CURRENT BASELINE LEVELS CONSIDERED:

POPULATION: Number of people resident (2006): 4.2m

INCIDENTS (Land based):
Number of incidents: 2968
Ratio of incidents per 10000 residents: 7.09

DEMAND:
Number of day visits (domestic) 36.4m (2009 data)

SUPPLY:
Coastguard SAR volunteer capacity: 2110 people (median age 47 yrs)
Surf volunteer capacity: 15003 (median age 17 yrs)

FACTORS CONSIDERED, PROJECTIONS (WHERE AVAILABLE) AND DIRECTION/MAGNITUDE OF CHANGE:

Demand		**Supply**	
Number of domestic day trips	Increase of 17% from 2009-2029	Total population growth for region	Strong increase of 23% from 2006-2031
		Total dependency ratio (including aged and young)	Strong increase from 50% (2006) to 64% (2031) – will place some strains on all resourcing.
		Coastguard and Surf volunteer capacity	Assumed moderate increase (due to growth in total population moderated by a reduced proportion of working age population relative to dependent)
		Median age (for NZ population)	Projected to increase from 36 years (2006) to 40 years (2031).
Overall magnitude of change	**Moderate Increase**		**Moderate increase**

Incident patterns			
	2010	**2030 (projected)**	**Increase (2010-30)**
Number of incidents (Marine based)	2968	3470	17% **(moderate)**
Incidents (land based) per 10,000 residents	7.09	6.95	-2% **(minor decline)**

MODEL OUTCOME: Demand = Supply

Commentary:
The projected rate of increase in domestic recreation activity nationally (based on domestic day trips) is slightly smaller in scale to projected increase in the NZ population. The projection is for 17% increase in the number of incidents over the next 20 years; the expected outcome is a reduction in the number of incidents per 10000 residents of 2% during that period. The effect of an aging regional population is more likely to impact on Coastguard (due to its higher median age) than Surf. There is some variation in patterns regionally (e.g., Northland is projected to have the largest increase in incidents per 10000 residents, whereas most other regions are static).

Table 155. Projected SAR Marine-based incident callouts* source data

	Total population size				Incident location data used				**Projection Variable**
Regional council area	2006	2026	Pop change 2006-2026	Pop change 2006-2026 (%)	SAR Marine Callouts Base (4 year period 2005-09)	SMCB index (per 10000 residents based on 2006 pop)	Projected SMCB (4 year period 2025-2029) Domestic Recreation day series	SMCBI (per 10000 residents based on 2026 pop) Domestic Recreation day series	Recreation rate of change (Domestic day series projected 20 yr period 2009-2029)
Northland region	152,700	169,900	17,200	11.3%	279	18.27	338	19.87	21.0%
Auckland region	1,371,000	1,833,300	462,300	33.7%	681	4.97	855	4.66	25.5%
Waikato region	395,100	458,100	63,000	15.9%	281	7.11	341	7.44	21.3%
Bay of Plenty region	265,300	314,100	48,800	18.4%	170	6.41	203	6.46	19.4%
Gisborne region	46,000	46,700	700	1.5%	16	3.48	18	3.80	10.9%
Hawke's Bay region	152,100	158,800	6,700	4.4%	53	3.48	57	3.58	7.3%
Taranaki region	107,300	109,800	2,500	2.3%	73	6.80	76	6.91	4.0%
Manawatu-Wanganui region	229,400	237,800	8,400	3.7%	57	2.48	62	2.59	8.1%
Wellington region	466,300	531,700	65,400	14.0%	647	13.88	721	13.57	11.5%
Tasman region	45,800	52,300	6,500	14.2%	97	21.18	110	21.05	13.5%
Nelson region	44,300	49,200	4,900	11.1%	45	10.16	51	10.38	13.5%
Marlborough region	43,600	48,600	5,000	11.5%	74	16.97	84	17.33	13.8%
West Coast region	32,100	32,100	0	0.0%	35	10.90	38	11.69	7.2%
Canterbury region	540,000	635,500	95,500	17.7%	211	3.91	245	3.86	16.2%
Otago region	199,800	222,700	22,900	11.5%	148	7.41	160	7.18	8.0%
Southland region	93,200	90,600	-2,600	-2.8%	90	9.66	87	9.64	-3.0%
North Island	3,185,100	3,860,400	675,300	21.2%	2,257	7.09	2670	6.92	
South Island	998,800	1,130,900	132,100	13.2%	700	7.01	775	6.85	
New Zealand	4,184,600	4,991,900	807,300	19.3%	2,968	7.09	3470	6.95	16.9%

* Based on domestic day visit projections.

7.4.1. Marine case study – Shorebased

The projection used for this incident type was the national level ethnicity projection series (used due to the distinctive ethnicity link shown the shore-based Marine profile – refer Section 5.3.7, p155).

KEY PROFILE REPORT: Marine shore-based incidents for New Zealand
This report examines a single incident profile type at the national level.

FOCUS: New Zealand

INCIDENT TYPE: Total Marine shore-based incidents

CURRENT BASELINE LEVELS CONSIDERED:

POPULATION: Number of people resident (2006): 4.2m

INCIDENTS (Marine shore-based):
Number of incidents: 89. Ratio of incidents per 10000 residents: 0.22

DEMAND:
Ethnic profiles: various

SUPPLY:
Coastguard SAR volunteer capacity: 2110 people (median age 47 yrs)
Surf volunteer capacity: 15003 (median age 17 yrs)

FACTORS CONSIDERED, PROJECTIONS (WHERE AVAILABLE) AND DIRECTION/MAGNITUDE OF CHANGE:

Demand		**Supply**	
Ethnicity links to incidents	Incident rates for each ethnic group (per 10000 people) are 5 to 7 times higher for Mäori (0.47), Asian (0.53) and Pacific (0.67) peoples than European (0.09).	Total population growth for region	Strong increase of 23% from 2006-2031
Rate of projected population growth of each ethnic group from 2006-2026	Eur: 6.5% from 2.8m to 3.0m Mäori: 31% from 553k to 725k Asian: 95% from 359k to 699k Pacific: 60% from 267k to 428k	Total dependency ratio (including aged and young)	Strong increase from 50% (2006) to 64% (2031) – will place some strains on all resourcing.
Regional variation in size of ethnic populations	Concentrated Asian and Pacific ethnic populations in Auckland and Wellington regions	Coastguard and Surf volunteer capacity	Assumed moderate increase (due to growth in total population moderated by a reduced proportion of working age population relative to dependent)
		Median age (for NZ population)	Projected to increase from 36 years (2006) to 40 years (2031).
Overall magnitude of change	**Strong Increase**		**Moderate increase**

Incident patterns			
	2010	**2030 (projected)**	**Increase (2010-30)**
Number of incidents (Marine shore-based)	89	128	43% **(strong)**
Incidents (Marine shore-based) per 10,000 residents	0.22	0.27	20% **(strong increase)**

MODEL OUTCOME: Demand > Supply

Commentary:
The projected rate of increase in shore-based marine incidents nationally (based on ethnicity projections) will outpace the rate of growth in the NZ population. The projection is for a 43% increase in the number of incidents over the next 20 years; the expected outcome is an increase in the number of incidents per 10000 residents of 20% during that period.

Assuming the current regional patterns of ethnic populations, the likely growth in incidents will be felt most in Auckland and Wellington regions (currently 2/3^{rds} of each of the total Pacific and Asian ethnic groups reside in one region – Auckland; followed by Wellington which has 13% of the Pacific and 10% of the Asian populations nationally). In terms of supply, these regions are projected also to benefit from relatively high population growth rates.

Table 156. Projected Marine shore-based incident callouts (NZ)* source data

Census data					Incident data used		**Projection variable**	Projection	
Ethnicity	Census (resident pop 2006)	Proportion of resident pop (2006)	Projected pop 2026	Derived total pop (2006)	Number of inshore incidents (2010 base)	Incidents per 10000 within each ethnic group (2010)	Rate of projected growth (2006-2026)	Projected incidents 2026	Incidents per 10000 within each ethnic group 2026
European subject	3213300	70.7%	3039480	2848623	26	0.09	6.7%	28	0.09
Mäori subject	624300	13.7%	725017	553448	26	0.47	31.0%	34	0.47
Asian subject	404400	8.9%	698726	358505	19	0.53	94.9%	37	0.53
Pacific subject	301600	6.6%	427527	267371	18	0.67	59.9%	29	0.67
Total	4543600	100.0%	4805341	4027947	89	0.22	19.3%	128	0.27

* The projection used for this incident type was the national level ethnicity projection series.

7.5. Other potential projections

There are several areas where more projections can be usefully achieved. This is a brief list of priority areas:

- Tramping incidents
- Walking incidents
- Hunting incidents
- Tourist incidents
- Other incident type projections (as need arises)
- Regional analysis and profiles. This involves identifying specific projections for SAR incidents and/or detailed incident/supply profiles at a regional level with targeted reporting to specific agency needs (along the lines of what has been undertaken, although at a more narrow scope, for projected West Coast LandSAR incidents (refer Section 7.2, p. 215), or Auckland Alzheimer's/Dementia incidents (7.3, p. 220).

8. Summary conclusions and recommendations

8.1. General

The model that was developed specifically for this study (the supply and demand model) appears to have performed well in terms of its intended purpose. Its application and the outcomes projected appear sufficient for the purpose of informing SAR strategic planning.

The application of the model to specific incident types indicates that, on the basis of projections used, there will be tensions in terms of excess demand for SAR services in three of the four modelled incident types (specifically Land based incidents due to recreation/tourism pressure, Alzheimer's/Dementia based on NZ's aging population, and Marine shore-based incidents based on ethnicity projections).

The supply and demand factors considered as part of the model have, in themselves, implications for SAR. The supply and demand profiles enable comparisons to be made across the volunteer SAR sector, and highlight regional differences within. Certain features stand out as having importance for SAR readiness in the medium to long term, particularly in relation to aging volunteer profiles. These are demonstrated most clearly with AREC, and somewhere for LandSAR and Coastguard.

Analysis of the amount of volunteers relative to the number of incidents for each region help to identify those regions that are either above, or below average in terms of relative volunteer resourcing for SAR. Those regions where resourcing is below average warrant closer examination, in order to determine whether they require specific management interventions targeted at increasing retention and recruitment of volunteers. This should be done in light of the longer term projections identified for each region.

The findings of this study point to the need for strategic planning for SAR to take account of the following:

- Population growth & regional patterns
- Ethnically more diverse populations & more diverse activities
- Changing SAR incident demands
- Aging population structure
- Projections for less volunteer capacity/capability in certain regions (e.g., West Coast) or functions (e.g., Radios - AREC)
- The likely impact of technology. This is a two-edged sword in terms of potentially improving SAR efficiency and effectiveness, and at the same time creating further challenges in terms of changing incident demands – including increased expectations for immediate and successful SAR response)
- Growth in tourism and recreation demands regionally
- Greater resource competition for SAR (particularly in regions where aged dependency ratios are projected to majorly increase)
- Aligning information/research needs both within the SAR sector and beyond

Findings point towards the opportunity for SAR agencies to apply management responses that best suit the specific contexts for each agency/region or incident type. Various initiatives are outlined below that have potential for application:

- Programmes developed to improve volunteer recruitment and retention (including training)
- Programmes that specifically address the current and potential roles for women & youth
- Programmes based around the 'One-SAR' concept with the objective of creating 'One-SAR' career paths and training opportunities. The potential for SAR volunteers to work and move across SAR sectors warrants further analysis
- Evaluating regional and central resourcing (particularly in relation to pressures from greater professionalising of SAR). Going 'up-a-cog' for certain regions in terms of their future resourcing/readiness may be warranted based on anticipated growth of demand.

- Balancing volunteer and professional roles within SAR
- Programmes aiming to Influence SAR demand (i.e., SAR incident prevention, education and awareness) along with partner agencies (e.g., recreation clubs, Mountain Safety Council, Department of Conservation, Regional Tourism Organisations, Ministry of Tourism and NZ Police).

Certain areas warrant close attention, as they are pivotal for future modelling and prediction work: such as ensuring there is sufficient and longitudinal data collected on incidents, supply (and also for relevant demand variables). Gaps in data sources were evident during the course of this study. The study highlights the importance of information sources as a key driver, or' fuel', for projecting out the future for SAR.

There is opportunity for greater integration, streamlining and management of data sources – and this is an area worthy of closer attention collectively across all SAR agencies (with the objective of achieving better and more efficient data management).

8.2. Updating projections

The projections undertaken for this project are based on historical data. The potential exists for the model to be refreshed as updated or new and improved data becomes available. The cycles for data updates include annual cycles (in relation to incident data), 5- yearly cycles (in relation to population census) and irregular cycles (of updated data from census and/or tourism projections).

8.2.1. Periodic updates of projections/model

The census cycle (5 yearly, with next round in 2011) is a suitable frequency for the various models to be updated (with earlier updates contingent on whether there are significant changes in forecasts/projections for key variables).

A further detailed assessment of trends in incidents and all supply variables is necessary. The authors were precluded from achieving this due as a lack of sufficient and reliable longitudinal data at the time of this study. This assessment may be possible around 2011/2012 (by which time incident data should be available covering 5-6 years).

8.3. Research and information

The main research development contributing to the New Zealand SAR sector in recent years has been the publication of 'Lost Person Behaviour' (Koester 2009), which is based in considerable part on New Zealand SAR data. This has provided a key resource for more effectively directing SAR techniques and operations in the field. Outside of this leading work, research on SAR-specific needs has been relatively rare both in New Zealand and overseas.

The current project represents a strategic response to this deficiency. By addressing the high-level issues of SAR demand and supply, it provides the basis for identification of a wide range of specific themes for priority research and development. The main themes forthcoming are summarised below (with qualitative **cost/benefit assessments underlined**). These represent options for SARINZ and the wider SAR community to consider for the purpose of improving future SAR response/readiness based on identified projections.

8.3.1. Baseline descriptive data

This is data that is already being partially collected, but would benefit from greater standardisation and consistency of collection across the SAR sector. It provides key planning information on the overall demand and supply factors related to SAR. This is a shared cross-sector need. (High benefit/low cost)

8.3.2. SAR Volunteer profile characteristics

Consistent and simple basic data on volunteer age, gender and home location are required across the SAR volunteer sector. Consideration should be given to extending the information collected (to include ethnicity, occupation and interest/skill areas (high benefit/low cost). Different SAR sector groups collect these data but this is not yet done consistently either between groups or within them. Some standardised variables are required, they need to be collected consistently and pre-authorised for reporting and analysis purposes.

8.3.3. SAR Incident characteristics and patterns

Consistent and simple basic data is required on incident characteristics and location. Incident characteristics cover the type of incident, incident location and related contributing factors (also linked to respective SAR subject characteristics). Location characteristics cover the specific location (including map-standard grid/GPS references) and physical environment type of the incident.

The P130 data does provide a basic framework, but is subject to uneven reporting levels and changing variable types. In order to reduce the potential for burden on staff time (for those completing the Police P130 forms) it may be necessary for further review and rationalisation of priority content. (High benefit, low cost)

It is recommended that there is further work undertaken with RCCNZ to review and refine beacon-based incident data variables and their recording to be more consistent with wider SAR incident data. (High benefit, low cost)

8.3.4. SAR subject characteristics

Consistent and simple basic data is required on SAR subject age, gender, home location, and activity type. Better specification of Marine activity types is required, with the generic 'boating' activity perhaps specifically distinguished by trip purpose or style of boating activity. Other data variables, addressing subject behaviour when lost, may need to be refined and simplified. Some standardised variables are required, they need to be collected consistently, and they need to be available. Overall high benefit, low cost

Related recommendation

It is recommended that SARINZ advocate for a central repository role for managing SAR sector baseline data (on behalf of the sector). In doing this, SARINZ may wish to initiate scoping discussions for developing cross-sector approaches to obtain resources for developing coordinated database options and tools. (High benefit/medium cost)

Note that the 2010 budget has cut the Cross Departmental Research Pool completely, removing the primary target that would have been recommended for any proposed bid.

Funding options to consider instead would include those available to charitable trusts (such as Lotteries funding and Community Energy Trusts). Another alternative would be to approach central government agencies for research/operational funding (such as NZ Police, Tourism and Conservation).

For SARINZ and SAR sector: high benefit, medium cost

8.4. Volunteer Recruitment and Retention Initiatives

Information gathered about volunteer needs and experiences would provide the basis for identifying strategies to encourage greater volunteer recruitment and retention. They would also assist identification of common 'pathways' of longer term volunteer involvement.

In order to maximise the value of these initiatives, target agencies/regions should include those projected to experience the highest degrees of tension (i.e., taking an action-research approach building on findings from the present study). The more specific these initiatives/studies, the more specifically they can address priority SAR volunteer roles. Any work on such studies can be in collaboration with the wider volunteer sector.

For agencies involved: high benefit/low cost with potentially large spillover benefits across all agencies

The variable nature of the interaction between SAR controlling authorities (e.g. NZ Police capability) and their use of volunteer resources across the country has not been systematically analysed (and was not covered as part of this study). This would represent an opportunity to identify examples of best practice resource-use, and examples of where cost-effective, time effective and volunteer-sustaining improvements could be made - (high benefit/medium cost).

Baseline descriptive data – as noted above.

8.4.1. Motivations and satisfactions

- Undertake research to identify the motivations and satisfactions of SAR volunteers that drive their participation in the SAR sector (e.g. LandSAR, Coastguard, Surf Life saving, AREC) - Medium benefit/medium cost
- Coastguard and LandSAR volunteer groups share very similar gender and age-group patterns, and also the characteristic of uneven distribution around New Zealand. Given these basic similarities, it is likely that issues of volunteer aging, recruitment and retention may be relatively similar for both organisations. This suggests collaboration in volunteer research may be productive (Med/High benefit/medium cost)
- Examine the experience of Women SAR volunteers and identify their motivations and constraints (High benefit/medium cost)
- Identify the motivations and satisfactions of Surf Life Saving volunteers, with particular attention to factors affecting the retention of all volunteers overall, and of younger women volunteers in particular (Medium benefit/medium cost)
- Identify the motivations and satisfactions of YouthSAR volunteers, as part of a wider case-study of YouthSAR groups and their development (Medium benefit/medium cost)

8.4.2. Priority volunteer roles

- There would be much benefit to be derived from identifying and consolidating priority volunteer roles and competencies (using established frameworks) across all SAR operations. This would enable the identification of potential pathways for volunteer development within and across SAR roles. This is an important foundation for an integrative 'One-SAR' career path, and associated recruitment and retention initiatives. (Medium benefit/high short term cost)

- Assess the roles that professional staff or commercial providers may play in future SAR provision (High benefit/low cost)
- Revise volunteer resourcing and roles taking account of current and likely future developments in technology, and modelled projections (High benefit/low cost)

8.4.3. YouthSAR Case Studies

- Review and summarise the development and current status of YouthSAR groups, including any separate youth-based groups included in initiatives (e,g, Scouts, Guides, Youth groups). Include assessment of participant motivations, experiences and satisfactions. Summarise the training processes which have been undertaken with YouthSAR groups and evaluate the outcomes. Adoption of best practises identified to improving youth participation and their retention. (High benefit/medium cost)
- Identify any potential cross-sector training opportunities that could link youth interest across the different SAR disciplines (e.g. Surf youth training with Coastguard in boat use, or with LandSAR in coastal searches). (High benefit/low cost)
- Identify the degree of alignment of formal qualification types and standards with SAR-related training courses, and any options to potentially increase opportunities to earn recognised qualifications. (Medium benefit/high short term cost)

8.5. SAR volunteer training

- Develop paths and models for training SAR volunteers based around the SAR Core Competency Curriculum. Needs for training can be prioritised based on the findings from this report (addressing, for example, specific gaps and needs in relation to aging volunteer-bases for LandSAR and Coastguard). (High benefit/low cost)

8.6. Advocacy

- Advocate strongly for recreation participation research to be undertaken centrally (i.e., by non-SAR agencies) so that the implications of changing participation patterns and their influence on incident rates can be better understood (High benefit/low cost – spill-over benefit across a range of central government agencies who are potential clients of improved outdoor recreation participation baseline data)
- Support any further opportunities for enhancing the public profile of SAR using media options or demonstrations (High benefit/low cost)
- Continue to advocate the One-SAR concept within the SAR sector (High benefit/low cost)
- Actively share results of SAR related research from a central information source (e.g. maybe a One-SAR website hosted by a key SAR agency) (High benefit/medium cost)

8.7. SAR Subjects

Information gathered on SAR subjects tells us who is getting in to trouble and what they were doing to get them into such situations. Improving this information will help predict areas of potential long-term SAR pressure, and also to target preventative actions at the most 'at-risk' groups.

Baseline descriptive data – as noted above.

8.7.1. Tourist SAR subjects

- If it is decided to undertake specific prevention initiatives (e.g., Tramper incidents), design them in such a way that the specific needs of NZ subjects are considered separate to those of Tourist subjects. (Medium benefit/low cost)

8.7.2. Marine SAR subjects

- Distinguish the recreation activity types more clearly within the generic 'Boating' activity category currently used. This would be based on more specifically identifying the purpose of the boat use Note that Water Safety New Zealand has over 20 different marine recreation activity categories in its DrownBase database. (High benefit/low cost)
- Develop a standard classification of Marine setting-types so that incidents can be better linked to the specific physical environments involved. When accompanied by improved location references (e.g. GPS reference), this would help identify hot spots of greater Marine SAR concern. Consider adapting the high level classifications used in the NZ Recreation Opportunity Spectrum guidelines for marine areas (refer Taylor, 1993). (Medium benefit/low cost).

8.7.3. Dementia SAR subjects

- Review the uptake and use of tracking technology on Dementia subjects internationally, and examine applications in a New Zealand case study (e.g. Auckland SAR and Police with 'WandaTrak'). (High benefit/low cost).
- Review SAR Dementia response and reporting across New Zealand by Police and LandSAR groups, and assess the current time and resource demands to identify potential hot spots of future SAR pressure. (High benefit/medium cost)

8.7.4. Aging SAR subjects

- Advocate for research (as part of a broader programme of recreation participation research noted earlier) that identifies and monitors trends in aged-person recreation activity participation using Statistics New Zealand data and any research available on aged-person recreation. Key trends relate to activity site choice nearer to home and to the front-country have been suggested but not identified. This also applies to ethnic group subjects. (High benefit/low cost)

8.7.5. Ethnic group subjects

- Monitor any trends in ethnic recreation activity participation using Statistics New Zealand data and any research available on ethnic group recreation (as part of a broader programme of recreation participation research noted earlier). Key trends relate to activity site choice nearer to home and to the frontcountry have been suggested but not identified. This also applies to aged-person subjects. (High benefit/low cost)
- There has been considerable work done to address the issue of drowning from shore-based fishing in the West Auckland beaches. This involved identifying target-groups and customising specific initiatives. Review this as an example of the scale and type of actions that might be considered in prevention initiatives targeting a high-risk group (High benefit/low cost)

8.8. Outdoor skills

- Review research on outdoor skills and preparation among recreation activity participants, with a focus on testing the assumption that skills among current participants are lower than those of the past, and that these will continue to decline (Medium benefit/medium cost)
- Review research (if any) on the impact that technological dependence may have on basic outdoor skills (such as spatial reckoning and way-finding) and related SAR demands (Medium benefit/low cost)
- There is not any NZ data indicating any relative decrease in outdoor skills, with the exception of swimming and water skills among children, as identified by Water Safety NZ. By using that as a case-study of how to deal with a similar type of skills shortage, it can be deduced how achievable/resource intensive it might be to attempt to increase general outdoor skills (Medium benefit/low cost)
- SARINZ could collaborate further with Mountain Safety and the outdoor education sector on promoting basic outdoor skill development (High benefit/low cost – large potential for spill over benefits for partners)

8.9. SAR Technology and Information Systems

Baseline descriptive data – as noted above for RCCNZ beacon data management

- SAR technology relates to the use of beacons (including tracking technologies), communications, and SAR tools (such as GIS, night-vision and Infra-red cameras). Expert overview of implications from these technologies is required, along with a standing review to identify new developments. Such reviews should identify the effectiveness of new technologies and efficiency gains arising. (Medium benefit/medium cost)
- Review opportunities for greater sharing of existing information and systems between SAR agencies to enable immediate and up-to-date data to be accessed by SAR agencies (incorporating GIS information from a range of agency sources including managers of public land - such as Department of Conservation and Territorial Authorities). (High benefit/medium cost)
- Modern search strategies involve the use of behavioural profiling, probability theory, terrain interpretation and resource management, and Geographic information systems provide a platform to integrate these various elements into an effective tool for managing search operations (Ferguson, 2008). The New Zealand SAR sector needs to explore the operational efficiencies to be gained by integration of SAR with GIS. (High benefit/medium cost)

8.9.1. Location and Beacon Technology

- Undertake a study to determine the expectations of SAR response among new 406hz beacon holders, and distinguish marine, air and land based users. (Medium benefit/medium cost).
- Assess opportunities to undertake collaborative work with GIS specialists to deliver novel GIS based search and rescue applications. (High benefit/medium cost).
- Review international experience with beacons, and identify the proportions and types of incidents where reliance on technical location-finding was unreliable in some way. Note that New Zealand has very high and rapid adoption rates for such devices, and that overseas experience may not be any greater that that here. (Medium benefit/low cost)
- Where database information and content allows, identify and profile the characteristics of beacon/PLB-generated SAR call-outs. (High benefit/medium cost).

8.9.2. Communications

- Examine the current use of radio communications in SAR operations, and the future role of volunteer radio operators. This is driven by the strongly aging-profile of AREC volunteers and the lack of any obvious recruitment pathway. (High benefit/low cost – depending on the extent to which this is considered a critical issue for SAR).
- If other communications technology is progressively replacing radio then any such trend should be identified along with any potential volunteer requirement. (High benefit/low cost).

8.10. Final observations

Overall, a series of insights and observations have been gained during this report. These are noted below:

- Forward-focussed work of this type is unprecedented in the SAR sector in New Zealand or overseas. This is demonstrated in the literature review which highlights the large gaps in SAR research coverage.
- There is considerable potential for international publication of material from this project which would help raise New Zealand's international profile as being among the leaders in SAR research and development.
- There is potential for the New Zealand SAR sector to conduct innovative research and development based on gaps and needs identified in the report. This would also help raise New Zealand's international profile as being among the leaders in SAR research and development.
- The work on Lost Person Behaviour as synthesised by (Koester 2009) represents one key strategic use of baseline SAR data to date to help SAR practitioners refine their planning and effectiveness in conducting operations. This report also represents a key strategic use of baseline SAR data and additional projection analyses to help the SAR sector understand its supply and demand factors, and to plan more strategically for these in to the future.
- There is considerable opportunity, at low cost, to improve the baselines of SAR supply and demand data, and to align them better in accordance with a 'OneSAR' principle and direction. This is in accordance with the progressive general directions being taken by individual SAR sector groups in terms of their information reporting, recording and management
- The volunteer sector is extensive and diverse, but prior to this report it had not been investigated in any depth beyond some one-off consideration of training needs. Australian work on bush fire-fighting volunteers provides the most directly relevant model for approaches to address the SAR sector volunteers. There are few other SAR-related examples of practical use beyond that. Wider volunteer research can provide key guidance on general volunteer principle and examples of research and management approaches.
- Comprehensive role analysis for fulfilling SAR needs is only recently being applied in parts of the SAR sector. This needs to be aligned with progressively improved understanding of SAR volunteer's characteristics, motivations, satisfactions and outcomes. This project provides a key baseline for an enhanced approach to understanding and planning for volunteer needs – including their needs from volunteering, and the SAR Sectors changing needs for their time and skills. The potential of women as a key future volunteer resource is very high.
- The variable nature of the interaction between SAR controlling authorities (e.g. NZ Police capability) and their use of volunteer resources across the country has not been systematically analysed (and was not covered as part of this study). This would represent an opportunity to identify examples of best practice resource-use, and examples of where cost-effective, time effective and volunteer-sustaining improvements could be made.

This project has represented an ambitious first step in scoping the wide range of SAR supply and demand issues, and signals many specific areas where there are both gaps and opportunities.

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References

AIPC, 2007: *Factors in Ambulance demand: options for funding and forecasting - consolidated report.* Australian Institute for Primary Care, LaTrobe University, Victoria, Australia. 122p. Viewed/downloaded at http://convention.ambulance.net.au/intranet/docs/Ambdemand_funding_forecasting.pdf

Auckerman, R. & Davidson, G. 1980: *The mountain land recreationist in New Zealand*. Canterbury, New Zealand: Tussock Grasslands and Mountain Lands Institute, Lincoln College.

Babbie, E. 1998: *The practice of social research.* Wadsworth, Belmont, CA.

Beatson, R. 2005: Recruitment and Retention of Female Volunteer Firefighters. *Occasional Report 2005:1.* Enhancing Volunteer Recruitment and Retention Project (D3), Bushfire Cooperative Research Centre (CRC), Australia. Included as Appendix C in: McLennan and Birch 2006.

Beaston, R; McLennan, J. & Birch, A. 2008: Recruiting and retaining women fire service volunteers. *FIRENOTE No. 23*, February 2008. Bushfire Cooperative Research Centre (CRC) and Australasian Fire Authorities and Emergency Services Council (AFAC). Melbourne, Victoria. Viewed/downloaded at: http://www.bushfirecrc.com/publications/downloads/Fire-Note-23-Volunteers-Women.pdf

Birch, A. & McLennan, J. 2006*: The availability of potential volunteers in regional NSW*. Viewed/downloaded at: http://bushfirecrc.com/documents/poster_progd%20-%20Birch.pdf

Birch, A.; McLennan, J.; Cowlishaw, S. & Beatson, R. 2007: *Arresting the decline in volunteer numbers: The New Member tracking survey.* Poster Tracking Survey. Bushfire Cooperative Research Centre (CRC), Project D3 – Enhancing the recruitment and retention of volunteers. Viewed/downloaded at: http://www.bushfirecrc.com/publications/D_Birch.pdf

Booth, K. & Mackay, M. 2007: *Tourism and Recreation in New Zealand's Natural Environment: A Bibliography and Research Synthesis.* Report prepared by Kay Booth and Associates for the Ministry of Tourism. Ministry of Tourism, Wellington Viewed/downloaded at: http://www.tourismresearch.govt.nz/Documents/Research%20Reports/TourismAndRecreation/Synthesis.pdf

Booth, K., & Peebles, C. 1995: Patterns of Use. In P. Devlin, R. Corbett & C. Peebles (Eds.), *Outdoor Recreation in New Zealand: Volume 1: A review and synthesis of the research literature* (Vol. 1, pp. 31-61). Lincoln, New Zealand: A Joint Publication of Department of Conservation and Lincoln University.

Cessford, G.R. 2009: *National Incident Database Report 2007-08.* Research Programme, New Zealand Mountain Safety Council, Wellington. Viewed/downloaded at: http://www.incidentreport.org.nz/resources/NID_Report%20_2007-08.pdf

Cessford, G.R. 2010: *National Incident Database Report 2009.* Research Programme, New Zealand Mountain Safety Council, Wellington. Viewed/downloaded at: http://www.incidentreport.org.nz/resources/NID_report_2009.pdf

Chronister, T. 2008: Space age pocket protectors go mainstream - Personal Locator Beacons: Lifesaving dream or the next false alarm nightmare? *Law Enforcement Technology,* October 2008. Viewed/downloaded at: http://www.officer.com/print/Law-Enforcement-Technology/Space-age-pocket-protectors-go-mainstream/1$43825

Corydon Consultants, 2008: Training for Rural Firefighters: Motivators and Impediments. *Research Report Number 84*. New Zealand Fire Service Commission. Wellington. 62p. Viewed/downloaded at: http://www.fire.org.nz/Research/Publishsed-Reports/Documents/4b22c3bb403eb94fd97bd83fb680cb0b.pdf

Denver, M.: Perez, J. & Aguirre, B.E. 2006: *Local search and rescue teams in the United States.* Preliminary paper, Disaster Research Centre, University of Delaware. Viewed/downloaded at: http://www.google.co.nz/search?hl=en&source=hp&q=megan+denver+jaime+perez&aq=f&aqi=&aql=&oq=&gs_rfai=

Denver, M.; Perez, J. & Aguirre, B.E. 2007: Local search and rescue teams in the United States. *Disaster Prevention and Management* 16(4):503-512.

Department of Conservation, 2007: *West Coast Te Tai O Poutini Conservation Management Strategy.* (Draft – 2007-2017) 683 p. http://www.doc.govt.nz/upload/documents/about-doc/role/policies-and-plans/west-coast-cms/volume-1/cms.pdf (viewed 14 May 2010).

Dignan, A. 2009: *Public Ski Area Incident Report 2009.* Research Programme, New Zealand Mountain Safety Council, Wellington. Viewed/downloaded at: http://www.incidentreport.org.nz/resources/PublicSkiAreaIncidentReport2009.pdf

Dignan, A. & Cessford, G.R. 2009: *Outdoor Recreation participation and incidents in New Zealand.* Mountain Safety Council. Wellington New Zealand. Viewed/downloaded at: http://www.mountainsafety.org.nz/files/Participation-and-Incident-GC-Fixed.pdf

Esmond, J. 2010: *Volunteer Management And 7 Trends Altering Volunteer Recruitment And Volunteer Recognition*. Online article viewed/downloaded at: http://www.articlesbase.com/education-articles/volunteer-management-and-7-trends-altering-volunteer-recruitment-and-volunteer-recognition-2098838.html

Ferguson, D. 2008: GIS for Wilderness Search and Rescue. *ESRI Federal User Conference*. Feb 20-22, Washington DC.

Flores, A.H.; Haileyesus, T. & Greenspan, A.I. 2008: National estimates of outdoor recreational incidents treated in emergency departments, United States, 2004-2005. *Wilderness and Environmental Medicine* 19: 91-98.

Guly, M. 1996: Medical aspects of the work of a moorland rescue team. *British Journal of Sports Medicine J Sports Med* 30: 260-263. Viewed/downloaded at: http://bjsm.bmj.com/content/30/3/260.abstract

Heggie, T.W. & Heggie, T.M. 2009: Search and Rescue Trends Associated with Recreational Travel in U.S. National Parks. *Journal of Travel Medicine* 16(1):23-27. Viewed/downloaded at: http://www3.interscience.wiley.com/cgi-bin/fulltext/121637273/PDFSTART

Howard, H. 2009. Climate change and the volunteer emergency management sector. *The Australian Journal of Emergency Management*, 24 (3): 11-14. Viewed/downloaded at: http://www.ema.gov.au/www/emaweb/rwpattach.nsf/VAP/(3273BD3F76A7A5DEDAE36942A54D7D90)~AJEM_24-3_Climatechange.pdf/$file/AJEM_24-3_Climatechange.pdf

Hughes, J.C. & Louw, S.J. 2002: Electronic tagging of people with Dementia who wander. *British Medical Journal* 325: 847-848

Johnstone, W. 2002: The New Zealand Volunteer Fire Service in 3 Rural Northland Communities. *Fire Research Report 34.* New Zealand Fire Service Commission. Wellington. 42p. Viewed/downloaded at: http://www.fire.org.nz/Research/Publishsed-Reports/Documents/0f86c882e722a2c39dd9fc820353a3f1.pdf

Khawaja, M.; Dunstan, K. 2000: *The changing face of New Zealand's population*. Key Statistics (Sept 2000), Statistics New Zealand, Wellington. 10p.

Koester, R.J. 2009: *Lost Person Behavior.* dbS Productions, Charlottesville, Virginia. 397p.

LandSAR 2008: The LandSAR 2009 to 2014 Strategic Plan. LandSAR New Zealand, Wellington. Viewed/downloaded at:
http://www.landsar.org.nz/Resource.aspx?ID=2624

LandSAR, 2009: *LandSAR New Zealand Year Book 2008-2009*. LandSAR New Zealand, Wellington. 65p. Viewed/downloaded at: http://www.landsar.org.nz/Article.aspx?ID=890

Malcolm, M. 2001: Mountaineering fatalities in Mt Cook National Park. *New Zealand Medical Journal 114* (1247): 78-80

Maritime New Zealand, 2009: *Maritime New Zealand Profile.* Maritime New Zealand, Wellington. 12p. Viewed/downloaded at: http://www.maritimenz.govt.nz/Publications-and-forms/Maritime-NZ-corporate-publications/Maritime-New-Zealand-profile.pdf

McLennan, J. 2004a: *Volunteer Data Base Collection and Management for Strategic Planning and Policy Development: A Comparison Across Fire Services. Report Number 2 - 2004: Enhancing Volunteer Recruitment and Retention Project (D3)*, Bushfire Cooperative Research Centre (CRC), Australia. (Copy from author)

McLennan, J. 2004b: *Profiles of Australia's Volunteer Firefighters. Report Number 3 - 2004: Enhancing Volunteer Recruitment and Retention Project (D3)*, Bushfire Cooperative Research Centre (CRC), Australia. Viewed/downloaded at: http://www.bushfirecrc.com/downloads/REPORT_3-PROFILE.pdf

McLennan, J. & Birch, A. 2005a: A potential crisis in wildfire emergency response capability? Australia's volunteer firefighters. *Environmental Hazards* 6 (2005) 101-107. Viewed/downloaded at: http://www.aemvf.org.au/site/_content/resource/00000097-docsource.pdf

McLennan, J. & Birch, A. 2005b: *Recruiting and Retaining Australia's Volunteer Firefighters.* Viewed/downloaded at:
http://www.bushfirecrc.com/publications/downloads/Enhancing_volunteerism.pdf

McLennan, J. & Birch, A. 2006a: *Survey of South Australian Country Fire Service Women Volunteers. South Australian Country Fire Service Report Number 1 - 2006: Enhancing Volunteer Recruitment and Retention Project (D3)*, Bushfire Cooperative Research Centre (CRC), Australia. Viewed/downloaded at: http://www.bushfirecrc.com/research/downloads/Women_volunteers_survey_SACFS_PDF.pdf

McLennan, J. & Birch, A. 2006b: *Survey of Survey of ACT Rural Fire Service Women Volunteers. ACT Rural Fire Service Report Number 1 - 2006: Enhancing Volunteer Recruitment and Retention Project (D3)*, Bushfire Cooperative Research Centre (CRC), Australia. Viewed/downloaded at: http://www.bushfirecrc.com/research/downloads/Women_volunteers_survey_ACTRFS.pdf

McLennan, J. & Birch, A. 2008: Why Would You Do It? Age and Motivation to Become a Fire Service Volunteer. *The Australian and New Zealand Journal of Organisational Psychology* 1:7-11. Viewed/downloaded at: http://www.atypon-link.com/AAP/doi/pdf/10.1375/ajop.1.1.7

McLennan, J.; Acker, F.; Beatson, R.; Birch, A. & Jamieson, R. 2004: *Volunteer Recruitment and Retention Issues: A Review of the Literature. Report Number 4 - 2004: Enhancing Volunteer Recruitment and Retention Project (D3)*, Bushfire Cooperative Research Centre (CRC), Australia. Viewed/downloaded at: http://www.bushfirecrc.com/downloads/REPORT_4_LIT_REVIEWD3.pdf

McLennan, J.; Birch, A.; Cowlishaw, S. & Hayes, P. 2008a: Maintaining volunteer firefighter numbers: Adding value to the retention coin. *The Australian Journal of Emergency Management,* Vol. 24 No. 2: 40-47. Viewed/downloaded at:
http://www.ema.gov.au/www/emaweb/rwpattach.nsf/VAP/(966BB47E522E848021A38A20280E2386)~ajem+24+2+maintaining+volunteer.pdf/$file/ajem+24+2+maintaining+volunteer.pdf

McLennan, J.; Birch, A.; Cowlishaw, S. & Hayes, P. 2008b: I quit! Leadership and satisfaction with the volunteer role: Resignations and organisational responses. *Australian Psychological Society Annual Conference, September, 2008*; Hobart. Viewed/downloaded at: http://www.frfanz.org.nz/PDFs/APS08_McLennan_etal.pdf

McLennan, J.; Birch, A.; Palmer, A. & King, C. 2008c: Keeping your recruits: boosting volunteer retention. *Fire Note 22*, September 2008. Bushfire Cooperative Research Centre (CRC) and Australasian Fire Authorities and Emergency Services Council (AFAC). Melbourne, Victoria. Viewed/downloaded at: http://www.bushfirecrc.com/publications/downloads/Fire-Note-22-Volunteers-Retention.pdf

Ministry of Tourism. 2010: *Key tourism statistics.* (March 2010).

Ministry of Tourism. 2010a: *Tourism forecasts 2009-2015.* (August 2009) http://www.tourismresearch.govt.nz/Documents/Forecasts%20Summary/Forecasts2009-2015/Summary%20-%20National%20Inbound%20Forecasts%20by%20Market%202009-2015.pdf (viewed 17 May 2010).

Ministry of Tourism. 2010b: *Tourism forecasts 2009-2015 – Summary Forecasts.* (September 2009) http://www.tourismresearch.govt.nz/Documents/RTO%20Forecasts/2009/Summary%20-%20Regional%20Forecast%20Tables%202009-2015.pdf (viewed 17 May 2010).

Miskelly, F. 2005: Electronic tracking of patients with Dementia and wandering using mobile phone technology. *Age and Ageing* 34: 497–518. Viewed/downloaded at: http://ageing.oxfordjournals.org/cgi/reprint/34/5/497?view=long&pmid=16107453

Monasterio, E. 2005: Accident and fatality characteristics in a population of mountain climbers in New Zealand. *New Zealand Medical Journal 118* (1208): unpaged

Moran, K. 2008: *Water Safety and Auckland's West Coast Fishers – Final Report*. Report to the Auckland Regional Council, Surf Life Saving Northern Region and WaterSafe Auckland Inc. Auckland. 37p. Viewed/downloaded at: http://www.watersafe.org.nz/_attachments/westcoastrockfishingfinalreport08.pdf

Moran, K. 2009: *Water Safety and Auckland's West Coast Fishers – 2009 Report*. Report to the Auckland Regional Council, Surf Life Saving Northern Region and WaterSafe Auckland Inc. Auckland. 33p. Viewed/downloaded at: http://www.watersafe.org.nz/_attachments/water-safety-and-aucklands-west-coast-fishers-.pdf

NCS, undated. *Volunteering Among Older Adults: Population Projections, 2007-2050*. Corporation for National and Community Service. Washington DC. 2p. Viewed/downloaded at: http://www.nationalservice.gov/pdf/07_0307_boomer_projections.pdf

NSRS, 1999: *Survey on Canadian Ground Search and Rescue. Part 3 of the Canadian Search and Rescue Study.* National Search and Rescue Secretariat, Ottawa. 35p. (plus Appendices)

NSS 1996: *SAR Volunteers Review.* National Search and Rescue Secretariat (NSS), Canada. Viewed at: http://www.nss.gc.ca/site/reports/volunteers_e.asp

NSS, 2007: *NSS Search and Rescue Volunteer Review - Phase 1 Findings.* National Search and Rescue Secretariat. Ottawa, Canada. 46p. Viewed/downloaded at: http://www.yssr.nb.ca/VSAR_PhaseI_Report_2007_11_10.doc

NZFEC, 2004: *Volunteering and Ethnic Communities - A Dialogue with Ethnic Communities (Executive Summary).* NZ Federation of Ethnic Councils. Viewed/downloaded at:

http://www.ocvs.govt.nz/documents/work-pragramme/encouraging-participation/volunteering-research/volunteering-and-ethnic-communities.pdf

NZIER, 2006: *Implications of a Growing and Aging Population. CMDHB: Health Service Needs and Labour Force projections.* Prepared by NZ Institute of Economic Research, Wellington. 31p. Viewed/downloaded at: http://www.nzier.org.nz/Site/Publications/reports/2006_Reports.aspx

NZIER, 2008a: *Volunteer-related training in emergency services –findings from a literature review.* New Zealand Institute of Economic Research. Report prepared for the Fire and Rescue Services Industry Training Organisation (FRSITO). Viewed/downloaded at: http://www.frsito.org.nz/documents/Report%20FRSITO%20desk%20research%20final%20version%2030%20Apr.pdf

NZIER, 2008b: *Volunteer-related training in emergency services – improving training outcomes. Findings from qualitative research.* New Zealand Institute of Economic Research. Report prepared for the Fire and Rescue Services Industry Training Organisation (FRSITO). Viewed at http://www.frsito.org.nz/documents/Report%20FRSITO%20qualitative%20final%20version%2025%20Jul%2008.pdf

NZSAR, 2008: The New Zealand Search and Rescue Plan 2009-2014. New Zealand Search and Rescue Council, Wellington 13.p Viewed/downloaded at: http://searchandrescuecouncil.org.nz/

NZSAR, 2009: *New Zealand SAR Statistics Reports*. New Zealand Search and Rescue (NZSAR) Secretariat, Statistics. 22p. Viewed/downloaded at: http://searchandrescuecouncil.org.nz/publications/nzsar-statistics/186-nzsar-statistics-report-2008-2009

NZSAR, 2009: *New Zealand Search and Rescue Council Annual Report 2008-09*. NZSAR Secretariat, Wellington. 19p

NZ Police, 2009: *New Zealand Police Annual SAR Statistics Reports.* New Zealand Police, Statistics. 15p. Viewed/downloaded at: http://searchandrescuecouncil.org.nz/publications/nzsar-statistics/183-police-sar-statistics-2008-2009

O'Loghlin, F.; King, C.; McLennan, J. & Birch, A. 2007: Recruiting Younger Fire Service Members. *Fire Note 11*, January 2007. Bushfire Cooperative Research Centre (CRC) and Australasian Fire Authorities and Emergency Services Council (AFAC). Melbourne, Victoria. Viewed/downloaded at: http://www.tasmanianambulancevolunteers.asn.au/Firenote.pdf

O'Sullivan, R. 2003: Secondary analysis. Pp. 285-288 in Miller, R.L.; Brewer, J.D. *The A to Z of social research.* Sage, London, UK.

OCVS, 2010: *Facts about the Sub-Sectors of the Community Sector.* Office for the Community and Volunteer Sector. Viewed/downloaded from: http://www.ocvs.govt.nz/work-programme/building-knowledge/subsector-facts.html

Plastow, N.A. 2006: Is big brother watching you? Responding to tagging and tracking in Dementia care. *British Journal of Occupational Therapy*. 69 (11) 525 –527. Viewed/downloaded at: http://bura.brunel.ac.uk/handle/2438/2502

Purnell, M. 2008: *An examination of the contribution of specific water-based activities to recent trends in death by drowning in New Zealand.* Report of the Accident Compensation Corporation from the Injury Prevention Unit, University of Otago. Viewed/downloaded at: http://www.acc.co.nz/PRD_EXT_CSMP/groups/external_ip/documents/reference_tools/pi00247.pdf

SARINZ, 2008: SARINZ Annual Report 2008. Search and Rescue Institute New Zealand, Christchurch. 20p. Viewed/downloaded at:

http://www.sarinz.com/index.cfm/3,497,611/sarinz-annual-report-2008.pdf

SARINZ, 2009: SARINZ Annual Report 2009. Search and Rescue Institute New Zealand, Christchurch. 20p. Viewed/downloaded at: http://www.sarinz.com/index.cfm/1,375,html

Sharp, B. 2007a: Scottish Mountaineering Incidents Digest (1996 – 2005). *Research Digest no. 102.* Sport Scotland. Caledonia House, Edinburgh. Viewed/downloaded at: http://www.mcofs.org.uk/assets/mountainsafety/mountain-incidents-digest.pdf

Sharp, B. 2007b: Scottish Mountaineering Incidents Report (1996 – 2005). *Research Report no. 109*. Sport Scotland. Caledonia House, Edinburgh. Vie3wed/downloaded at: http://www.mcofs.org.uk/assets/mountain-incidents-report.pdf

SLS, 2009: *Project Groundswell - Full Report.* Surf Life Saving New Zealand. Viewed/downloaded at: http://www.slsnz.org.nz/Resource.aspx?ID=10947

Statistics New Zealand, 2001: *Around the Clock: Findings from the New Zealand Time Use Survey 1998/1999*. Statistics New Zealand, Wellington. 91 pp.

Statistics New Zealand, 2006: *QuickStats About Unpaid Work 2006 Census.* Statistics New Zealand. Viewed/downloaded at: http://www.stats.govt.nz/Census/2006CensusHomePage/QuickStats/quickstats-about-a-subject/unpaid-work.aspx

Statistics New Zealand 2006: *Urban and rural migration.* Research Report, Statistics New Zealand, Wellington. 11p.

Statistics New Zealand. 2010: *Subnational population projections: 2006 (base) – 2031 update*. http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/subnationalpopulationprojections_hotp2031.aspx (viewed 7 May 2010).

Stephens, B.D.; Diekma, D.S. & Klein, E.J. 2005: Recreational Injuries in Washington State National Parks. *Wilderness and Environmental Medicine* 16: 192-197.

Suss, J. 2007: *Annotated bibliography summarising material related to fire service volunteering by people from Non-English Speaking Backgrounds (NESB) and Cultural and Linguistic Diversity (CALD) backgrounds. Report 1:2007: Enhancing Volunteer Recruitment and Retention Project (D3),* Bushfire Cooperative Research Centre (CRC), Australia. Viewed/downloaded at: http://www.bushfirecrc.com/research/downloads/Annotated-Bibliography-Multiculturalism-February-2007.pdf

Taylor, P.C. 1993: *The New Zealand recreation opportunity spectrum: guidelines for users.* Department of Conservation and the Hillary Commission for Sport, Fitness and Leisure, Wellington.

UMR, 2001: Developing a Strategy to Nurture, Enhance, and Expand the Volunteer Fire Brigade. *Research Report Number 23.* New Zealand Fire Service Commission. Wellington. 94p. (Copy obtained from NZ Fire Service Commission Library)

UMR, 2003: Recruitment and retention of women volunteers within the Fire Service. *Fire Research Report 36. New Zealand Fire Service Commission.* Wellington. 86p. Viewed/downloaded at: http://www.fire.org.nz/Research/Publishsed-Reports/Documents/d88d6fe0e71e15a9274bb222001d73c5.pdf

VASAR, 1997: *Overview and Needs Assessment of the Virginia Search & Rescue System – 1997.* Virginia Search and Rescue Council. 7p. Viewed/downloaded at: http://www.dbs-sar.com/SAR_Research/vasarco_study.pdf

VNZ, 2009: *Facts and Figures on Volunteering in New Zealand.* Volunteer New Zealand and the Office for Community and Voluntary Sector. Viewed/downloaded at: http://www.ocvs.govt.nz/documents/work-pragramme/encouraging-participation/volunteering-research/vaw09-facts-figures-.doc

Williamson, J. 2006: *Accidents in North American Mountaineering* 9(1): Issue 59. The American Alpine Club/The Alpine Club of Canada. 108p.

Wilson, C.; Hendricks, A.K. & Smithies, R. 2001: "Lady Bountiful" and the "Virtual Volunteers": The Changing Face of Social Service Volunteering. *Social Policy Journal of New Zealand 17*, December 2001: 124-146. Viewed/downloaded at: http://www.msd.govt.nz/documents/about-msd-and-our-work/publications-resources/journals-and-magazines/social-policy-journal/spj17/17_pages124_146.pdf

Wilson, C. 2001: *The Changing Face of Social Service Volunteering.* Ministry of Social Development, Wellington. 71p. Viewed/downloaded at: http://www.msd.govt.nz/documents/about-msd-and-our-work/publications-resources/archive/2001-changingfaceofsocialservice.pdf

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Appendices

APPENDIX 1: Mapping objectives, guiding questions and methods

Primary objectives*	**Guiding question (as per RFP)**	1. Literature review	2. SAR 'demand' analysis/profiles	3. SAR 'supply' analysis/profiles	4. Recreation/tourism patterns & trends	5. Stats NZ Census & projections	6. SAR volunteer status analysis
1, 2	(a) What will the characteristics of the changes in the population trends/projections look like in 20 years in terms of numbers, age, location – geographic and rural/urban, ethnicity, health – mental and physical, etc.	✓✓	✓	✓		✓✓✓	✓✓
1, 2, 3	(b) How will this impact on SAR operations over the next 20 years and in particular the sector's training needs and standards?	✓✓	✓✓	✓		✓	✓✓✓
1, 2, 3	(c) What are the key factors that will affect changes in the structure of NZ SAR response?	✓✓	✓✓	✓	✓✓	✓	✓
1, 2, 3	(d) What impact will an increased urban population have on the makeup of SAR response?	✓	✓✓✓	✓✓		✓	✓✓
1, 2, 3	(e) What will be the split between urban and non-urban SAR incidents? What will be the characteristics of these incidents and how will this affect the response?	✓	✓✓		✓✓	✓	
1, 2, 3	(f) How will a more culturally diverse population impact on recreational activities? How will this impact on SAR response capabilities and types of operations?	✓	✓		✓✓	✓✓	
1, 2, 3	(g) Will SAR volunteers have bushcraft and boating skills or will they come to SAR agencies to learn these?			✓✓			✓✓✓
1, 2, 3	(h) How will the size and composition of the New Zealand population affect the composition of SAR agencies (volunteers and paid professionals)?	✓		✓		✓✓	✓
1, 2, 3	(i) What are the consequences of the population trends for funding and training search and rescue?	✓	✓	✓✓	✓	✓	✓✓
1, 2, 3	(j) What preventative SAR education strategies need to be considered to respond to population trends?	✓	✓✓		✓✓	✓✓	

* Underlined text denotes the objectives principally addressed through the proposed methods.