NATIONAL INCIDENT DATABASE REPORT 2009

outdoor education and recreation

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OUTDOOR SAFETY
NEW ZEALAND MOUNTAIN SAFETY COUNCIL

DISCOVER MORE, SAFELY

Abstract

This report summarises data collected on the National Incident Database for the 2009 year, and builds on the 2007-08 report. It presents summary figures and interpretations from a range of database results, and includes a number of brief case-study examples of some feature findings and material. Example narratives describing some incidents and causal factors are included in Appendices according to incident severity and case-study topics. These complement examples given in the 2007-08 report. Recommendations are provided on key needs for growing the support, uptake and applications of the NID, and for making it more useful in the future.

Table of contents

Contents

1. Background

1.1 Description of the NID

The National Incident Database (NID) is a national record of outdoor recreation incident data and is designed for use by those involved in outdoor activities. That is, people and organisations involved in self propelled outdoor pursuit/outdoor adventure activities such as; kayaking, rafting, biking, tramping, trail running, caving, skiing, climbing, sailing, paragliding, diving, etc. As well as motorised adventure activities such as quad biking and jet skiing. These people/organisations could be commercial, educational, not for profit, or informal groups and individuals recreating in the outdoors or any combination of the above. Any of these may register to use the NID for entering data on any incidents they encounter or for generating summary reports from their own data of incident records.

In this database '*incident*' is an umbrella term to describe outcomes of fatality, injury, illness, damage to equipment/property, near miss, psychological issue or a combination of these[1]. An *incident event* represents the specific occurrence of a situation where any one of these outcomes occurs, and *incident cases* represent these outcomes for each individual person directly affected. At any particular incident event there may be multiple incident cases. Each incident event is labelled with a specific ID number, and any multiple incident cases associated with the event are recorded under that same number. The 41 variables included in each database entry include information on the type of incident, its location and prevailing environmental conditions, the actual and potential severity, the number and description of affected people, the activity type, the group leaders and other people present, a description narrative and some indicative causal factors. The full list of variables included in the NID is presented in Appendix One. Greater explanation of each variable, its response categories and data-entry requirements is provided in a comprehensive guidelines document that is available in hard copy and online[2].

In summary the NID provides for:

- free registration
- easy standardised data entry for incident reporting online that meets health and safety legislation requirements
- printable versions of incident report forms for use in the field
- easy online generation of standardised reports
- access to summary information on incident trends and causes
- the possibility for selection of subsets for examining incidents in relation to particular activity types, group characteristics, recreation sectors, locations, environmental conditions and time periods

[1] Wherever the term *'incident'* is used in this report the term is inclusive of these wider types.
[2] Refer to http://www.incidentreport.org.nz/resources/OER_NID_Guide.pdf

1.2 The Need for a NID

There are many reasons why a resource such as the NID is important to the outdoor recreation community. Some of these reasons are evident from the comments listed below:

> "*The National Incident Database gets organisations asking 'what are the factors in our current operations that could lead to such an incident happening here', and 'can we make changes to safeguard against the same thing happening to us?*"
> - Rex Moir, Department of Labour, Senior Advisor

> "*Anything that better informs people of pitfalls to be aware of, or better ways of organising EOTC events, has to be hugely beneficial to the safety and care of students and adults.*"
> - Lorraine Kerr, NZ School Trustees Association President

> "*Risk managers understand the need to track close calls and accidents in their programs. Only by identifying what is actually occurring in the field can managers respond to situations and improve program protocols, staff training etc.*"
> - Rick Curtis, International Incident Database Project.

> "*Effective incident reporting and review procedures are crucial to transfer the learning from incidents into effective safety management in an outdoor programme. Valued lessons can be gleaned from incidents to inform organisational policies, improve the programme, assist in staff training, and contribute to a better understanding and management of the risks involved. Incident reports can provide organisations with valuable historic lessons which, if accessibly stored, can help to retain organisational knowledge despite staff and culture changes over time. Incident review findings can also inform relevant government policy and outdoor sector activity guidelines*"
> - Cathye Haddock, Ministry of Education, Senior Advisor

Overall, scarce resources mean that better justification is required for any allocation of resources, costs or priorities to develop or improve a recreation programme or opportunity. In the absence of good information about relative risk, benefit and participation level then decisions will be made on the basis of perceptions, and it is not uncommon that outdoor recreation activities are seen by decision makers as relatively high risk and relatively low importance compared with other types of recreation and sport. It is also difficult to authoritatively identify, implement and improve better safety practices and programmes without evidence to show the effect of these over time. To improve the provision of safer and more rewarding recreation services and opportunities, more accurate data is required to compare between different activities, programmes and initiatives. Improved data on incidents from different activities and programmes must be accompanied by improved data on the corresponding participation levels, without which true relativities cannot be assessed. Overall it is in the interests of all involved in the outdoor recreation sector to have a comprehensive and standardised database of incidents and corresponding participation levels.

This is not a need confined to New Zealand[3]. In describing the background for a proposed international incident database, Rick Curtis of OutdoorEd.Com and OutdoorSafety.org

[3] The NID also matches US attempts to develop a similar resource by the Wilderness Risk Manager's Committee and Association for Experiential Education. This early initiative has recently concluded (http://www.nols.edu/nolspro/pdf/idrp_project_conclusion.pdf) but a new development towards an international standardised database has recently been announced (www.incidentdatabase.org).

(USA) described for outdoor education what is a familiar situation to anyone trying to develop coordinated information systems in outdoor recreation - *The current state of our industry is incredibly fragmented in this regard. Some programs keep no incident records; others keep records on paper, some in spreadsheets, and others in databases. The lack of consistency across data collection means that it is currently impossible to compare types and rates of incidents in any meaningful way.* Following an extensive literature review and case studies on human factors in led outdoor recreation incidents, Australian researchers Salmon et al (2009:iv) concluded that - *In closing, the need for further research in the area is articulated, in particular focussing on the development of standardised and universally accepted accident and incident reporting systems and databases.* It should be noted that such a call for some form of integrated incident/accident data management system was being made by a similar literature review in Australia 15 years earlier (e.g. Finch et al 1995). Clearly it takes considerable time, start-up initiative and persistence to address this long standing need.

The recent (2004) initiation of the NID programme has been New Zealand's response to addressing this challenge and developing a coordinated and consistent approach for the outdoor recreation sector[4]. This innovation programme is an ongoing 'work-in-progress' which is refined and revised as opportunity allows. It is in the growth stages of the innovation cycle with a mixed uptake by a variety of early adopters. The ski industry is most advanced in its engagement with a customised version of the NID adapted to its needs. The NID is part of a wider information resource available to inform outdoor recreation safety management, based around the two key components of incident and participation data.

1.3 Incident and Participation data

Research on outdoor recreation incidents is highly dependent on the extent to which the data sources are representative of the types of activities being carried out, and of the numbers of participants engaged in them. Accurate reference data on participation levels and characteristics is critical to accurately assessing the relativities between different incident types and different activity types. A range of indicative data on incidents and corresponding participation levels are already collected from a variety of other sources, although the respective limitations of these for sport and recreation purposes need to be recognised. The clear conclusion from reviewing a range of studies related to identifying and assessing outdoor recreation incidents and related participation levels is that no single or simple data sources are available. With investment the NID presents a very real opportunity to address this gap.

Currently any attempts to assess incident characteristics and participation levels rely on extrapolations from indirect database sources such as hospital admissions; emergency department presentations; injury claim records such as those collected by the Accident Compensation Commission (ACC) in New Zealand; or from large scale sample surveys of incident occurrence and activity participation rates. Such high level databases and studies have concentrated mainly on sports, with outdoor recreation-related disciplines often hidden within generic activity classifications. Specific outdoor recreation cases often have to be identified indirectly through means such as content analysis of one line narratives in the case of ACC data (Davidson, undated; Bentley et al 2006). Such high level databases

[4] Note that while complementary, this differs in purpose from that of the International Search and Rescue Incident Database (ISRID), which is specifically aimed at Search and Rescue issues rather than outdoor safety. This does however illustrate the potential of large database systems in the outdoor sector– as most clearly expressed through the key ISRID-based SAR guidelines book '*Lost Person Behaviour'* - Koester (2008)

also tend to focus only on injury and fatality, leaving out some of the other incident types affecting outdoor recreation activities (e.g. illness, psychological, equipment, missing and near miss incidents). Whatever the tool being used, there is a dual requirement for good incident data and good participation data, and both are considered briefly here in turn.

1.3.1 Incident data

Collection of injury data related to hospital admissions is common both worldwide and in New Zealand (e.g. NOHSAC, 2005) and some studies have used such data to estimate the extent and characteristics of sport and recreation-related injuries (e.g. Northey, 2003; Gabbe, et. al. 2005; Flood & Harrison, 2006; Carmont 2008; Smart & Chalmers 2009). However such data is limited to hospital admissions, and those injury cases not requiring hospitalisation are not included. Other studies have used data from emergency department presentations, which do not necessarily involve a hospital admission (e.g. Finch et. al, 1998; Carmont 2008; Flores et al, 2008). This allows a wider range of coverage, but in turn does not allow for injuries in which treatment may only be required from a GP or other medical provider (e.g. Nicholls et. al. 1995; Cassell et. al. 2003). Occasional studies (e.g. Finch et al 1995; Cassell & Clapperton 2002; Ashby & Cassell 2004; Gabbe et. al. 2005; Carmont 2008) do go further to combine database sources that span such information hierarchies, but the majority of studies are confined to a narrow range of source material. Nor do any of these allow for the majority of injury cases where no medical treatment is sought at all. Surveys do provide a means by which non-reported injuries can be assessed (e.g. Finch et al 1995; Nicholl et. al. 1995; Stevenson et. al. 2000; Stevenson et. al. 2003), and these show that non-reported injuries greatly exceed the number of injuries where some treatment is sought. As shown in the UK by Nicholl et. al. (1995), treatment was sought for only about 25% of all injuries reported, with only 7% involving a hospital visit.

Overall these high level medical sector databases do capture many of the more serious injury and illness issues, as does the incident claim data collected in New Zealand by ACC. But they do not capture the far larger number of incidents not connected to their systems through admissions, attendances or claims. While these excluded cases may not be such immediately acute incidents many may have been potentially very serious *near misses* or *close calls*. These require attention as much as do any ultimate injuries as they have significant instructive value to outdoor recreation providers and managers (refer section 2.4). It is clear that the generic frameworks for the recording of injury and incident data do not provide the level of detail required by the outdoor recreation sector.

At the other end of the spectrum are incident records collected on a case-by-case basis for specific organisations, centres or activity groups. As noted in Section 1.2 by Curtis this is '*incredibly fragmented*'. Schools are encouraged by Ministry of Education guidelines to document incidents in *Education Outside the Classroom* (EOTC) activities, and are provided with a standardised form to do so[5]. A partner of the NID, the Ministry has had a link to the NID on its website since the NID's inception and schools have been encouraged to register. The Ministry's 2009 EOTC guidelines provide the NID form in the Toolkit for EOTC Management and schools are encouraged to register for the NID. In addition most outdoor education and experience providers have their own systems for recording incidents, as indicated by the 12 organisations providing data for the study by Davidson (2002, 2006). Some of these contribute data to the NID but the engagement is variable. Outside of the outdoor education sector any incident recording in the wider outdoor

[5] Refer to www.tki.org.nz/e/community/eotc/

recreation sector appears to be highly variable on the rare occasions it occurs. Progress towards integrating some of these existing resources and processes into the NID is slow, and it is part of the ongoing work-in-progress on this innovation.

Particular outdoor sector segments are addressed in some New Zealand research streams with researchers looking at incident issues in outdoor education (e.g. Davidson 2002, 2006, undated; Haddock, 1999, 2008); general adventure tourism and sports (e.g. Bentley et al 2006, 2007; Monasterio, 2006) mountaineering (e.g. Malcolm, 2001; Monasterio, 2005); skiing (Donald et. al. 2005) and equestrian (Northey 2003)[6]. It is also useful to note that extensive research has been done using similar methodologies in the sport sector such as netball (Smart & Chalmers 2009), and in the outdoor recreation sectors overseas (e.g. Stephen et al 2005). However the outdoor recreation sectors in New Zealand beyond the skiing industry are highly fragmented with little centralised capacity to run their own sector incident or participation information systems.

One notable cross-sector incident data recording system for outdoor recreation has been operational in the US since the early 1990s. It was established by the Wilderness Risk Manager's Committee (WRMC) in association with the Association for Experiential Education (AEE) and the National Outdoors Leadership School (NOLS). Results from its data were summarised in Leemon & Merrill (2002) and Leemon (2009), and in its early stages it was an influential example behind advocacy for the NID. It was based most on data from organisations providing outdoor education experiences, with 32 of the 43 organisations which submitted data being AEE accredited. While long established, this initiative has recently concluded (March 2009) due to the technology and staff needs required for necessary database modernisation, and due to changing priorities in the Wilderness Risk Management Committee[7]. However, options are being investigated for continuation, including connection with a proposed international incident database[8] . Such cross-sector options are rare but attempts have been made, and in New Zealand the Ministry of Education developed a common data entry form for EOTC injuries[9] in 2002 that was accessible on the internet. As a partner of the NID, the Ministry has encouraged schools to register for the NID since its inception and put a link to the NID on its website. The Ministry's 2009 EOTC guidelines provide the NID form in the Toolkit for EOTC Management and encourage schools to register for the NID. However like the US example above, registration with the NID is voluntary.

Other reporting formats are used in other situations such as the mountaineering accident reports done in the US for almost 60 years (American Alpine Club 2006) using data and narratives. Similar summaries are published periodically in New Zealand's Federated Mountain Club (FMC) bulletins. The Mountain Rescue Committee of Scotland also collects standardised incident information and reports on it annually (Sharp 2007a&b). The US National Park Service collates SAR records in to annual SAR reports (Heggie & Heggie 2009). Parks Canada has a mountain safety page recently set up on its website where people can report accidents and near misses[10]. And individual organisations in the professional outdoor education/experience sector (e.g. Outdoor Pursuits Centre, Outward Bound etc) do collect detailed incident and participant data as part of their safety management systems.

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[6] There is an extensive international literature related to specific activity types e.g. mountain biking
[7] Refer to http://www.nols.edu/nolspro/pdf/idrp_project_conclusion.pdf
[8] Refer to www.incidentdatabase.org
[9] Refer to *Toolkit Sample Forms* on http://eotc.tki.org.nz/EOTC-home/EOTC-Guidelines
[10] Refer to http://www.pc.gc.ca/progs/np-pn/sp-ps/sec7/index_e.asp and http://www.pc.gc.ca/progs/np-pn/sp-ps/sec8/index_e.asp

In all these studies and programmes the key data required has been the presence of consistent incident recording, combined with applicable reference data on corresponding participation and participants. Where these complementary data sets are not available, then meaningful quantitative conclusions beyond the immediate study group are largely unachievable. Where good complementary qualitative information is also available some 'working' inferences can be made, but these will eventually require testing if they are to be considered a basis for any significant decision-making.

1.3.2 Participation data

The importance of participation data in outdoor recreation applies at a hierarchy of levels. It can relate to managing particular sites or facility uses; particular activity types; particular time periods; individual organisations; whole sectors and issues affecting the national population. National data on sport and recreation participation in New Zealand is collected by the Active New Zealand Survey. Figure 1 (overleaf) summarises some of the key totals for outdoor recreation.

The Active New Zealand Survey takes a representative sample (n=4443) of the national population and provides data on participation in different activity types through a national report (SPARC 2008) and a selection of regional and activity-specific summaries (e.g. SPARC 2009 a & b). Of the typical outdoor recreation activities, fishing (marine) is the most prevalent, followed by tramping, canoeing/kayaking and mountain biking. It is important to understand that these totals only represent activities that people have engaged in over the previous 12 months. This is a typical measure in such national level participation studies in New Zealand and overseas (e.g. SPARC 2008; Australian Sports Commission 2008; Outdoor Foundation 2008). What these results cannot do is indicate the *participation intensity or effort* (e.g. participation days or hours), which is the typical participation measure against which incident rates are calculated. Other complementary research would be required to extrapolate these participation levels more widely as representing actual activity-levels.

Figure 1: Overall outdoor recreation activity levels (in last 12 months)

Activity Type	**%**	**Population number**
Fishing - marine	16.6	539,446
Tramping	9.4	306,342
Canoeing/Kayaking	6.4	209,648
Mountain Biking	6.1	202,237
Fishing - freshwater	5.7	184,784
Diving/scuba	3.8	121,625
Skiing	3.7	123,536
Equestrian	3.0	99,283
Snowboarding	2.7	87,649
Sailing	2.4	78,209
Mountaineering	1.1	37,868
Orienteering, Hunting (deer, pigs), and Rock climbing	<1.0	No totals given below 1%

There is a distinction between overall participation survey data and the actual levels of activity that people engage in. To calculate meaningful incident rates such activity-level measures are preferred. Ideally more key reference information is required on the number or participants involved in specific activities, times and places. Where the number and time characteristics of use are more readily identified such as in organised sport or at managed

sites such as ski areas the participation side of the incident-rate equation is much easier to determine. Ski areas are typically able to identify very accurate incident rates in New Zealand due to known participation levels and comprehensive incident reporting. However in most parts of the outdoor recreation sector beyond skiing, the capability to collect comprehensive participation data is highly limited. This is in part a reflection of the more flexible time-use in many informal outdoor recreation activities, and the highly fragmented nature of organisational structures for many activities in the outdoor recreation sector.

In very specific instances outdoor recreation participation data can be collected through targeted surveys of particular activity groups or site uses, or by concentrating on monitoring numbers at very specific locations. While in other countries it is possible to use park visitation records to provide participation level data (e.g. Stephens et al, 2005), in New Zealand parks entry is not controlled in most locations. The Department of Conservation has good visitor counting devices which can count precise visitor numbers at particular locations. If researchers were investigating incident issues in very specific outdoor locations, DOC visitor counters could be good sources of participation data. Beyond this there is no real systematic collection of participation data, as demonstrated clearly by Dignan and Cessford (2009), and anyone engaged in an outdoor safety investigation wanting such data may have to include a specific participation study in their investigation. The NID has provision for the entry of detailed activity-specific participation data in the form of *participation day rates*, representing the participation totals from combining participant numbers with activity/programme durations. It is on this basis that representative incident rates can be calculated.

In the case of the outdoor education/ recreation sector there is greater potential to collect good participation data and to enter specific *participation day rate* (PDR) data into the NID. Many individual organisations in the sector do collect participation data about the use of their facilities or services, as well as information about incidents. As noted previously Davidson (2002, 2006) used such data from 12 of 25 major outdoor experience providers. However few have taken the opportunity to enter *participation day rate* data into the NID[11], and in fact the combined use of such incident and participation information across the wider sector is still not common, with little data sharing or coordination apparent. As noted in the US by Leemon and Merrill (2002:8) *the collection of incident data for the adventure programming* profession *has stuttered along in fits and starts. Many organisations have been hesitant to collect data or, if they collect it, they have been reluctant to share their findings with others. The reasons stated are often based on legal philosophies and a fear of admitting mistakes*. In this climate it is difficult to create collaborative common resources.

The purpose of the NID is to provide a mechanism to fulfil all these needs across the whole outdoor recreation sector in a one-stop shop, and such a tool has been widely called for by researchers and information managers in New Zealand (e.g. Bentley et al, 2006, 2007; Davidson 2002, 2006, undated; Haddock 1999, 2008) and overseas (e.g. Leemon & Merrill 2002; Salmon et al 2009). The NID also goes further by including provision for entry of activity participation levels and detailed narratives on incident description and causal factors. These raise the opportunity for the identification of meaningful incident rates and interpretations across a wider arrange of evaluation needs. A brief example of this is presented in Section 2.6 (incident rates) and in the Appendices (descriptive and causal narratives).

[11] As a result only minimal analyses of results in relation to participation day rates were possible (Section 2.6), although these were beyond what was possible in 2007-08.

1.3.3 Narratives

Complementing all other data collected in the NID are specific narrative variables where incidents can be described (the 'Descriptive' narratives) and causal factors can be discussed (the 'Causal' narratives). These represent a key information resource for aiding the interpretation of other incident data. However, while narratives are collected in the NID, not all have been available for analytical purposes due to privacy concerns and constraints. This presented a problem in the 2007-08 NID report where an extensive narrative analysis was conducted, but only a small fraction of that could be published as examples.

As part of conducting the 2007-08 NID report, a process was initiated for gaining approvals for narrative use from the contributing organisations. These '*narrative waivers*' are linked to another confidentiality process for 'anonymising' narrative content so that no detail of individuals involved, organisations involved could ever be identified from it. On that basis an increasing proportion of those organisations registered to use the NID have been giving their approvals for such controlled narrative use. This has been progressing successfully and of the 120 (non-ski) incidents reported to the NID in 2009, 96 were entered under the narrative waiver. This meant that 79% of the 2009 NID incidents were able to be included in consideration for narrative analysis as examples. While this was a good proportion, the quality of entries was variable which slightly reduced the number eventually used. As well as continuing to encourage more entries, more guidance is required on the key content to be included.

1.4 Development and Current Status of the NID

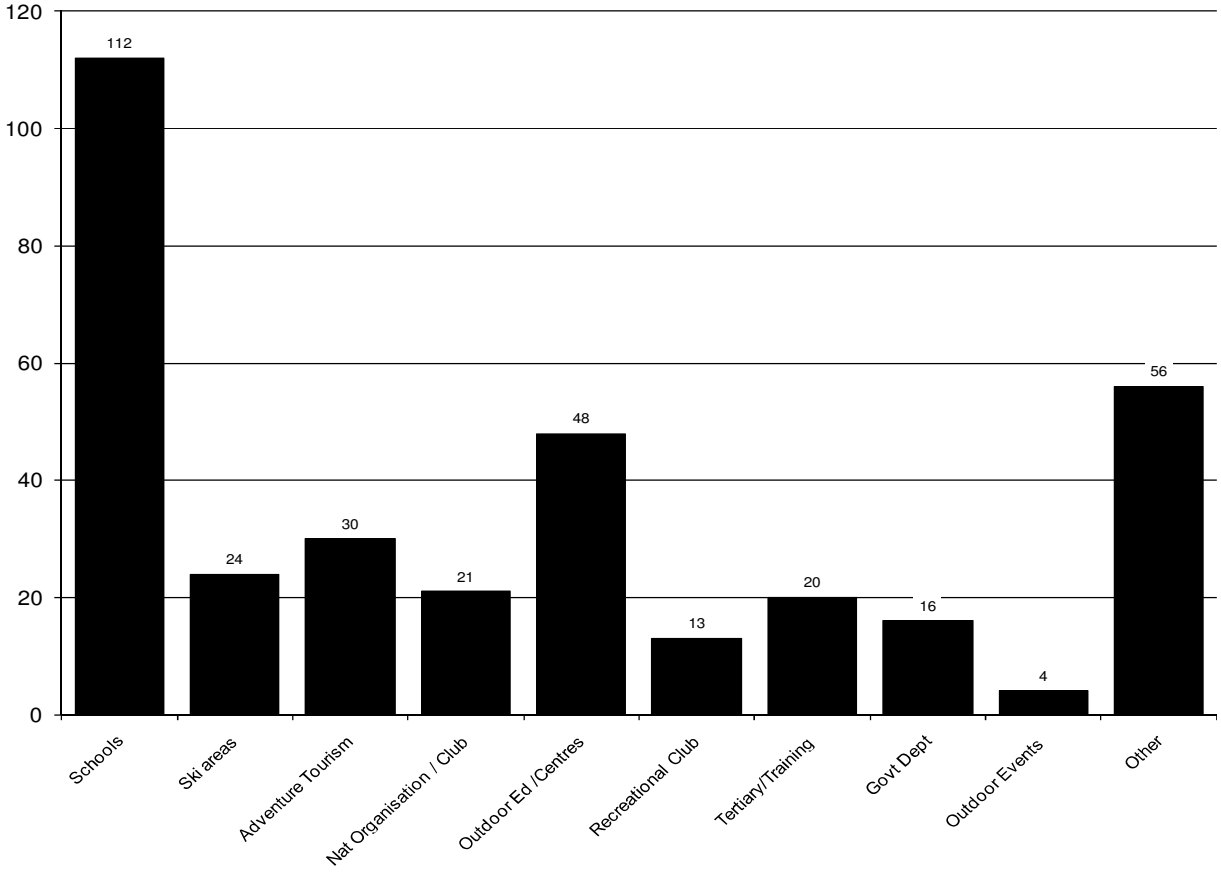
The NID development project was initiated by New Zealand Mountain Safety Council after discussions arising from the Risk 2002 Conference[12]. It went online in May 2004 by June 2007 there were around 120 organisations registered to use it. By June 2008 this had increased to around 250, by September 2009 to 313 and by March 2010 the total number of registered organisations was standing at 344 – up by 31. This shows a steady ongoing accumulation of registered organisations.

The overall categories of organisations included are listed below, and the current numbers of each illustrated in Figure 1:

- Schools - primary and secondary schools *(up 9 from 103 in 2008)*
- Ski areas - club and commercial fields[13] *(same number)*
- Adventure Tourism - commercial opportunity providers *(up 3)*
- National Organisation/Club - national associations and clubs *(down 1)*
- Outdoor Education Providers/Centres - site-based or general providers *(up 4)*
- Recreational Clubs - local area rather than national member ship *(up 1)*
- Tertiary/Training sector - courses and training in outdoors *(up 2)*
- Govt Dept Members- for outdoor recreation and safety management *(up 3)*
- Outdoor Events - events including competitive outdoors sport *(up 1)*
- Other - individuals and groups not otherwise classified *(up 9)*

[12] Refer http://www.safeoutside.org/risk/Data/intro.html for details of this conference
[13] Incident data from ski areas is reported separately

Figure 1: Number of registered organisations (March 2010).



While schools and outdoor education providers comprise around half the total registered organisations (n=160) overall, by far the most significant contributor to the database to date have been the ski areas. As at April 2010 there were approximately 28,788 NID entries recorded overall. Of these around 90% were from ski areas. The engagement and use of the database by the ski industry is extensive and provides a good example of its potential utility and value. The extent of the ski area data, made possible by this high level of engagement by all the major ski areas in the ski sector provides strong evidence for judging injury-related issues, trends and needs.

Leaving the ski data aside, the remaining 577 non-ski entries (as at April 2010) represent incidents entered for a range of other outdoor recreation and outdoor education related activities. Here is it important to note that these 577 entries were individual *event cases*, spread over 483 *Incident events*[14]. An *incident event* is the incident situation which results in any number of individual incident cases arising. An *incident-case* is an individual person's specific 'injury', 'illness', 'psychological', 'equipment', 'missing', 'fatality' or 'near miss' outcome from the event. There may be multiple incident cases from any incident event i.e. 5 people swimming down a grade 4 rapid after a raft capsized, 1 incident with 5 people involved.

These 483 outdoor recreation incident entries have been entered over a 5 year period as shown in Figure 2 (overleaf), with the comparative numbers of ski area entries also shown. Each recording year used here runs from May 1st, based on the start date of the NID in May 2004. This time fits in the shoulder season between the summer peaks of outdoor recreation activity and the winter peaks of ski area activity.

[14] In those cases each individual incident case is recorded under the single incident number for the common incident event. This results in some repetition of incident reports under the same *Incident ID* number.

Figure 2: Annual Incident entries (year to 1 May)

Year	Outdoor Recreation	Ski-area
2004-05	55	16
2005-06	32	4841
2006-07	50	5734
2007-08	157	5018
2008-09	66	5177
2009-2010 (to 1 April)	109	5475

The difference in reporting scale is obvious, with vastly more entries from ski area incidents. The low level of database entries from ski areas in 2004-05 reflects the NID going online at the start of the ski season. Ski-area engagement with the NID was not fully achieved until the following season (2005-06). Database entries from outdoor recreation activities do not appear to have increased notably over the period the database has been active, although the 2007-08 year is a clear peak. This may reflect a period of stronger advocacy of the NID to user groups at that time. Particular effort was put in to promoting incident entry in late 2009/early 2010, and this is reflected in a higher tally for that year.

Overall it appears that beyond the ski sector, the engagement of the outdoor recreation and education sector with the NID has not been great, with limited engagement, erratic incident reporting, and rare specification of participation data (e.g. participation day rates). For example, Davidson (2002, 2006) gives an indication of the unmet potential in this sector. He approached larger outdoor education organisations (>3 employees) to assess their incidents from 1996-2000. A list of 25 organisations that fitted the criteria was provided by Outdoors New Zealand and each was approached with a request to provide their incident data. Of these 25 only 12 contributed their data. Of the other 13 organisations seven did not respond to the request or a follow up, two did not keep incident records, two considered their records didn't have any incidents of interest, one did not consider they met the criteria and another simply did not want to contribute data. Yet even with the selective inclusion criteria and limited engagement by requested participants, Davidson was still able to identify over 1900 incidents in the five year period. Despite having a much wider scope of potential contributing outdoor recreation sources the NID was only able to get 363 non-ski entries over a similar five year period. The scale of non-reporting to the NID by the non-ski outdoors sector is very clear, yet it is also clear that valid data is collected internally and extensively by many qualifying organisations.

The reasons for such high engagement by ski areas compared to the remainder of the outdoors sectors are not clear. While they are a shared commercial sector, they are competitors in some respects and issues of commercial sensitivity arise. Despite this the use of the NID by the ski industry is extensive, and represents a practical example of value gained through cross-sector collaboration. There has been no evaluation of this to date, and such an evaluation may be a necessary step in order to identify success factors and demonstrate case study examples to advocate the benefits of similar engagement by other sectors (e.g. commercial recreation and tourism; outdoor education; sports disciplines) .

Noting these omissions, the purpose of this report is to summarise progress and results in the 2009 calendar year. Past reporting from the database has been based on the calendar year - and this convention is followed here. Consequently the period covered by this report

is from January 1st 2009 to December 31st 2009. During this period there were 122 specific *incident events* reported involving 145 individual *incident cases*. Figure 3 summarises the numbers of incident event and incident cases, with some summary notes to illustrate how multiple cases may arise from any single event. The results presentation starts overleaf.

Figure 3: Breakdown of incident cases and events

Cases per event (n= 144)	Incident events (n=121)	Notes
1	113	Most events involved only one incident-case where an individual got injured, ill, had a near miss, equipment issue etc. These more often involved individual circumstances of injury accident, specific illness or lapses in individual judgement.
2	6	In some events multiple individuals were affected. These more often involved adverse environmental conditions of cold and wind, water conditions, challenging terrain or water, wasps etc – things that might affect more than one person if encountered.
4	1	One incident involved an operation when a tramping group was delayed by cold wet weather and limited radio communications. This was simple lateness.
14	1	School group disturbed a wasp nest resulting in many of the group being stung (all minor with no reactions)

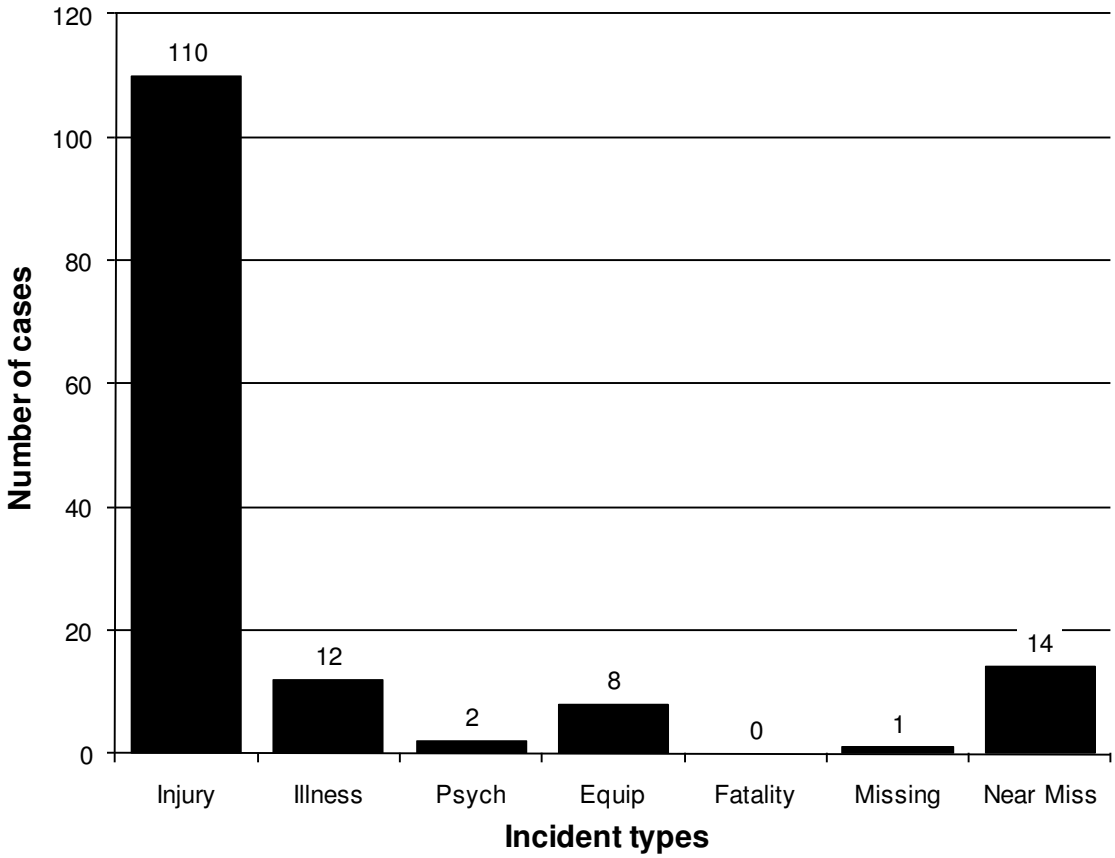
2. Overall Incident Summary

These results represent all 121 incidents reported (incident events), affecting 144 individuals directly (incident cases). The period covered is the year from January 1st 2009 to December 31st 2009. The results represent only the subset of incidents reported, and the absence of comprehensive participation and participant data limits the validity of any generalisations beyond that subset to indicative hypothesis only. In other words any notable results seen here might be indicative of a wider pattern, but any confirmation would require specific testing of a corresponding hypothesis with better reference data. In addition some problems with question wording and respondent interpretations were apparent from viewing the database contents, and these are noted where required. These should be considered as options for improvement in any future refinements made to the database and its base questions.

2.1 What types of incidents?

The breakdown of different incident types is presented in Figure 4. The majority of incident reports included only one incident type, although some included more (e.g. *Illness* and *Psychological*, *Injury* and *Equipment*).

Figure 4: Incident types reported (n=219 cases)



The main incident type was *Injury* (110 cases), followed by *Near Miss* (14) and *Illness (12).* These are described briefly below. Further details of such incidents can be obtained by viewing the associated descriptive narratives for each respective incident. Such narratives

were presented as examples in Appendices 2, 3, and 4 of the 2007-08 NID report. It was not considered necessary to include further examples in the 2009 report. The content of the 2009 incident types is summarised briefly below:

- The *injury* cases were predominantly strains & sprains (32); lacerations & cuts (19); stings (14); fractures & dislocations (13); bruising (10); head injury & concussion (7); burns (3) and one each of blister, dental, near-drowning, electrical shock and winded.

- The *near miss* cases were highly diverse and depended on a variety of case specific circumstances across a variety of activities. Only 14 near misses were reported, although it seems that where an actual injury, illness or other incident type was recorded then it was not usually considered a near miss as well. However in a different part of each incident record are variables recording *actual* and *potential* severity ratings. This is discussed further in Section 2.4, but it is worth noting here that 51 incidents were recorded as having high potential severity (i.e. >5, refer Appendix 2), which could be considered indicative of a near miss situation.

- The *illness* cases were predominantly hypothermia (9) and allergic reaction (3). Single cases were reported for abdominal pain, asthma, chest pain, dehydration, food poisoning, hypoglycaemic (low blood sugar) and skin infection. Overall there were 12 cases reported. Short 'anonymised' narratives from the NID records describing the events leading to some of these types of *illness* incidents are summarised in Appendices 2,3,and 4 of the 2007-08 NID report as examples.

- The *psychological* cases can reflect a variety of personal reactions to stressful or hazardous situations they or people they were with encountered. There were only 2 such cases recorded in the 2009 year.

- The *equipment* cases were related to problems or damage related to equipment use, or equipment failure in adverse conditions. There were only 8 such cases, related vehicle use and serious injury in activities involving equipment.

- The *missing* cases can be related to a range of situations from temporary delays due to some party members taking a wrong turn where victims were missing for a time through to fatalities . However there was only 1 'missing' case recorded.

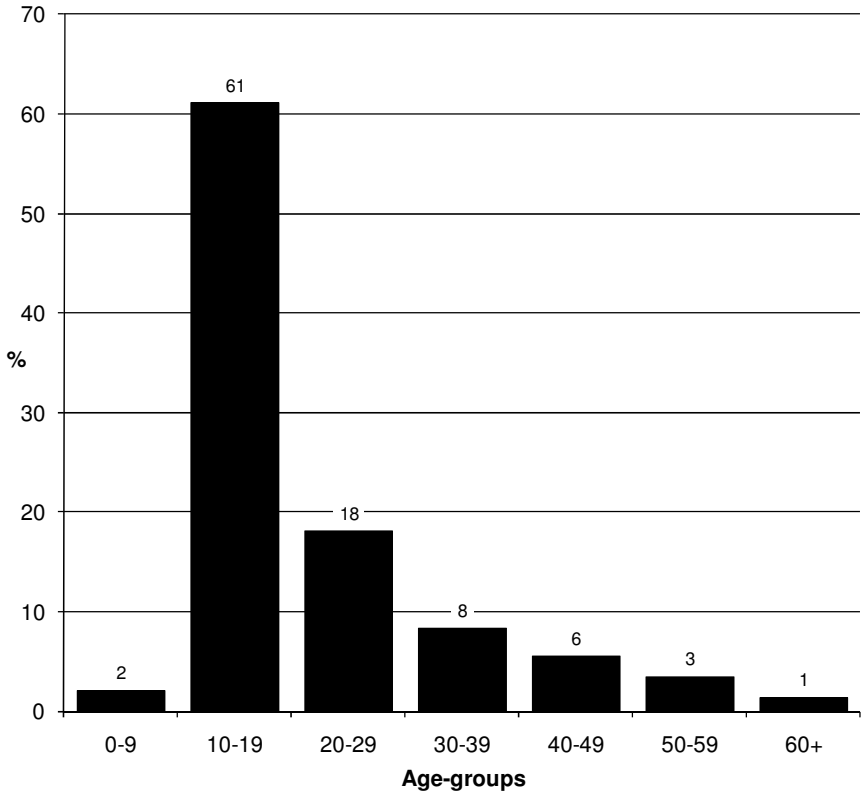
- There were no *fatality* cases recorded in the NID for the 2009 year.

Should any of these incident types require more in-depth consideration, the combined narratives over all years for the target incident type could be extracted as a group. This larger narrative group would provide much deeper analysis potential for each incident type.

2.2 Who suffered incidents?

Incidents could be associated with different ages, ethnicities and gender. Most of the 144 incident cases reported were young New Zealanders. Figure 5 shows 61% were in the 10-19 year age group, reflecting the high proportion of reported incidents made from the outdoor education sector (see Section 2.2), and possibly also the higher number of schools registered as NID users (see Figure 1, Section 1.4). One large group of 14 school students were also involved in a mass-stinging incident with wasps.

Figure 5: Age groups of individual incident cases (n=144 cases)



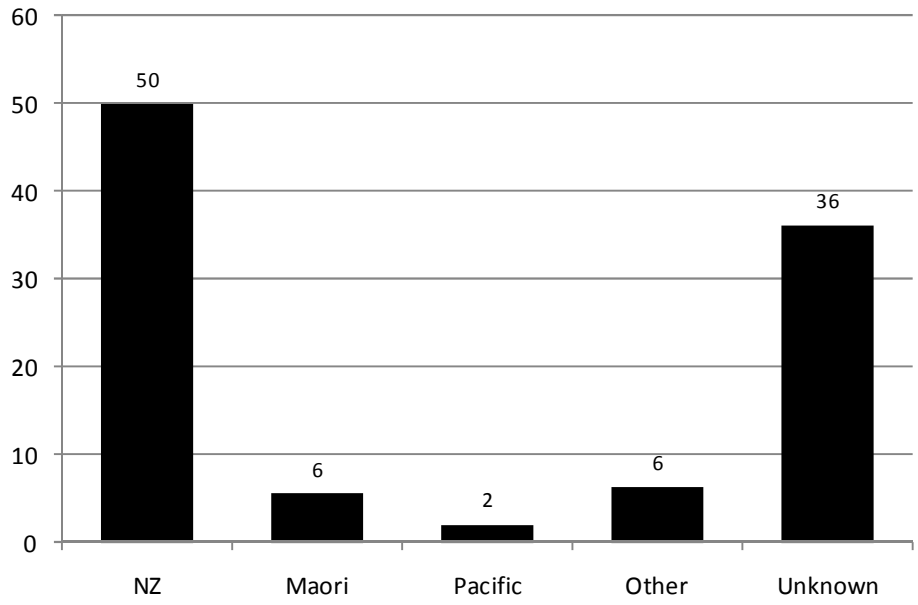
It is unknown if this age-group distribution also reflects the overall pattern of corresponding activity participation, as relevant participation reference data is not available. A bias towards more reports of incidents affecting younger participants is suggested here when comparing these results with those in Bentley et. al. (2006), whose data analysis identified a more even age-group spread in ACC claims from people doing adventure tourism and adventure sport. However survey studies of general population have shown highest rates of sport and recreation injury do seem to occur among children and young adults up to 25 years (Coggan et al 2002; Conn et. al. 2003). While this suggests higher incidence, lack of participation reference data limits any generalisation here.

The gender ratio of individuals reported in incidents was 63:38, comprising 90 females compared with 54 males. This differs from the 50:50 ratio found in the 2007-08 NID data. Given that males are generally over-represented in most outdoor recreation activities, this is a surprising finding. It may reflect a higher female participation proportion through schools. Some research has found that women reported higher outdoor recreation incident rates than men on Outward Bound (Colorado) courses, although some of this was considered due to men often under-reporting (e.g. Twombly & Schussman 1995). However any possible hypothesis that women experience more incidents than men in NID incidents

would require specific testing with better reference data. In the absence of corresponding participation data no conclusion can be drawn about the representativeness of this result, although most outdoor recreation activities typically involve a higher proportion of males. Males were found by Bentley et al (2006) to make more outdoor recreation based claims to ACC than were females (60:40), but probable differences in the levels of injuries reported as incidents to the NID, and those resulting in eventual claims to ACC mean that direct comparisons cannot be made. Again, better reference data is required to allow any generalisations from these demographic data at this stage.

Figure 6 shows that while 50% gave 'NZ' as their ethnicity, 36% gave no response (e.g. 'unknown') and the other ethnic groups were all at very low levels. Caution is clearly required with responses to the ethnicity question as it is not well worded in the data entry forms, and there is also a notable respondent resistance to 'ethnicity' questions in general which often results in an inflated 'NZ' response in surveys. However here, there is also the complication of high non-response, unlike in 2007-08 when the corresponding figure for unknown was only 6%. Definition of distinct 'ethnicity' and 'nationality' questions combined with careful wording is required in the future. Some movement towards this has already been made with the recent alignment of ethnicity categories with those used by ACC, although a clear nationality distinction is still absent. The non-response 'unknown' level also requires review.

Figure 6: Ethnicity of individual incident cases (n=144 cases)



2.3 Where did reported incidents occur?

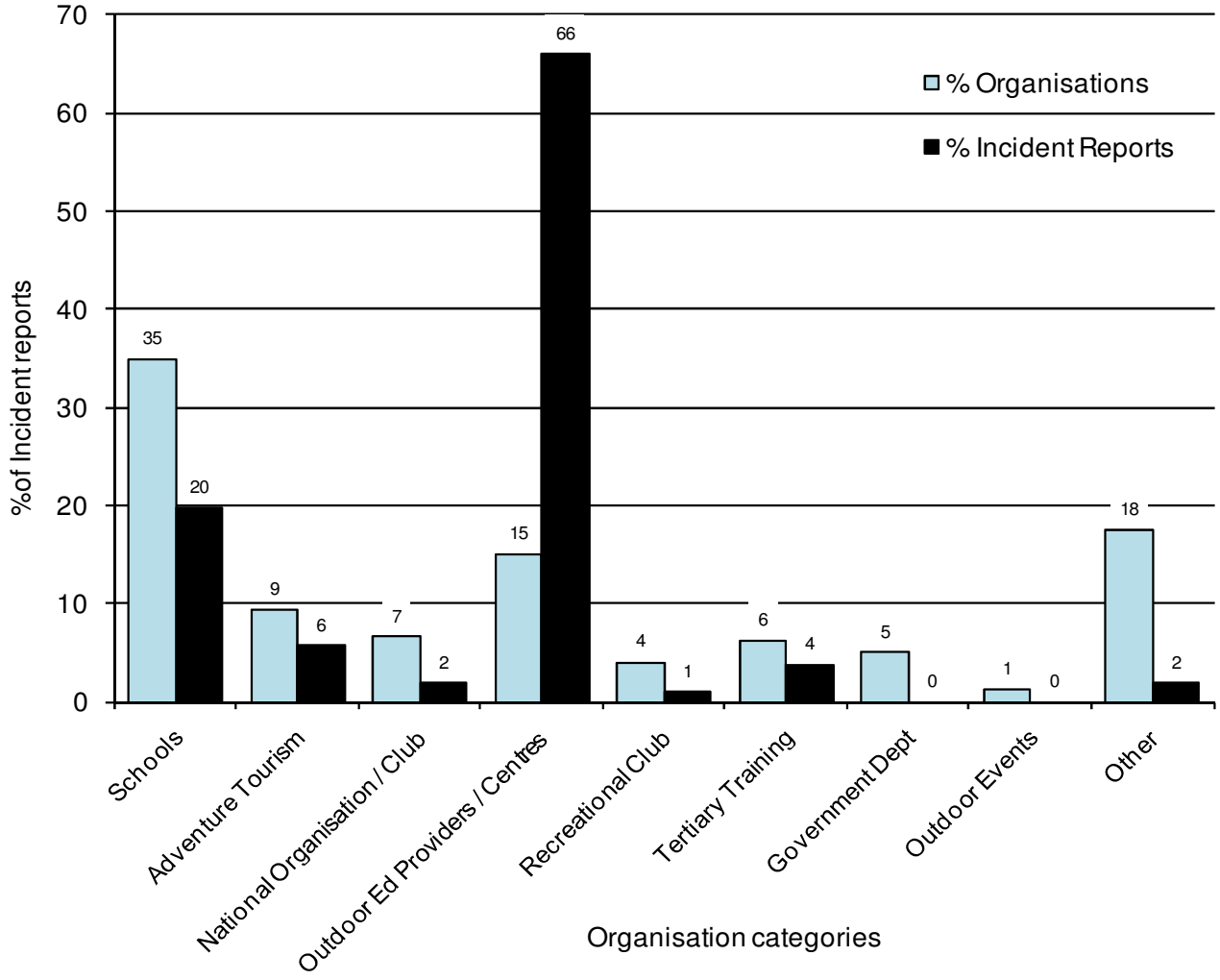
Incidents can be linked to different activities, times, places and weather conditions, and some distinctive results were apparent. This section looks at where, when and in what context did incidents occur.

Activity context

Half of the reported incidents (50%) were experienced while participants were engaged in activities associated with 'Education outside the Classroom' (EOTC). This compares with 57% in 2007-08. Both these figures indicate EOTC activities are clearly overrepresented in

the NID relative to overall participation rates in various outdoor recreation activities, although the extent of this cannot be determined precisely without better participation data for EOTC activities and wider general recreation activities. This does provide some explanation for the very high proportion of 10-19 year olds among incident sufferers shown in Figure 5. However this does not mean that incidents were reported at higher levels by schools. When the percentages of incident reports were compared with the percentage of registered organisations (refer Figure 7), the level of reporting by schools appears disproportionately low.

Figure 7: Proportion of Reports by Organisation types

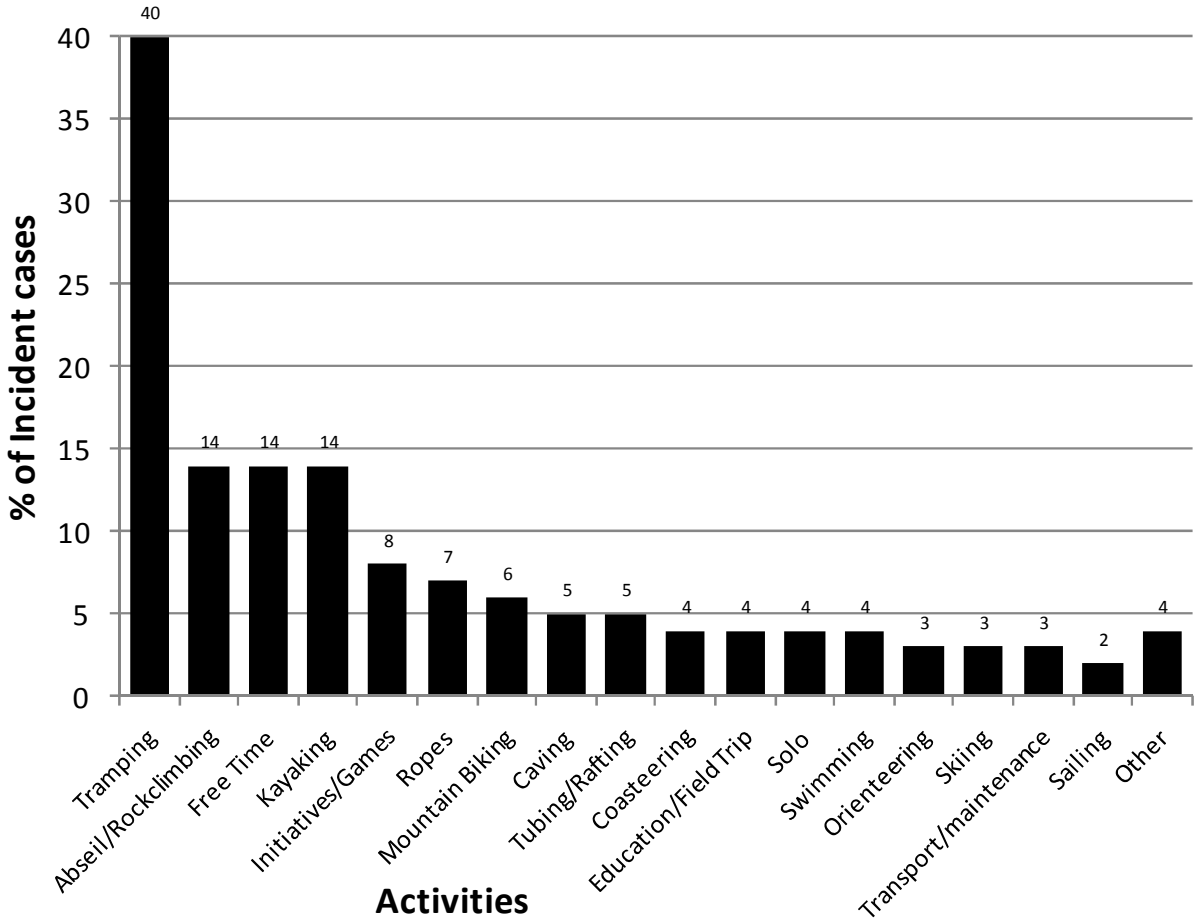


While comprising 35% of registered organisations schools only accounted for 20% of incident reports. By contrast while the outdoor education providers/centres comprised only 15% of the registered organisations they reported 66% or incidents. In the absence of reference data on relative participation levels this should certainly not be interpreted as representing any higher incident rate at outdoor education centres. It is much more likely that it reflects better reporting and higher activity rates from the outdoor education centres. Such conclusions can remain only speculative however in the absence of the reference participation data. This would also reflect the high EOTC content and the high proportion of youth in reported incidents. This pattern also matches that from the 2007-08 NID report.

Activity type

When reported incidents are viewed by specific activity in Figure 8, it is clear that most took place while tramping (40). Of these 40 tramping incidents, half occurred on EOTC trips and the other half on general recreation trips. Such results are not surprising given the preponderance of incident reports from other EOTC-related activities. However in the absence of reference data this cannot be seen as representative of wider outdoor activity levels or incident patterns, and can be seen as only reflecting those incidents reported on the NID

Figure 8: Activities in which Incident cases reported (n=144 cases)



Another interesting point is the presence of incidents reported from people's free time (14) and in relation to activity transport and maintenance (3). Some of these related to incidents while cooking[15] at camp, independent activity at camp or in breaks, or while travelling to or from the activity location. These remind us that safety concerns require attention for the whole of any trip or activity, and not just when people are 'on-activity'.

Incident timing

The timing of incidents also reflected the need for safety concerns to span the entire trip or activity. Figure 9a (overleaf) shows that while over half the incidents occurred in the early afternoon, some did occur in the later evening and overnight. Unlike 2007-08, incidents in 2009 were more evenly spread across the day. Late evening and overnight incidents were often related to free time activities around cooking and campsites.

[15] 'Free Time' here includes 'cooking'.

The overall pattern shown in Figure 9b differs somewhat when the timing of injuries in particular (n=94) was investigated separately from other incident types (n=26). This highlighted a preponderance of injury incidents in the early afternoon. This pattern has also been noted in previous NID summary reports and in the analysis by Bentley (2002; 2004; 2006), although no explanation for this can be offered here at this time. Readers may have insights from their experience which may raise interesting hypotheses in relation to activity intensity, activity scheduling, participant tiredness or other possible factors. The influence of including non-injury incidents appears to be reflected in relatively higher morning and evening occurrences overall.

Figure 9a: Incident timing (n=120 incident events, 2009) *(n=154 for 2007-08)*[16]

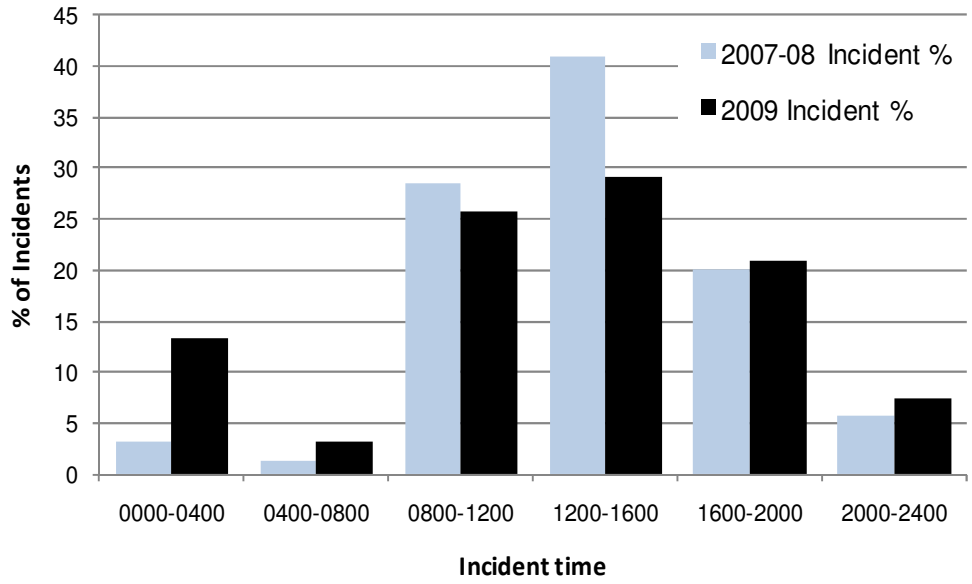
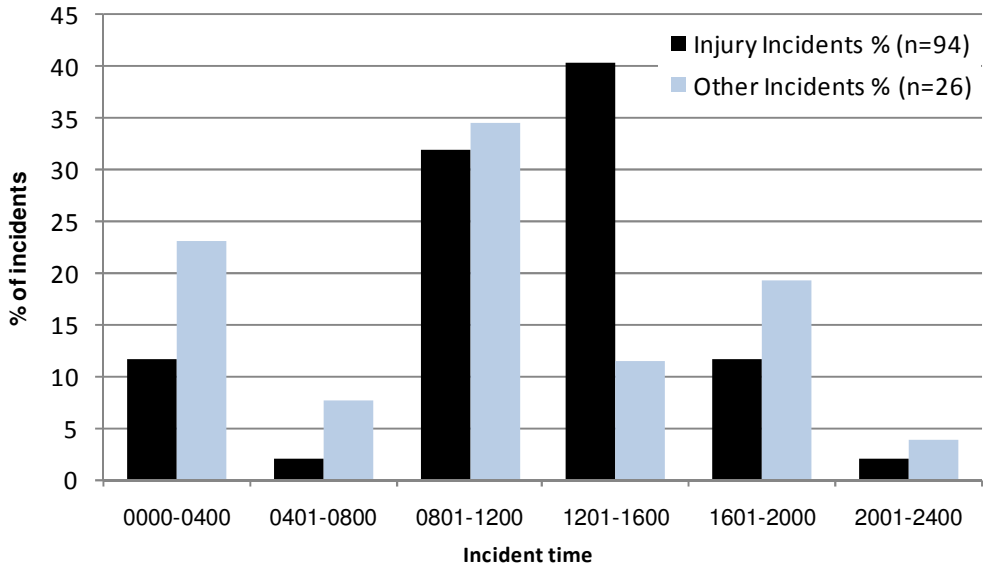


Figure 9b: Incident timing (n=120 Injuries vs other incident events, 2009)



[16] Note that these 2007-08 figures are recalculated owing to discovery of a contextual error in the original 2007-08 chart which used incident cases (e.g. all individuals) rather than incident events (the specific incident which sometimes involved multiple individuals). This reduced the level of the1200-1600 category in particular.

Incident regions

Reported incidents occurred unevenly across different regions (Figure 10a) and also between difference years (Figure 10b).

Figure 10a: Locations of incidents *(n=123 incident events in 2009)*

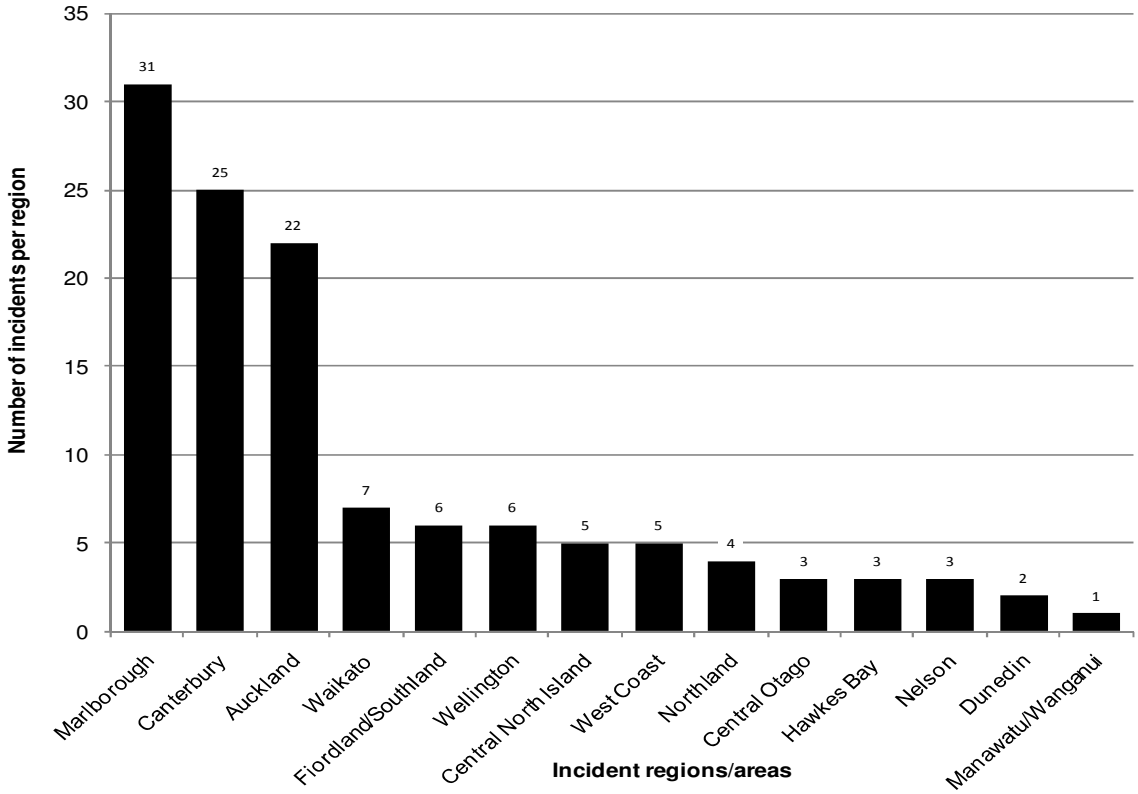
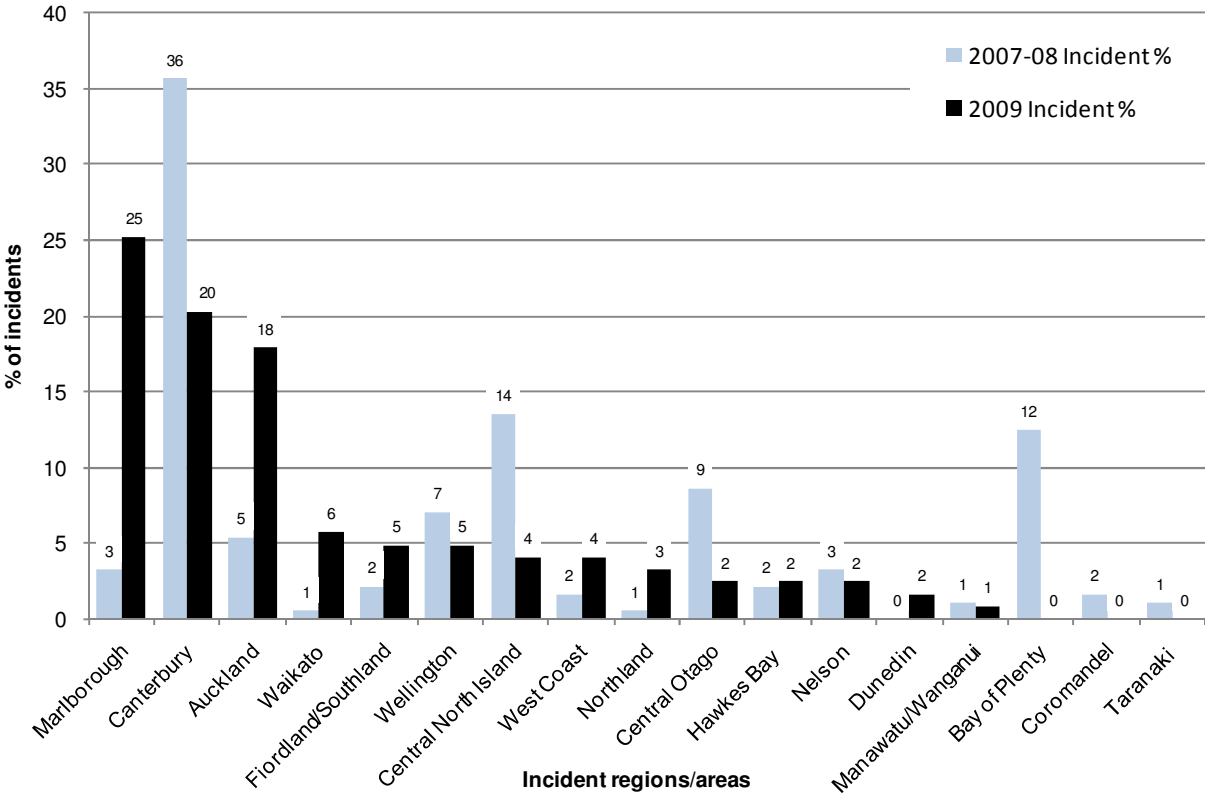


Figure 10b: Locations of incidents – 2009 (n=123) vs 2007-08 (n=185)



Most reported incidents in 2009 occurred in Marlborough, Canterbury and Auckland, with the remainder well spread across a number of other areas (Figure 10a). This differed from the pattern in 2007-09 where reported incidents in Canterbury far exceeded those from any other area (Figure 10b), followed by the Bay of Plenty and Central North Island areas.

As noted in the 2007-08 NID report, it is highly unlikely that this result represents higher outdoor recreation participation levels in Canterbury than elsewhere. Results from the Active New Zealand Survey for the Canterbury Region (SPARC 2009b) do not indicate it has any higher outdoor recreation activity levels or club membership than other regions. What this result most probably shows is that some of the organisations that run activities based in Canterbury had been particularly active in reporting incidents. By contrast in 2009 the emergence of higher reporting incidence in Marlborough largely reflected the effect of particular organisations entering more data than in previous years[17]. There is clearly some inconsistency in regular data entry across many registered organisations in the NID. These results appear to relate more to data entry performance than to relative levels of incident occurrence. As more records accumulate over time, and corresponding participation rate data is included, conclusions about relative incident occurrence levels may be more possible.

2.4 How serious were these incidents?

The seriousness of each incident was indicated by applying a subjective severity score. This was done by the individuals when entering their incident record, guided by reference to a standardised Incident Severity Scale (see Appendix 2). Such an approach had been adapted and proposed by Davidson (2002, 2006); in response to inconsistencies he revealed in the severity levels of incidents reported by different groups. A standardised rating approach based on Davidson's Severity Scale was subsequently recommended and adopted for the NID.

In addition, Davidson proposed use of both an *actual* severity score representing the reality of the specific incident, and a *potential* severity score representing what could have easily happened in a worse-case scenario. This was consistent with Haddock (1999) who undertook an extensive review outlining the significance of investigating the *high potential for harm* (HIPO) incidents as well as actual instances of serious harm. This does not mean investigating all incidents equally no matter how minor, but it means focussing on those that have the most power to highlight key issues, learning's and directions. Embedding this *actual-potential* distinction - supported by application of a standardised severity scale - was done to easily identify the serious or potentially serious incidents requiring more in-depth review and investigation. Beyond those serious incidents, the larger numbers of relatively minor incidents could be simply recorded as required, thereby minimising time and resource demands.

The actual and potential severity of incidents recorded in the NID for this report reflected those found by Davidson (2002, 2006). The potential severity reported for any single incident event was almost always higher than the corresponding actual severity, indicating a latent hazard component was implicit in almost all incidents. Figures 11and 12 (overleaf) summarise the actual and potential severity ratings from these incidents, and as found by Davidson (2002; 2006), most reported incidents were judged as being minor rather than major. Only 22% (26) of incident events were reported as having a major actual severity,

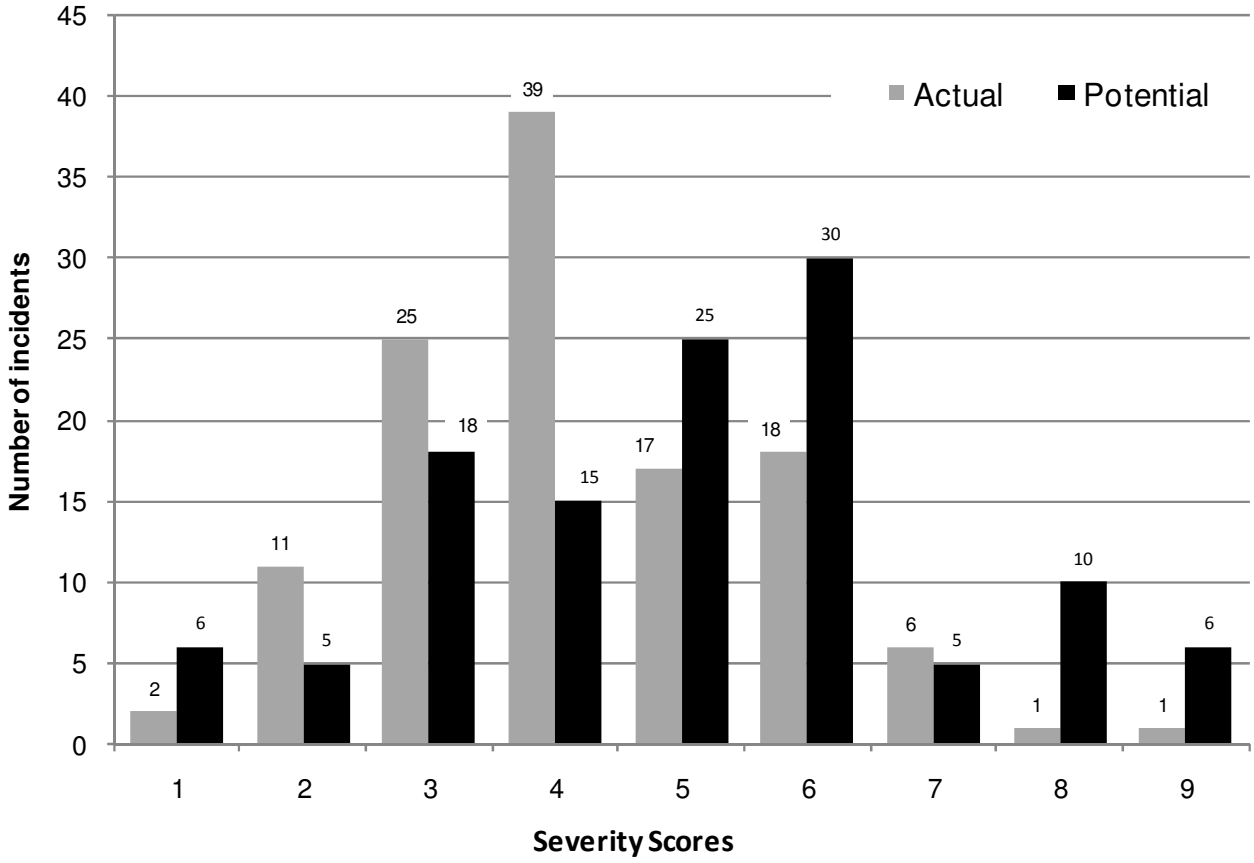
[17] Data is available in the secured part of the NID - available only to the NID administrator - that can identify which organisations made incident reports. Appropriate privacy levels are maintained.

closely matching the corresponding 6% identified in Davidson's original analysis (Davidson (2002, 2006). However the presence of considerable latent hazard in many incidents was apparent from the 42% of incidents judged as being major near misses. These were also closely matching the corresponding 49% identified by Davidson.

Figure 11: Actual & Potential Severity Scores *(n=120 incident events)*

Severity Score Scale	**# of Ratings (Actual)**	**# of Ratings (Potential)**	**Severity Grouping**	*Actual freq.*	**Actual %**	*Potential freq.*	**Potential %**
0			**Minor injury or near miss**	*94*	**78**	*69*	**58**
1	2	6					
2	11	5					
3	25	18					
4	39	15					
5	17	25					
6	18	30	**Major injury or near miss**	*26*	**22**	*51*	**42**
7	6	5					
8	1	10					
9	1	6					
10	0	0					

Figure 12: Chart of Actual and Potential Severity Scores (n=120 events)



Here is useful to note that incidents could be recorded specifically as an incident type of '*near-miss'*, along with injury, illness, psychological etc. However these near-miss designations tended to apply to those close-call situations where no actual injury occurred. Where injury occurred it was usually only designated as an injury incident. In this respect

reliance on the 'near-miss' designation of incident-type can under-estimate the real extent of potential hazard. Of the 51 incidents reported from the NID as having of major potential severity (scoring 6 or over), only 11 had also been recorded specifically as near-miss incidents. This near-miss incident category only picked up 21% of those incidents where those entering the data also considered a very serious negative outcome could have occurred (through potential severity scores).

The use of potential severity rating does provide a useful additional approach by which potential hazard can be included in the incident records. Such an approach allows attention to be focussed on the very serious situations that did occur, or those situations where it was a near miss that could easily have been very much more serious. As emphasised strongly by Davidson (2002, 2006), Haddock (1999) and Leemon & Merrill (2002), both these areas are seen as priorities for strategic learning and informing the development of preventative actions or processes. For these types of reasons Parks Canada has very recently set up a specific section on its 'Mountain Safety' webpage where near-miss incidents can be recorded[18].

Based on this actual and potential severity scoring approach, selected descriptive narrative data for high severity incidents from the NID were extracted for inclusion in this report (Appendix 3). These were selected on the basis of having a severity score above 6 which, in accordance with the Department of Labour's standard definition of 'serious harm', is used as an arbitrary break between minor and major severity definition (Figure 11).

It was not within the scope of this summary report to undertake a qualitative analysis of these *High Severity* narratives, but readers can view these narratives and apply their own knowledge and experience to making their interpretations. This in some respects represents a simple form of incident review here, which was the recommended outcome from those advocating a prioritised incident analysis approach that incorporated major *potential* as well as *actual* incidents (e.g. Davidson, 2002, 2006; Haddock 1999; Leemon & Merrill 2002; Salmon et al 2009).

2.5 What causal factors may have contributed to incidents?

A number of classifying variables and a dedicated narrative space have been included in the NID to assist interpretation of possible causal factors related to any combination of environment, people or equipment issues. Reflecting this, the different classifying variables included in the NID are related to weather conditions; the presence, qualifications and experience of leaders; possible causal factors of the leaders, participants, equipment and environment; the number of people and the experience composition of the group. All of these require that those entering data choose from listed options. However the last data entry required in any incident report is a narrative where the person making the incident report can write a specific causal narrative explaining what they think happened. Those causal narratives relating to incidents with a severity score of 6 or more are summarised in Appendix 3, along with corresponding descriptive narratives. These illustrate the added interpretive value provided by complementary narrative responses.

[18] Refer http://www.pc.gc.ca/progs/np-pn/sp-ps/sec8/index_e.asp

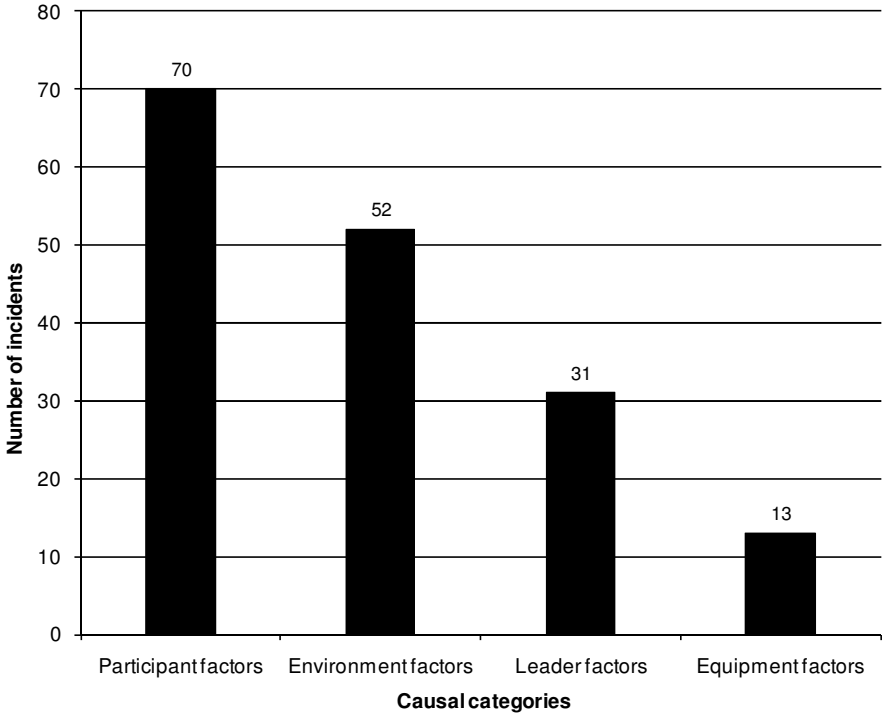
It is beyond the scope of this summary report to conduct a full analysis of all classifying variables (refer Appendix 1 for variable list), and both the limitations in the representativeness of the data and the relatively small number of incident records makes such analyses of limited utility at this time. In addition there is a high level of complexity in determining the relative significance of different potential causal factors in the occurrence of any incident. This is highlighted in an analysis of high potential incidents by Haddock (1998), who goes on to say in Haddock (2008: p18) that

Incidents don't just happen. They usually have multiple causes that combine under just the right circumstances to result in an incident. Some factors can be described as immediate causes such as an unsafe act or equipment failure immediately prior to the event. Other factors can be described as the basic or root causes of an incident, such as inadequate policies and standard operating procedures or an informal culture of saving money by employing unqualified people.; and

It is important to identify both immediate and root causes of incidents. These can form a complex web of interacting factors, with different weightings. In the case of the caving incident 15 immediate and 10 root causes were identified. In the case of the rock climbing incident, 11 immediate and 7 root causes were identified. Organisations need to address the underlying root causes rather than focus purely on preventing unsafe acts (immediate causes).

These quotes are included to emphasise the inherent complexity of causal analysis, and it is beyond the scope of this summary report to undertake such level of analysis. However some useful indicative insights about the potential value of the NID can be gained here from briefly exploring some of these variables and the related narratives (e.g. Appendices 3-5). A good place to begin is with the causal factors indicated for each incident from the lists of tick box options available. These included specific causal factors listed under main headings of *leader*, *participan*t, *equipment* and *environment* headings (Figure 13).

Figure 13: Causal categories cited for incidents (cumulative)



Multiple causal factors were indicated in only 63% of the reported incidents, which would

seem an underestimate given the generally accepted levels of complexity in such causal factors. However this may also reflect a limitation in the question style used to enter the data, and greater understanding is apparent in the descriptive and causal narratives (e.g. Appendices 3-5). Based on the boxes ticked by entry-makers Figure 13 summarises the number of times in which each category of causal factor was cited overall (e.g. *Leader*, *Participant*, *Equipment* and *Environment* categories).

Looking at each of these categories, a number of different specific factors stood out among their respective sub-categories:

- *Participant-related factors* were cited in 58% of incidents (70 times) including:
  - 18 cases specified as *judgement error*;
  - 14 as *inadequate physical or mental condition*,
  - 10 as *bad/incorrect technique*;
  - 10 as *inadequate practice or preparation*.
  - 6 as *unsafe acts*;
  - 3 as *inadequate health or emotional condition* and;
  - 1 as *failure to listen or follow instructions*;

- *Environment-related factors* were cited in 43% of incidents (52 times) including:
  - 28 cases specified as *terrain*;
  - 7 as *adverse weather*;
  - 12 as *water;*
  - 2 as *animal/insect/plant* and;
  - *other* comments about slippery structure, hard surface, and heights

- *Leader-related factors* were cited in 26% of incidents (31 times) including:
  - 13 cases specified as *judgement error*;
  - 10 as *inadequate supervision*;
  - 4 as *inadequate training/experience,* and;
  - 1 each as *failure to follow procedures* and *inadequate physical condition.*

- *Equipment-related factors* were cited in 11% of incidents (13 times) including:
  - 6 cases specified as *faulty equipment*;
  - 4 as *inadequate design*;
  - 2 as *wrong equipment,* and;
  - 1 *other* comment about a *New Rope*

While the numbers of responses in individual response sub-categories are sometimes low, arbitrary categories are used to collect the data and there is the possibility of entry-maker (often leader) bias, valuable guidance is given on the entry-makers interpretation of causal factors and the main areas they consider are important. When combined with access to the explanatory causal narratives entered in relation to their categorised causal responses, deeper insights can be gained. Appendices 3-5 present some examples of these causal narratives, and illustrate a wide range of variation and detail in what people say.

Additional understanding of causal factors can also be gained from using the other data in the NID. Issues related to undertaking deeper causal are discussed overleaf.

Deeper causal analysis – some considerations

Overall, the interaction of the summary classifying variables for incidents type, severity and causal factors with both the descriptive and causal narratives provides a comprehensive basis for exploring incident causes. The classifying variables include comprehensive lists of incident types and causal factors which can allow selection of specific factors for investigation. The 2007-08 NID report gives examples in its Appendix 8 where the basic classifying variables entered on weather conditions (e.g. precipitation, temperature, wind) were complemented through the creation of a new *weather index* summary variable to more simply identify target 'bad weather' incidents. In other 2007-08 examples of the potential for deeper causal analysis from NID data the role of leader experience in relation to incident severity can be considered. Such specific analyses are not the purpose of this report, which provides an overall summary and selected examples of potential. They are among many specific analyses that can be carried out on specific occasions as required.

The utility of this can only improve with the progressive inclusion of more incident data over time. In this respect the more incidents that can be added to the NID the better. Another area where improvements can take place is in the consistency of data entry and category choices by entry-makers. The NID guidelines do provide a good descriptive basis for this especially in relation to incident severity (e.g. the severity scale in Appendix 5), but more guidance on criteria for causal category choice does need to be developed and made more readily available and understood. The process of incident data entry will always have a degree of subjective variation, but the more this can be reduced the more valuable will be the NID data. In addition more comprehensive and specific narratives describing incident occurrences and probable causal factors will add further value. The current notes guiding the causal narratives ask entry-makers to *"Explain in detail what you think caused the incident. Include any suggestions, observations or recommendations regarding this incident".* The content of narratives summarised in Appendix 3-5 illustrates how variable the quality of narratives sometimes are, but the better this can be done in all respects the better will be the results gained from the NID and its applications. And at some stage in the future connection of the NID database with statistical packages and qualitative text analysis tools will also add considerable value to any general or causal-factor analysis. However considerable value is already potentially available by systematically sorting the narratives around target topics of interest. For example, Appendix 4 summarises narratives from those incidents related to burns, including narratives from 2007-08 as well as 2009. This shows the growing value of the NID data over time as more examples are accumulated.

All this use of narrative data must of course be subject to maintaining the privacy of individuals and groups involved with incidents. Any use of narratives must remove specific reference to individuals, places, organisations or any other identifying features. This can be done without removing the key learning points but it requires having strictly controlled access to the data. NID administrators must manage this process and allow access only for approved studies operating within appropriate ethical standards. These would be cross-sector studies by independent analysts, which would only publish results in the form of summary information and highly modified narrative examples.

2.6 How can we use participation rates?

Registered organisations can enter *participation day rates (PDR)*, which are the number of days spent by individuals doing particular activities. They are calculated by the number of participants in each activity combined with the number of hours each activity takes place, cumulatively totalled as participation days[19]. They are important because they allow the relative incident rates of different activity types and situations to be comparable. For example we may have 200 tramping incidents in a year, compared to five rock climbing incidents. This may appear to be a significant difference but with a hypothetical 200,000 participant days for tramping and 500 participant days for rock climbing the relative incident rate is 10 incidents per 1000 participant days for rock climbing and one incident per 1000 participant days for tramping. This hypothetical analysis shows that rock climbing would actually have a higher incident rate than tramping.

Looking at some actual data from the NID does show some real incident rates. Two examples are presented from the two contributing organisations that best fulfilled the combined requirement to enter both incident records and participation day rates (Example A and Example B). Example B includes 2 years of such data, with this organisation having been the initial example described in the 2007-08 NID report.

Incident Rate Example A (Figure 16a) – Organisation A

This is data taken from the NID for a specific outdoor education centre/provider for the 2009 calendar year (n=31). This organisation was one of those prompted to update its incident data during the 2009 year, and to add useable participation rate data.

Figure 16a: Incident rates for activities run by Organisation A *(2009 data)*

Activity	Incidents	Participation Day Rates	Incident rate (per 1000 days)
Kayaking	8	2550	3.14
Ropes	3	1260	2.38
Tramping	5	6720	0.74
Sailing	2	3862	0.52
Solo	2	3900	0.51
Swimming	3	6720	0.45
Cooking	3	14000	0.21
Transportation	1	6720	0.15
Free Time	1	14000	0.07
Overall	31	59732	0.52

This Example A shows that different activities have different incident rates, and that some are going to be higher than others. Here *Kayaking* and *Ropes* emerge as the activities with the highest relative incident rates, while the lowest rates are related to incidents happening in participant *Free-time* outside of specified activities. If *Cooking* and *Transportation* were included as a 'free time' activity - as has been done in earlier parts of this report - then the

[19] Participation Day Rate = sum of (course/activity duration x attendance) - **½ day = <4hrs and full day = >4 hrs.** Refer to p6 in guidelines http://www.incidentreport.org.nz/resources/OER_NID_Guide.pdf

Free Time rate would be higher. But there is clearly value in specifying recreation activities and supporting tasks separately in this case.

Overall the balance of incident rates is also different between different organisations, as is demonstrated by considering Example B.

<u>Incident Rate Example B</u> (Figure 16b) – Organisation B

This is data taken from the NID for a specific outdoor education centre/provider for the 2008 calendar year (n=19), with their additional 2009 incident data and respective PDR data added (n=9). Although the number of records available is low, the utility they offer can be seen. This organisation was best overall example of incident recording combined with good participation rate data.

Figure 16b: Incident rates for activities run by Organisation B *(2008 and 2009 data)*

	Participation Day Rates				Incidents		Incidents/1000 participant days		
Activity	**2008 PDR**	**2009 PDR**	**Total PDR**	***2008 Incidents***	***2009 Incidents***	***Total incidents***	**2008 Incident rate**	**2009 Incident rate**	**Total Incident rate**
Initiatives	1296	2040	3336	*11*	*5*	*16*	8.49	2.45	4.80
Tramping	960	600	1560	*2*	*0*	*2*	2.08	0.00	1.28
Orienteering	960	900	1860	*1*	*1*	*2*	1.04	1.11	1.08
Kayaking	2112	1500	3762	*3*	*0*	*3*	1.42	0.00	0.80
Abseiling	1296	1632	2928	*1*	*1*	*2*	0.77	0.61	0.68
Ropes	1536	2400	3936	*1*	*1*	*2*	0.65	0.42	0.51
Rock Climbing	160	360	520	*0*	*0*	*0*	0.00	0.00	0.00
Snorkelling	160	240	400	*0*	*0*	*0*	0.00	0.00	0.00
Solo	128	90	218	*0*	*0*	*0*	0.00	0.00	0.00
Swimming	576	800	1376	*0*	*0*	*0*	0.00	0.00	0.00
Sea Kayaking	0	150	150	*0*	*0*	*0*	na	0.00	0.00
Total PDR	9184	10712	19896	*19*	*8*	*27*	2.07	0.75	1.36

As with Example A, this not only shows the total incident rate for the specific organisation (e.g. 1.36 incidents per 1000 participant days), but also the rates for the main activities it provides. Example B highlights 'Initiatives' as the highest relative source of incidents, followed by Tramping and orienteering. However the relative significance of these incidents has not been determined here and more in-depth analysis could reveal that they might be mostly of low severity for example. Such follow-up analysis guidance is one of the values of having such indicative data.

But Example B also differs from Example A because it includes two years of data. This means that changes in incident rates can be observed over time. Overall it appears from that this organisation has reduced its incident rates from levels recorded in the 2008 year – down from an overall total of 2.07 to 0.75 (*incidents per 1000 participant days in 2009.* Whether this is due to a real reduction in incident occurrences cannot be determined at this early stage. There may be relatively random variations in incident levels as a normal part of operation. But if rigorously applied, the potential this approach represents for demonstrating results from changing safety and operational practices is clear.

Incident Rate Examples Discussion

Both these examples indicate that there could be different incident rates for different activities, that these rates may vary between different organisations and their corresponding activity and operational settings, and that they may vary over time. Results such as these provide obvious direction for further questions. However it is important to remember that the source data in the NID is subjectively entered and that these rates should be seen as only a guide to follow-up investigation or review. For example, the subjectively defined label '*Initiatives*' used here includes a variety of specific activities such as wide games, stream study and 'initiatives'. Also, it is not good practice to calculate rates for any applied use when there are a small number of cases. A small variation in the frequency of incidents can lead to a large change in apparent incident rates. Valid use of rate estimates really requires accumulation of a larger number of cases. This suggests considerable potential of the NID to collectively accumulate far larger numbers of incidents related to specific activities, both over time and from cross-sector contributions. The higher incident numbers received can lead to more meaningful incident rate estimates which can be used by all.

However incident rates on their own are not enough for drawing meaningful conclusions. A high incident rate does not necessarily indicate a problem, and it is important to explore these further by investigating the actual significance of the incidents. To this end the NID includes severity and narrative information which helps interpret the significance of different incidents and incident rates. For example, the actual severity scores for the 31 incidents identified in Figure 16a had an average of only 3, and only two were scored at a severity above 6. Using the standard severity score table in Appendix 5, with the exception of the two scored over 6, these would all be classified as '*minor*'. In this example the contextual information helps put the incidents concerned into more accurate context. Further development of indicator capability is possible using severity scores as weighting elements in developing incidence/severity indexes to better identify an increase or decrease in safety performance.

Whatever the severity scores, further important exploration is also possible by use of the corresponding descriptive and causal narratives related to each highlighted incident, as demonstrated by the Incident Rate Analysis Example in Appendix 5. This shows that the incidents reported by Organisation B (Figure 16b) comprised an array of only minor injuries. Without such clarification the significance of the apparent incident rates in Figures 16a and b could be misinterpreted. Some may look at the apparent 2008 rates for *'Initiatives'* in Example B (Figure 16b) and raise concerns. Should any serious or potentially serious situation really have occurred with any of these activities the combination of complementary severity score and narrative information would allow these to be identified. However, in the example given in Appendix 5, the outcome was confirmation that although these '*Initiatives*' incidents had a relatively high rate, they were in fact only minor severity.

This example shows the analytical potential of the NID, which can be realised more widely and robustly with more comprehensive incident entries and participation rate recording. In the case of the participation day rates, entry is only really required once a year. The time for this would logically be when completing data recording for annual reports and similar summary reporting. Incident records could be entered progressively on a case-by-case basis or in batches, depending on how they are recorded in respective organisations.

3. Summary and recommendations[20]

In summarising the NID data for 2009 and referring to the previous 2 years summarised in the 2007-08 report, this report has reinforced the utility of the NID and areas for its improvement. Recommendations made in 2007-08 still hold, and have been complemented by others. All are included here.

The NID has been developed on the basis of considerable previous research and database exploration, and it shows the potential to be a significant learning and advocacy resource for the outdoor sector. Its use of actual and potential severity scores, incident prioritising on that basis, a focus on including near misses and use of narratives are all key elements. It offers a single collective store of incident information for New Zealand's outdoor recreation sector, alongside which is the potential to have links to a new initiative that is attempting to develop an international incident database. Both these objectives are worthwhile as both offer the potential to significantly enhance the interpretive power and authoritative status of incident databases and their applications.

As noted early in this report, without access to robust and respected data, the judgements made about outdoor recreation and its relative worth and risks will continue to be more subject to general opinions externally rather than documented fact from inside. In addition, organisations that do not learn or are not seen to learn from past situations or mistakes may come under increasing scrutiny in the future. While individual outdoor sector organisations may have internal needs for good incident data, these should not be seen in isolation from the shared needs of the wider sector and the advantages that shared data offers. While the outdoor recreation sector is sometimes seen as being fragmented, opportunities to pool effort around common needs have been taken such in some component sectors such as outdoor education with the EOTC Guidelines for schools (e.g. Ministry of Education 2002, 2009) and Outdoor Activities – Guidelines for Leaders (SPARC 2009).

The NID is being developed along similar cross-sector collaborative lines. Most outdoor recreation organisations across the whole sector have very similar reasons to have good information systems around incidents and safety, and using a common system would be advantageous for all. The more extensive analyses possible from a larger database reflecting a wider range of organisations and conditions can add considerable value and validity to findings. The NID offers the opportunity for a robust and easy-to-use system that can meet the needs of most organisations. Engaging with this not only provides a useful tool for any individual outdoor sector organisation, many of which lack the capacity to run strong systems on their own, but it also offers a higher level of rigour, robustness and informed collective perspective that adds significant value in risk and safety management, decision-making and justification. The main questions to consider are '*Why wouldn't you?*' and '*How hard can it be?*' - especially if your organisation is already running its own systems. Data matching and transfer systems may be all that is required in some cases.

[20] Many conclusions, recommendations and summary discussion points are repeated unchanged from the 2007-08 report as they still hold and are likely to continue to do so for the next few years. Additions from new knowledge gained during the 2009 year and its NID reporting have been included where required.

3.1 Engagement and uptake of the NID

The current NID data on organisation type, incident region and activity type suggests a very uneven engagement to date. Although this has improved over 2009 with a considerable number or new organisations having registered to use the NID, the current level of reporting when compared to that apparent in incident studies such as Davidson (2002, 2006) is still relatively low and erratic. One advance has been in the number of organisations giving *narrative waivers*, subject to assurances about confidentiality management. We have even invented a new word in that regard – '*anonymised*'. Any approved narrative information will not be used without being suitably anonymised. The uptake of this waiver on that basis indicates a general progress in uptake of the NID approach. This has required a sustained effort over 2009 which will need to continue.

As with any innovation there is a common pattern of persistent initiators and early adopters leading the way over an extended period, before a body of evidence and example begins to build and the more general uptake develops (assuming that evidence is compelling). This would appear to be the situation for the NID at present, and more attention would seem to be required on identifying case study examples that illustrate what the NID can offer and how the information can be used. This would appear to be the most constructive direction for new work in relation to developing the NID, beyond the ongoing technical refinement that should occur as a matter of course. Some of the larger outdoor recreation sector organisations that are already collecting incident information should consider how they might provide leadership and contribute positively here. This does not necessarily involve commitment of any substantial finance or resources, as with a strong collective case other funding opportunities can be explored. But it does involve a willingness to share data and cooperate on database structure. This has been demonstrated in the engagement with and use made of the NID by the ski sector.

The recommendations from the 2007-08 NID report emphasised that the logical place to look at for gains in NID uptake should be the outdoor education component of the outdoor recreation sector. In this area both the outdoor education/experience providers and the schools have requirements for robust risk and safety systems and related incident reporting requirements (both compulsory and voluntary). Many already have their own internal reporting systems and databases, some are attempting to use common systems already, and many are adopting the NID already. Effort was particularly directed at this sector during 2009 resulting in more schools becoming registered on the NID, and more data being entered from the outdoor education sector. If this sector could lead the next phase of engagement with the NID to the extent to which the ski sector has achieved, the NID and its value to all would be considerably enhanced. Alternatively, some sectors such as the commercial adventure recreation/tourism could also take a lead. This would also make the New Zealand outdoor recreation sector world-leading in incident data information and management.

Here it is useful to consider the example of the International Search and Rescue Incident Database (ISRID), which has been developed over the last 30 years. It has been built over time through the sustained commitment of its principal developers who have continued to collect, compile, manage and analyse Search and Rescue incident data from a wide variety of sources. This has enabled development of a database containing over 50,000 SAR incidents (as at 2008), and has led to publication of a definitive guideline book (Koester 2008) which is now considered a fundamental reference tool for Search and Rescue operations in many situations over many countries. Similarly, the NID itself also provides a compelling example of the value of such systematic collection and

management of strategic incident data. This is through the uptake and applications made of the ski-sector incident data, which is regularly used to inform a variety of operational management decisions in ski-field management. Clearly there is considerable value to be gained from establishing systematic incident data systems and persisting with their support over time, as over time the value of the growing data resource is realised in an ever increasing number of ways. Both these approaches are world leading and the potential exists for the wider non-ski component of the NID to have a similar impact in the future.

Overall the main recommendation is that the outdoor education/outdoor centres sector continues progressively move toward wider adoption of the NID as its collective incident database for outdoor recreation and education needs. This can parallel internal systems where they already exist, and it builds upon the internal management structures already operating cross-sector on a number of needs in education. Other outdoor sectors such as commercial adventure tourism simply do not yet have the same level of sector-wide organisation, although the value of doing so in this sector is high. By taking leadership here the outdoor education/outdoor centres sector can provide examples which can demonstrate the value of the NID to other less readily engaged sectors such as adventure tourism and recreation activity groups. Opportunities to develop ongoing data matching, sharing and transfer systems from existing database resources should be a priority topic of discussion.

3.2 Improvement of participation data

Another general need is improved specification of participation data. There is capacity in the NID for specific participation data to be entered for specific activities as *participation day rates*, but to date this has been completed by very few registered organisations. It is recommended that:

- entry of participation day rate data be advocated wherever possible, and that the more organised professional organisations that already collect such data be targeted to lead the way.

Again, basic participation data, including both numbers and basic profile characteristics is something most professional organisations would or should already collect for their own requirements. However it is also clear that this is rarely done outside of the ski industry, with the main exception possibly being some of the outdoor education/experience providers. To provide evidence for the value of participation data, it is recommended here that:

- case studies are sought which demonstrate useful applications from having such key reference data used in combination with good incident records.

This could be another theme considered by the working group of key representatives suggested above.

In the case of non-professional/non-commercial organisations it is understood that such data may not be available to different individuals or groups, and that other means may be required to source it when undertaking any incident analysis. However, if specific activity sectors (e.g. mountain biking, equestrian, canoeing etc) can independently develop their own participation data estimation systems as best they can then that will be a considerable advantage when engaged in any incident rate or trend investigation (or in meeting any other participant need). Overall, those with better data/evidence will get better results.

Some outdoor sectors are more advanced than others in that respect (Dignan and Cessford 2009). They should be looked at for case study examples.

It should be noted that meeting the risk and safety needs of the outdoor recreation sector are not the not the only reasons for having good participation data. Any initiatives to improve participation data collection could be developed as part of a wider identified need in the outdoor recreation sector. This has obvious implications for wider resource and funding potential. The NID could just as usefully aim to make itself part of a national participation database as well as being the national incident database. A recommendation here is that the NID stakeholder group investigate possibilities to engage in a wider study of outdoor recreation participation data, along with new partners sharing that need.

3.3 Other recommendations

Leaving aside the need for wider engagement with the NID on incident reporting and participation data, there are a number of areas where it can be improved, or where information from it can be usefully applied. While this must be subject to resource and staff availability, it is useful to briefly note some of the particular points observed while engaged in this 2009 report and its 2007-08 predecessor (in no particular order):

- There is clear need for more opportunity to analyse narratives (in a suitably 'anonymised' form). Approvals to date allowed narratives from 96 of the 120 incidents to be included in the 2009 report analyses. The effort made to get approvals during 2008-2009 has made a difference to the value of narratives, but such approvals should continue to be strongly encouraged in the future, with suitable provisions embedded to provide clear anonymity of data source.

- Related to this is a need to include more guidance on what key information to include in NID data entries. It is apparent that there is already considerable assistance material provided, but that content can be highly varied in volume and value. Other complementary means of communicating the key information themes for optimising data entries need to be explored.

- More specifically, guidance should be given to entry-makers on the desired content of causal narratives. Some have been willing to enter the incident record but have not appeared to understand what was requested for casual narratives. Some provide only a slight variation on the descriptive narratives, while others give a simplistic response of one or two words such as 'weather', bad judgement, 'not prepared'. Clearly there are contributing factors behind these general-level 'label' responses, and these are the things that need to be explored. One option may be to more specifically request, along with accompanying definitions, description of the '*immediate*' causes and '*root'* causes, as described as a useful approach by Haddock (2008).

- Undertaking some in-depth narrative analysis case studies which result in published outputs may also assist demonstrate the value of such baseline information and its potential for wider application. The preliminary examples provided in the Appendices of this report and those in the 2007-08 report) suggest there will be numerous themes which could be explored individually. Between these two reports have been indicative examples addressing incident themes around burns, high actual- and potential-severity, hypothermia, bad weather, activity types, near misses and incident rates. None of these examples represented a full analysis, but rather demonstrated the different ways in which NID data could be used.

- There were a high variety of incidents of different types and significance. Given the lack of reference data such as participation levels the focus for analysis at this time should be on exploring the narratives and identifying priority hypotheses for testing. Such an approach could provide the basis for the types of case studies referred to above.

- Case studies of the applications made of the NID data by the ski-industry should be carried out. These would provide examples to demonstrate the benefits of engagement to the non-ski sector. Such evidential material would be required to convince relevant decision-makers to support the time and resources that may be required for their engagement with the NID.

- Consistency in data entry should be improved over time. The guidelines on data entry should if possible be made more widely and easily available so that over time the consistency of data entry is enhanced. This could include some form of link to explanation-assistance for respective questions which is accessible as the individual is entering the record.

- Where data is imported from registered organisations already running their own databases, greater focus is required on ensuring data is properly matched.

- A review of the database variables should be considered, to identify how each variable works in data analysis and whether any changes or additions could improve utility. This would be consistent with the NID project being a development programme, and a current 'work-in-progress'. Any reassessment could also include consideration of data needs from particular sectors. It is noted that the ski-sector has a degree of customisation in its data entry fields, and this could be worthwhile considering in relation to any other large common sectors (e.g. the outdoor education sector). Should some customisation be the price of achieving greater engagement by a significant sub-set in wider outdoor recreation sector, such flexibility should be considered.

- It is also noted that as part of development of a proposed new international incident database, an extensive analysis has taken place of data needs and the variable types required (i.e. refer www.incidentdatabase.org). The collaboration potential noted in the 2007-08 NID report's recommendations has been advanced and should continue.

- Related to the database recommendations and opportunities noted above, a filter variable is required in the database to identify different components of the outdoor recreation sector. At the moment it requires a long manual process to distinguish between ski and non-ski records. Should it ever be required to identify an outdoor education sub-sample for example, the process required would be time intensive and subjective, based on data analyst deductions from viewing other data in the records. This would be an easy fix, with some sort of tick box question being all that is required.

- Some specific data entry fields lack criteria to control entry errors. One example is the date field, which was seen to have data entered in dd/mm/yyyy format in some cases; mm/dd/yyyy in others; and text entries. This complicated attempts to search for cases over any set time period. Similarly, some users have entered data in the wrong fields, involving additional data cleaning being required by database managers. Some data entry packages have the capacity to allow specification of valid and non-valid entry types. This could assist here, although it is acknowledged that there are some resource implications. However, if the NID is to be practically easy enough to use to encourage larger scale engagement then such issues must be considered.

- The ethnicity question has some design problems that results in unreliable data. Redesign to distinguish nationality from ethnicity is recommended if this question is to be retained. It is understood that ethnicity data is an important component of subject profiles in any public service provision. Related to this, given popular interest in tourism incident costs, consideration of a simplified nationality question should be given to identify the distinction between New Zealand and overseas subjects. Many such questions start with a simplified NZ/Overseas tick box filter followed by a specific NZ 'ethnicity' question (choosing from categories).

- Because multiple incident cases can be entered from any specific incident event, some means of better distinguishing the event from the number of cases in each should be considered. Without this, the database reporting will have bias toward incidents involving larger numbers of individuals. This may involve creating a specific variable of unique 'Incident event', as well as the current *IncidentID* number attached to each case. Both are required. In their absence the separation must be done manually. While this is feasible given the non-ski outdoor recreation component of the NID is currently not large, it will become increasingly problematic as it grows.

- Consideration is required for connecting NID data to statistical analysis packages and qualitative information analysis packages. The variables in the database provide a variety of analytical opportunities, which are often not simple or possible to address in EXCEL. The capacity to sort, summarise and analyse data is limited, and considerable manual processing was required to provide many of the data findings and figures charts in this report. In addition, as the narrative record builds, means to more quickly sort through these to identify common qualitative themes will be important.

To conclude using slightly edited content from NID advocacy material, to make the national Incident database work we need:

1. *Active participation from the whole outdoor sector* - Outdoor centres/providers, national organisations, recreational clubs, schools, tertiary education organisations, outdoor event organisers, adventure tourism and ski area operators.
2. *Financial, in-kind and advocacy partners* – contributors so far include the Ministry of Education, NZ Mountain Safety Council, Education Outdoors NZ, Outdoors NZ and ACC. Also note there are also potential international partners developing.
3. *A culture of collaboration* – including openness, identification of common purpose and a willingness to share incidents without judgement.
4. *To spread the word* – please tell others about the National Incident Database and about any successes you have had using it.

To register go to: www.incidentreport.org.nz

4 References

American Alpine Club (2006): *Accidents in North American Mountaineering* 9(1): Issue 59. The American Alpine Club/ The Alpine Club of Canada. 108p.

Ashby, C.; Cassell, E. (2004): Boating-related Sport and Recreational Injury, Victoria July 2000 to June 2002. *Hazard* 56:1-15. Victorian Injury Surveillance and Applied Research System (VISAR). Monash University Accident Research Centre (MUARC), Victoria, Australia. See: http://www.monash.edu.au/muarc/VISU/hazard/haz56.pdf

Australian Sports Commission (2008): *Participation in Exercise, Recreation and Sport: Annual Report 2008*. Belconna, ACT. 174p.

Bentley, T.; Macky, K.; Edwards, J. (2006): Injuries to New Zealanders participating in adventure tourism and adventure sports: an analysis of Accident Compensation Corporation (ACC) claims. *The New Zealand Medical Journal* 211(1247): NZMJ unpaged.

Bentley, T., Page, S.; Macky, K. (2007): Adventure tourism and adventure sports injury: The New Zealand Experience. *Applied Ergonomics* 38, 791-796.

Carmont, M.R (2008): Mountain biking injuries: a review. *British Medical Bulletin* 85: 101-112

Cassell, E.; Clapperton, A. (2002): Preventing Injury in Sport and Active Recreation. *Hazard* 51:1-22. Victorian Injury Surveillance and Applied Research System (VISAR). Monash University Accident Research Centre (MUARC), Victoria, Australia. See: http://www.monash.edu.au/muarc/VISU/hazard/haz51.pdf

Cassell, E.P.; Finch, C.F.; Stathakis, V.Z. (2003): Epidemiology of medically treated sport and active recreation injuries in Latrobe Valley, Victoria, Australia. British Journal of Sports Medicine 37: 4-5-409.

Coggan, C.; Hooper, R.; Adams, B. (2002): Self-reported injury rates in New Zealand. *The New Zealand Medical Journal* 115 (1161): NZMJ unpaged.

Conn, J.M.; Annest, J.L.; Gilchrist, J. (2003): Sports and Recreation related injury episodes in the US population, 1997-99. *Injury Prevention* 9: 117-123

Davidson, G. (2002): Exploring the Myths: Analysis of Incidents and Accidents in Professional Outdoor Education in New Zealand, 1996-2000. *Paper presented at SPARC Risk 2002: Proceedings – New Zealand Conference on Outdoors Risk Management*. See: http://www.safeoutside.org/risk/Data/myths.html

Davidson, G. (2006): Fact or Folklore? Exploring "Myths" about Outdoor Education - Accidents: Some evidence from New Zealand. *New Zealand Journal of Outdoor Education* 2(1): 50-85 (reprinted there with permission from original publisher – Journal of Adventure Education and Outdoor Learning 4(1): 11-35 (2004)

Davidson, G. (Undated): *The Cost of Outdoor Recreation Accidents in New Zealand – Some Initial Indications from ACC Claims.* See: http://www.nzoia.org.nz/resources/doc_library_details.asp?catID=22&name=Research+Papers

Dignan, A.; Cessford, G.R. 2009. Outdoor Recreation Participation and Incidents – A scoping study relating incidents to participation levels. Research Programme,

Mountain Safety Council, Wellington. See: http://www.mountainsafety.org.nz/files/Participation-and-Incident-GC-Fixed.pdf

Donald, S.; Chalmers, D.; Theis, JC. (2005): Are snowboarders more likely to damage their spines than skiers? Lessons learned from a study of spinal injuries from the Otago ski areas in New Zealand. *New Zealand Medical Journal* 118 (1217): NZMJ unpaged.

Finch, C; Ozanne-Smith, J.; Williams, F. (1995). The Feasibility of Improved Data Collection Methodologies for Sports Injuries. Monash University Accident Research Centre (MUARC): Report No.69. Victoria, Australia. See: http://www.monash.edu.au/muarc/reports/muarc069.html

Finch, C.; Valuri, G,; Ozanne-Smith, J. (1998): Sport and active recreation injuries in Australia: evidence from emergency department presentations. *British Journal of Sports Medicine* 32:220-225.

Flood, L.; Harrison, J.E. (2006): Hospitalised sports injury, Australia 2002-03. Australian Institute of Health and Welfare, and Flinders University. See: www.nisu.flinders.edu.au/pubs/reports/2006

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.

Gabbe, B.J.; Finch, C.F.; Cameron, P.A.; Williamson, O.D. (2005): Incidence of serious injury and death during sport and recreation activities in Victoria, Australia. *British Journal of Sports Medicine* 39: 573-577.

Haddock, C. (1999): High Potential Incidents – determining their significance. *Paper presented at the Wilderness Risk Management Conference*, Sierra Vista, AZ: pp33-46.

Haddock, C. (2008): Incident Reviews: aspects of good practice. *Ki Waho- Into the Outdoors* 2, Sept 2008: 16-19. Outdoors New Zealand. Also see: http://www.outdoorsnz.org.nz/cms_show_download.php?id=180

Heggie, T.W.; Heggie, T.M (2009): Search and Rescue Trends Associated with Recreational Travel in US National Parks. *Journal of Travel Medicine* 16 (1):23-27

Koester, R.J. (2008): *Lost person Behaviour: a search and rescue guide on where to look for land, air and water*. dbS Productions, Charlottesville, Virginia, USA. 398p. Refer: www.dbs-sar.com

Leemon, D. (2009*): Adventure program risk management report. Incident data from 1998-2007.* See: http://www.aee.org/files/en/user/cms/WRMC_Incident_Poster_text_2008.pdf.

Leemon, D.; Merrill, K. (2002): *Adventure program management report: Volume III – data and narratives from 1998-2000.* Wilderness Risk manager's Committee, National Outdoor Leadership School, Association for Experiential Education, Student Conservation Council.

Malcolm, M. (2001): Mountaineering fatalities in Mt Cook National Park. *New Zealand Medical Journal* 114 (1247): 78-80

Ministry of Education (2002*): Safety and EOTC – A good practice guide for New Zealand schools.* Ministry of Education, Wellington, New Zealand. 90p.

Ministry of Education (2009): *EOTC guidelines – bringing the curriculum alive.* Ministry of Education, Wellington, New Zealand. 83p. See: http://eotc.tki.org.nz/EOTC-home/EOTC-Guidelines

Monasterio, E. (2005): Accident and fatality characteristics in a population of mountain climbers in New Zealand. *New Zealand Medical Journal* 118 (1208): NZMJ unpaged

Monasterio, E. (2006): Adventure sports in New Zealand: Dangerous and costly recklessness or valuable health-promoting activity? *New Zealand Medical Journal* 119 (1247): NZMJ unpaged

NOHSAC, (2005): Methods and Systems Used to Measure and Monitor Occupational Disease and Injury in New Zealand. *NOHSAC Technical Report 2*: National Occupational Health and Safety Advisory Committee, Wellington, 2005. See at: www.nohsac.govt.nz

Northey, G. (2003): Equestrian injuries in New Zealand, 1993-2001: knowledge and experience. *New Zealand Medical Journal* 116 (1182): NZMJ unpaged.

Outdoor Foundation (2008): *Outdoor Recreation Participation Report 2008*. Outdoor Foundation, Boulder, Colorado. 41p.

Salmon, P.; Williamson, A.; Mitsopoulos-Rubens, E.; Rudin-Brown, C.M.; Lenne, M.G. (2009): The Role of Human Factors in Led Outdoor Recreation Incidents: Literature Review and Exploratory Analysis. Monash University Accident Research Centre (MUARC), Victoria, Australia. 68p. See: http://outdoorcouncil.asn.au/doc/OAI_REPORT_FINAL_VERSION_OCT_15th_2009.pdf

Sharp, B.S. (2007a): Scottish Mountaineering Incidents (1996-2005) – Summary Report. Research Digest No. 102, Sport Scotland. 7p. See: http://www.mrcofs.org/media/download_gallery/Summary%20Report.pdf

Sharp, B.S. (2007a): Scottish Mountaineering Incidents (1996-2005) – Full Report. Research Report No. 109, Sport Scotland. 44p. See: http://www.mrcofs.org/media/download_gallery/Incident%20Report.pdf

Smartt, P.; Chalmers, D. (2009): Obstructing the goal? Hospitalisation for netball injury in New Zealand 200-2005. *New Zealand Medical Journal* 122 (1288): NZMJ unpaged

SPARC, (2008): *Sport, Recreation and Physical Activity Participation Amongst New Zealand Adults: Key Results of the 2007/08 Active New Zealand Survey*. Sport and Recreation New Zealand, Wellington. 21p.

SPARC, (2009): *Outdoor Activities – Guidelines for Leaders*. Sport and Recreation New Zealand, Wellington. See: http://www.sparc.org.nz/en-nz/young-people/Guidelines--Resources/Outdoor-Activities---Guidelines-for-Leaders/

SPARC, (2009a): *Sport and Recreation Participation Levels: Findings of the 2007/08 Active New Zealand Survey*. Fact sheet – Sport and Recreation New Zealand, Wellington. 5p.

SPARC, (2009b): *Sport, Recreation and Physical Activity Profile: Canterbury 2007/08: Findings of the 2007/08 Active New Zealand Survey.* Sport and Recreation New Zealand, Wellington. 18p.

Stephens, B.D.; Diekma, D.S; Klein, E.J. (2005): Recreational Injuries in Washington State National Parks. *Wilderness and Environmental Medicine* 16: 192-197.

Stevenson, M.R.; Hamer, P.; Finch, C.F.; Elliot, B.; Kresnow, M. (2000): Sport, age and sec specific incidence of sports injuries in Western Australia. *British Journal of Sports Medicine* 34: 1288-194.

Stevenson, M.; Finch, C.; Hamer, P.; Elliot, B. (2003): The Western Australian Sports Injury Study. *British Journal of Sports Medicine* 37: 380-381

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6. Appendices

1. NID base variables
2. Incident Severity Scale
3. Narrative Analysis Example - High Severity Incidents
4. Narrative Analysis Example - Burns
5. Incident Rate Analysis Example – Severity and Narrative

Appendix 1 - NID base variables

This lists the NID variables. They are not listed 'data entry' order, but as they appear in the database. Refer to NID Guidelines for full variable descriptions and metadata.
http://www.incidentreport.org.nz/resources/OER_NID_Guide.pdf

- IncidentID – number for each incident event
- Actual Severity - code
- Potential Severity –code
- Region – open text entry
- Address – specific location - open text entry
- Grid Ref – open text entry
- Date – open text entry
- Time – open text entry
- Incident type - codes, multiple entries possible
- Descriptive narrative – open narrative
- Weather –code
- Temperature - code
- Wind–code
- Communications – open text entry
- Lost Days – YES/NO plus number of days
- Number Persons - number (may be more than 1 incident case per event)
    - age - number
    - sex – male/female
    - ethnicity - code
    - injury – detail of injury type (coded)
    - Illness – detail of illness type (coded)
    - near miss – post-coded by database administrator)
    - missing – post-coded by database administrator)
    - fatality - post-coded by database administrator)
    - evacuation method - code
- Activity Type - code
- Curriculum area – code (schools only)
- Duration hrs - number
- No. Qualified Instructors - number
- No. Volunteer Helpers - number
- No. Supervisors - number
- No. Participants - number
- EOTC
- Leader age - number
- Leader Gender – male/female
- Leader Relevant Qualifications – yes/no
- Leader Experience - coded
- Casual Factors Leader - coded
- Casual Factors Participants - coded
- Casual Factors Equipment - coded
- Causal Factors Environment – coded
- Causal Factors – Narratives

Appendix 2 - Incident Severity Scale

Note that incident reports require both 'actual' and 'potential' severity scores to be entered, with related narrative entry describing how the incident could have been potentially worse. Also note many people do enter incidents with scores < 3, and that is some cases this is encouraged to reduce reporting loads. It is recommended in many cases that incidents with severity of 6 or over area the subject of more in depth review.

Severity Ranking	Impact on Participation	Injury	Illness	Social / Psychological Damage		Equipment Damage	Environmental Damage
1	**Minor or short term impact on**	Splinters, insect bites, stings	Minor irritant	Temporary stress or embarrassment.	1	Minor cost	Littering
2	individual(s) that doesn't have large effect on their participation in the programme.	Sunburn, scrapes, bruises, minor cuts.	Minor cold, infection, Mild allergy.	Temporary stress or embarrassment with peers.	2	>$50	Minor damage to environment that will quickly recover.
Severity Scale 3 & above to be recorded on National Incident Database							
3	**Medium impact** on individual(s) that may prevent participation .in the activity/programme for a day or two	Blisters, minor sprain, minor dislocation, cold/heat stress	Minor asthma, cold, upset stomach, etc.	Stressed. Beyond comfort level. Shown up in front of group.	3	>$100	Scorched campsite, plant damage
4		Lacerations, frostnip, minor burns, mild concussion, mild/hypo hypothermia.	Mild flu, migraine.	Stressed. Wants to leave activity. A lot of work to bring back in.	4	>$500	Burnt shrubs, cut live branches to burn, wash dishes in stream.
5		Sprains & hyperextensions, minor fracture.	Flu, food/hygiene related diarrhoea / vomiting	Distressed. Freezes on activities, requires 'emotional rescue'. Does not want to participate again.	5	>$2,000	Walked through sensitive ecological area destroying some plant life, toileting close to water course
Any Incidents to people at grade 6 & above need to be reported to Department of Labour							
6	**Major impact** on individual(s) that would mean they were unable to continue with large parts of the programme.	Hospital stay < 12 hours. fractures, dislocations, frostbite, major burn, concussion. Surgery. Breathing difficulties moderate hypo/hypothermia.	Medical treatment required Hospital stay < 12 hours e.g. Serious asthma attack, serious infection, Anaphylactic reaction.	Very distressed. Leaves activity and requires on site counselling. Unwilling to participate in activity ever again.	6	>$8,000	Destroyed / killed some example of flora/fauna
7		Hospital stay > 12 hours e.g. Arterial bleeding, severe hypo / hypothermia. Loss of consciousness.	Hospital stay > 12 hours e.g. Infection or illness causing loss of consciousness, serious medical emergency.	Therapy / counselling required by professional.	7	>$20,000	Killed, destroyed, polluted small area of environment.
8	**Life changing** effect on individual(s) or death	Major injury requiring hospitalisation e.g. Spinal damage, Head injury.	Major illness requiring hospitalisation e.g. Heart attack.	Long term counselling/therapy required after incident.	8	>$50,000	Killed example of protected species
9		Single death	Single death	Post-traumatic stress disorder, changed profession because of incident. Post-traumatic stress disorder.	9	>$250,000	Fire or pollution etc resulting in area of wilderness being destroyed
10		Multiple fatality	Multiple fatality	Suicide because of incident.	10	>$1,000,000	Major fire or pollution causing serious loss of environment or life.

Appendix 3 – Narrative Analysis Example - High Severity Incidents

The data presented below for each injury incident comprise the actual severity score, potential severity score and the narrative about what happened.

Note that these narratives are strictly edited ('anonymised') to remove any specific references to any particular persons, organisations, place names or other wording indicative of such. Only narratives from those organisations giving approval waivers for such controlled use are presented. The NID management is committed to maintaining the appropriate levels of privacy and anonymity of the data providers and those involved in incidents.

Arranged by Actual Severity – selected examples from 26 high actual severity incidents (scored >5)

Actual Severity	Potential Severity	Descriptive Narrative	Causal Narrative
8	9	Climber and belayer on rocks. Using bolts to climb a route. The climber when reaching the top was dropped by the belayer who mistakenly took the climber off belay. The belayer should have lowered the climber. The climber called 'have you got me' (the standard call) the belayer called yes and took him off belay. The climber fell 12 metres to the ground. Broken eye socket 2 vertebra fractures concussion 5 foot fractures scrapes and bruises. Very lucky not to have been killed. In hospital for 2 months and now 4 months later still in a body brace. Returning overseas to recover.	A mis-communication and lack of understanding resulted in the belayer not understanding what he was supposed to do. They had only climbed together for that day. so had not properly discussed and planned their calls.. . XXXX is from overseas with good English and experienced in climbing. The other climber was from YYYY and denied that he was at fault initially. Later he admitted he made a mistake in taking XXXX off belay.. . The climber could have checked that the belayer still had him on belay. by leaning back (with his safety still on) to check the rope tension.. . Mostly the belayer's fault. in my opinion. not understanding the calls. . . . . I talked to XXXX about the incident several times. He was mentally OK but taking a long time to heal.. . . . You need to change the form so that I can put in 'don't know' for details i.e. I don't know the other participants name. age etc or the exact date or time. . .
7	8	Group had just completed long swim . When XXXX stood up to get out of the water he collapsed and had an asthma attack. Students called to myself and YYYY as we were on launch on the mooring. Students grabbed sleeping bags. I swam in put XXXX on blue mat and sleeping bag in recovery position. XXXX took his ventolin 3-4 times. Because his body was in shock the coldness affected him. YYYY jumped beside him to assist his warm up. I also helped with that until he warmed and was breathing easy again.	Asthma Fatigue/exhaustion
6	7	XXXX was picked up from Solo by YYYY. At this time she noticed something on XXXXs leg that he described as an itchy bite that had gone bad. At closer inspection YYYY thought the "itchy bite" looked more like an advanced infection. XXXX was taken to Local Hospital where he received a injection of antibiotics to treat the infection. XXXX was returned to his group the following day to continue with the journey. He met them at AAAA from where he completed the journey with no problem.	Infection

6	6	XXXX was walking down the hill from being on top of peak when she slipped and heard a popping sound in her wrist. Hand swelled up on the top very sore to touch limited movement sideways. Strapped up walked her slowly. On the sixth she was seen by YYYY and ZZZZ then sent to the Doctor. Was talk it was not broken but sprained. Support tape and drugs given	
6	6	XXXX vomited about midnight feeling cold temp normal attended to and monitored by night supervisor. Condition deteriorated and instructor and duty manager were contacted about 0200 - severe abdominal pain taken to A&E Treated for pain and mild dehydration at Hospital Parents contacted Mother drove up from home. XXXX's departure processed on recommendation of doctor.	
6	6	XXXX slipped and fell while crossing a stile broke his collar bone	Stile was very wet and slippery
6	6	Whilst the student was involved in a wide game he was running after a friend and tripped over the ramp and a bike which was lying on the ground and fell over bumping his head which result in a lump on his forehead. He then got up and kept running after his friend.	The area that was going to be used for the wide game was not cleared of other obstacles - namely the bikes that were lying around the area.

These give examples of high actual severity incidents, as judged by the persons making the entries. They also illustrate the types and degree of content provided in the NID narrative entries. The potential for deeper analysis is clear, subject to quality source content being provided. Guidance should be provided to ensure the content of the narratives highlights key information points.

Arranged by Potential Severity – selected examples from 51 high potential severity incidents (scored >5)

Actual Severity	Potential Severity	Descriptive Narrative	Causal Narrative
1	9	Student tangled his leg in a "wrapped raft" scenario. He fell into the water. The tutor standing alongside immediately grabbed the student and untangled him. Incident took a total of 2-3 seconds.	Tutors should be teaching inside scope range of the award.
2	9	Groundsperson was spraying weeds on the quad bike when the bike became unbalanced and rolled. Groundsperson jumped off as it rolled sustained bruise to rib cage as he fell.	Judgment error - Grass was slippery as it still had morning dew on it. Groundsperson should not have been on such a steep gradient with the quad bike if the surface was wet.
5	9	While holding metal tray with right hand opened warming unit with other hand. On touching the warming unit handle received a strong electrical shock.	Fault found with warmer unit on inspection by electrician and failed subsequent electrical checks. Warmer unit placed out of service until repaired.
8	9	Climber and belayer on rocks. Using bolts to climb a route. The climber when reaching the top was dropped by the belayer who mistakenly took the climber off belay. The belayer should have lowered the climber. The climber called 'have you got me' (the standard call) the belayer called yes and took him off belay. The climber fell 12 metres to the ground. Broken eye socket 2 vertebra fractures concussion 5 foot fractures scrapes and bruises. Very lucky not to have been killed. In hospital for 2 months and now 4 months later still in a body brace. Returning overseas to recover.	A mis-communication and lack of understanding resulted in the belayer not understanding what he was supposed to do. They had only climbed together for that day. so had not properly discussed and planned their calls.. . XXXX is from overseas with good English and experienced in climbing. The other climber was from YYYY and denied that he was at fault initially. Later he admitted he made a mistake in taking XXXX off belay.. . The climber could have checked that the belayer still had him on belay. by leaning back (with his safety still on) to check the rope tension.. . Mostly the belayer's fault. in my opinion. not understanding the calls. . . . . I talked to XXXX about the incident several times. He was mentally OK but taking a long time to heal.. . . . You need to change the form so that I can put in 'don't know' for details i.e. I don't know the other participants name. age etc or the exact date or time. . .
1	8	Instructor was setting up the climb - she needed to abseil down to a ledge to get a rope. One end of the rope went through the ATC device and the instructor jumped 2 - 3 metres to the ground landing in bushes.	The instructor made assumptions about the ropes and complacency meant that the ends of the ropes were not knotted as they were not touching the ground.

2	8	Student coming down fixed safety rope on XXXX Peak. Gave clear instructions to all students to step down even pointing to foot holds. He proceeds to take first step and then jumps to ground. He loses his balance and falls over edge. I grabbed his pack and he self arrests. I pulled him back up to ridge and gave him a few appropriate harsh words.	Failure to follow instructions. inherent risk of the activity
3	8	Lead van continued to town. Second van took short cut bypass road travelled at speed swung out in front of lead van at speed and leaned over a long way. Students in lead van commented on how dangerous the driving was both staff members scared because looked like van was going to roll	Peer pressure from students in the other van to race. Speeding to beat the other van. Bad judgment call by driver. Was discussed with driver and protocol put in place with second van to follow route of first van to avoid any temptation
3	8	Night time emergency evacuation of a student with 4WD and two instructors. Driving at 30km hr braked for corner front right wheel slide on wet clay vehicle continued to slide on clay ending up in side ditch and slowly rolling to rest on drivers side evacuated vehicle through passenger window	Adverse weather conditions and poor quality of road
3	8	Belayers could not slow or stop climber who fell off the wall. Rope slid through hands of group using rix a trix belay system. Climber fell 4m to the ground and hurt her back.	The kids were tired and hot and not used to using the rix-a-trix belay system. . . . . Suggested minimum age to be used for this belay system as failure of the system causes the climber to fall from height.
4	8	Walking down hill student above XXXX dislodged a rock. Rock tumbled down hill and hit XXXX in head.	Loose rock on steep ground. when combined with students or are inexperienced in terrain and foot placement and with students below caused this incident.. . Make sure to brief students and remind them of foot placement and pulling on dead trees so as not to dislodge anything below. Have students move out of fall zone if possible.
4	7	7am on hut verandah. 2nd stage lighting stove fuel squirts from pump to hand/wrist & ignites. Burn injury. Put hand in bucket water for longer than 1/4 hr. Further immersions as discomfort returns later. Immersions in stream 24 hours later. Nil effect.	Lack of information at stove purchase concerning regular routine maintenance
2	6	Group of students orienteering on camp individual tripped over and twisted ankle	Student orienteering fell over due to terrain
2	6	small rock fell off crag hit student in face	occasional small rockfall off crag

2	6	While one group was receiving instruction with a single instructor another group came over early to the activity. The additional group began misbehaving and did not have parental supervision. While without supervision a student cut his left hand on a cable.	Upon noticing no supervision of the additional group the activity leader should have contacted office and/or other activity leaders to assist in supervision of the additional children. Parental supervision should be reinforced for all groups at Camp.
3	6	XXXX failed to hold on correctly as the raft descended the falls and slipped forwards onto the rocks knocking his shin	He waited too long to hold on
3	6	Patient to a run up to the mudslide and slipped on the slide. She wacked the top back part of her head into the slide	Due to the slippery area participants should be instructed not to perform 'run ups' on the mudslide
3	6	Climbing up over low initiative wall during program. Knee turned opposite way to body. Felt pain heard crack in knee.	Patient was injured 8 months ago and was not fully recovered before attempting exercise. Injury was unknown to staff before commencing activity.
3	6	Student had an asthma attack at the beginning of the XXXX tramp	Patient did not have breakfast or drink water before beginning tramp. Patient also did not carry her own medication on the tramp. despite being reminded by activity leaders to have an inhaler with her. . . . . There were too few activity leaders for the group.
4	6	XXXX stepped over the stile and landed on the wrong part of her foot - ankle was in immediate pain.	The student misjudged her footing - potential for a broken joint was highlighted.
4	6	As XXXX was coming down the stairs next to the mudslide he lost his balance on the last step and fell forward. His shin contacted the edge of the last step causing a laceration.	Lack of supervision on the activity by group members. An instructor was not hired to supervise this activity.
5	6	Student was involved in coasteering activity as a result of jumping off a rock into the sea fractured his arm which required a visit to the hospital student returned to camp the following morning to continue with the programme.	The student XXXX was nervous and stepped off the rock towards the left. Instead of jumping straight out into the sea.

5	6	A group of Y10 students riding a single track with some stepped portions. Student attempted descent of staircase though at low speed braked hard at a corner and went over handlebars down a bank. Broke fall with hands and sprained wrist	Students were instructed in how to descend drop offs and did some practice. Students encouraged to walk bike through difficult sections but inadequate practice and overconfidence for the student in question to attempt the staircase was a factor. Instructor did not clearly communicate to wait for a spotter to be in place before attempting challenges. hence no-one in place to prevent/break the fall
6	6	XXXX slipped and fell while crossing a stile broke his collar bone	Stile was very wet and slippery
6	6	Whilst the student was involved in a wide game he was running after a friend and tripped over the ramp and a bike which was lying on the ground and fell over bumping his head which result in a lump on his forehead. He then got up and kept running after his friend.	The area that was going to be used for the wide game was not cleared of the obstacles namely the bikes that were lying around the area.

These give examples of high potential severity incidents, as judged by the persons making the entries. They also illustrate the types and degree of content provided in the NID narrative entries. The potential for deeper analysis is clear, subject to quality source content being provided. Guidance should be provided to ensure the content of the narratives highlights key information points

It is important to recognise that these high *potential-severity* incidents also represent an important complementary cross-check of probable *near miss* occurrences. It was found there that many more incidents were scored with high *potential severity* than were specifically reported as *near misses* in other response variables. This adds value to the interpretive potential of NID data, and the importance of near misses as a learning opportunity has been emphasised in a number of studies (e.g. Davidson, 2002, 2006; Haddock 1999; Leemon & Merrill 2002; Salmon et al 2009).

Appendix 4 – Narrative Analysis Example - Burns

This example[21] illustrates how the NID narratives and other classifying data (e.g. variables such as injury, weather conditions etc) can be explored to investigate the influence of different potential causal factors in incidents. It illustrates the range of situations that can lead to burn incidents and promotes consideration of what issues may need to be considered in their prevention and response.

All data is presented as entered by individuals making entries to the NID. In some cases readers of the narratives may consider that other choices may have been made in what classifying data was entered, including the actual and potential severity. This represents the differences in subjective judgement that are unavoidable in such a system of voluntary data entry. But the presence of narratives does allow some degree of review of other classifying data that is entered.

Note that these narratives are strictly edited ('anonymised') to remove any specific references to any particular persons, organisations, place names or other wording indicative of such. Only narratives from those organisations giving approval waivers for such controlled use are presented. The NID management is committed to maintaining the appropriate levels of privacy and anonymity of the data providers and those involved in incidents.

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[21] The Appendices in the 2007-08 NID report also present examples of different types of narrative analysis relating to hypothermia incidents and bad weather causal factors.

Example - Burns incident narratives

These narratives were selected where '*burns'* referred to as injury types in the respective NID data entries. This involved searching the database for '*burns'* as a keyword, and also scanning narratives in case the term '*burn'* was not used in a burning-related incident. The 12 example incidents listed below come from combining the three years of NID data from 2007 - 2009.

This very brief descriptive example illustrates the value of using multiple years of data to address questions on a target issue which may be relatively uncommon in any particular year. In this case, as well as giving narrative descriptions of fire-related burn incidents (as was anticipated), this process also highlighted the value of narratives in highlighting unforseen results. In this particular case the search process identified burn incidents arising from fire, electrical and friction effects. This broadened the scope of issues related to burn safety practice for example. Again, a longer duration of NID data collection by more users giving better quality entries would increase the potential for similar analyses of many other targeted topics.

Actual Severity	Potential Severity	Descriptive Narrative	Causal Narrative
5	9	While holding metal bay tray with right hand opened warming unit with other hand. On touching the warming unit handle received a strong electrical shock.	Fault found with warmer unit on inspection by electrician and failed subsequent electrical checks. Warmer unit placed out of service until repaired.
4	7	7am on hut verandah. 2nd stage lighting -stove fuel squirts from pump to hand/wrist & ignites - burn injury. Put hand in bucket water for longer than 1/4 hr and further immersions as discomfort returns and later immersions in stream 24 hours later til nil effect.	Lack of information at stove purchase concerning regular routine maintenance
5	6	The group was cooking tea and asked a teacher to refill the meths container for their trangia cooker. A flame shot up from the container burning the student on the arm and face.	While it has never happened before. the thought is that the meths container was too hot - policy around refilling has been revised to state that \'the container must be cool to the touch before meths is added.'

2	6	XXXX was lighting a trangia and burnt himself around his knee. The fuel container wasn't in the correct placement. XXXX lit the fuel and then tried to move it into place. In the process the fuel spilt and the flames roared up and set XXXXs thermal legging. XXXX wet some cloth and kept his burn cooled that evening. We were camping so did not have running water nearby. He put gauze over the area the next day to keep it clean while tramping	
5	5	Using handline to go down steep terrain student slipped and held on to rope causing rope burn to hand.	Staff training systems, policies and guidelines
2	5	Participant attempting to run across high beam. Slipped and fell grazing (burning) his arm on the high beam before the belay line took up his weight.	Current policies and procedures are not clear in regard to running on the high beam. If the participant had not been running on the high beam the incident would not have occurred. There are other. safer. ways to increase the level of challenge on the high beam. Policies and procedures need to be revised and appropriate training given to ensure that running and jumping on the high beam is not one of the options for increasing challenge to participants.
4	4	Y7 students cooking their dinner under the supervision of their Y13 leader over gas cookers in a designated area. Student walked too close to cooker and billy of near boiling water fell and poured water over another students ankle and foot and into her shoe sustaining a painful burn.	The Year 7 student had significant hearing loss. Her mother attended camp and was with her at the time. The cooking areas and safety guidelines were set. all groups were cooking next to the stream in case of fire or burns. Possibly she did not hear the billy get knocked or the warning as it fell as she didn’t\'t see it happen till too late. Hence she was allowed to sit too close to the cooker. Despite giving clear instructions for cooking safety. including not walking through the cooking area some of the group were not good at retaining and following instructions. The leader had momentarily moved away to get some food and perhaps some impatience with the length of time cooking took when students were hungry and tired at the end of a long day.

4	4	XXXX put her hot soup cup down on the groundsheet inside the tent and one of the other girls knocked it over- spilling some of the contents on her foot. YYYY placed her foot in pan of cold water for approximately 10 mins. I then filled her gumboot up with cold water. XXXX said she was OK to walk to road. I asked ZZZZ to pick her up and check her out in the 1st aid room. She had a small blister on her big toe. No further action taken.	Traps in work environment – student
3	4	students brewing hot drink after days sea kayaking. poured drink into cup held above knee. hot water poured onto knee resulting in fist sized burn	lack of attention and concentration while handling hot fluids. drink should have been poured into cup placed on camp table.
3	3	People were pulling person up rope line and one person had rope wrapped around hand. When rope pulled tight rope burnt her hand.	Participant not following instructions. Need to be more assertive about this hazard when briefing group.
3	3	XXXX was using an abseil 'rack' for the 3rd time and chose to adjust it to enable himself to go faster. He went faster than he anticipated. Instead of releasing his personal safety (letting go of the prussick) he held onto it tighter and therefore didn't slow down. He finally let go and the prussick stopped his descent but by this time had a reasonable rope burn to his brake hand. He continued the activity for another two hours. He had previous injury to the area because of dog handling (and believed that as a result he was more susceptible to getting a rope burn injury than most other people).	Lack of experience for the participant so he knew instinctively what to do when he started moving too fast. He hadn't anticipated it would go so fast. . . . . Next time the instructor would place a safety line onto the person and retain control rather than rely on participant to arrest himself with a prussick back up.
2	3	Picked up a very hot food plate with right hand. Had hot coffee in left hand and couldn't drop the plate. By the time she placed the plate down the heat had burnt her finger.	Lack of awareness that the plate had become very hot. Did not drop the plate immediately (wanted to ensure she got a meal). . . . . Cover prevention regarding this situation in "cookers". Recommend using a pot holder.

Appendix 5 – Incident Rate Analysis Example

The incident severity scores and narratives presented here relate to the 27 incidents recorded by one particular organisation in 2008. They provide information which allows interpretation of its activity incident rates as demonstrated in Section 2.6 (refer Figure 16b in the column titled '*2008 Incident Rates*'). Here a range of incident rates are presented which show some activities having much higher incident rates than others. However the relative significance of these rates is not clear.

While these incident rates on their own might suggest some activities might more 'incident-prone' than others, this is on the basis of a small data record with no interpretive context. Reference to severity scores and narratives can clarify the relative significance of these incidents. While this is especially useful when data records are few it is also an important interpretive aid whatever the scale of the database. Here the narratives below support the low severity scores given to these incidents. This is an important database capability, as without it the basic incident rates may be misinterpreted. So while '*Initiatives'* activity in Figure 16b has a much higher incident rate relative to other activities, the narratives below clarify that these incidents are all relatively minor in actual severity (although some have high potential severity). While this is only a very brief and indicative example, it does reinforce the complementary interpretive value of combining narrative analysis with the basic numeric data.

Note that these narratives are strictly edited ('anonymised') to remove any specific references to any particular persons, organisations, place names or other wording indicative of such. Only narratives from those organisations giving approval waivers for such controlled use are presented. The NID management is committed to maintaining the appropriate levels of privacy and anonymity of the data providers and those involved in incidents.

Example: Severity scores and narratives for incidents reported by Organisation X in 2008 (Example B in Section 2.6)

Actual Severity	Potential Severity	Descriptive Narrative	Causal Narrative
5	6	Student running around camp site playing a game. Landed awkwardly on foot after vaulting a fallen log - suspected sprain. This was during 'school' teacher-led time (not YYY instructors). The teacher chose to call the ambulance and this resulted in the local ambulance and the Westpac helicopter arriving at the campsite.	A minor accident that occurred due to energetic participation in a fairly low risk camp activity. Unfortunate about the over-reaction by the teachers and emergency services involved. Turned out to be only a minor sprain and the student lost little time on the programme.
4	5	XXX staff training session - kayaking at YYY Bay. ZZZ wet exit and cut her foot on a submerged rock. Required stitches.	Participant not wearing shoes and shells/rocks at YYY Bay are very sharp. XXX has now a new policy that kayakers must wear something on their feet to protect them from sharp shells/rocks.
3	5	Participant running down hill - uneven undefined terrain no trail. Fell over and landed on a gorse stump which punctured her leg. Was sent to medical centre to check if it needed stiches.	Uneven terrain hazardous for running. Potential risk of injury if fall over - but difficult to minimise this without making activity less challenging.
3	5	Participant traversing on tyre-swing initiative activity. His foot slipped and got caught inside a tyre twisting it slightly. Minor sprain that came right after rest.	Participant had a sore hand which was not disclosed to the instructor. This meant he was unable to hold onto ropes properly. Favouring his hand meant that he had bad technique and strength resulting in him slipping and hurting his ankle.
3	5	School group playing wide game on camp grounds at night. Children running around grounds and through bush in the dark. One student has run down a dry creek bed and crashed into a low bridge that he didn't see. Winded. Teachers/parents suspected broken ribs and called ambulance.	Possibly inadequate briefing/boundaries on the part of the teachers in charge. Student acting like a lunatic and a fairly obscure accident.
3	3	Whilst playing a running around game instructor strained hamstring. Continued to play game but a few days later decided to get it checked by doctor as still painful and inhibiting some movement.	Instructor not properly warmed up for sudden running activity.
3	6	Student climbing over fence slipped and landed on her right arm causing a minor sprain.	Student needed more help/support in getting over the fence in order to avoid the fall. . . Students should not have been climbing over the fence. but this was the result of a slight misjudgement on the part of the instructors in regard to the hiking route.

3	3	Camper's foot got stuck in the mud on a section of the tramp and while trying to extract herself fell over and rolled the 'stuck' ankle.	Student was particularly unenthused about tramping and was lagging behind. Teachers and instructors involve suspect injury was exaggerated but she was taken to medical centre afterwards anyway - and agreed it was a mild sprain. Continued with camp programme for next 2 days with no discomfort.
3	4	Student fell out of kayak and cut his hand on a rock. Steri strips/bandage applied and student taken to local medical centre in case need of stitches. No stitches required.	Student was in shallow water when capsized - rock was on seabed.
3	4	Instructor of group loading kayak trailer. Lifting kayak above his head and pulled muscle in shoulder/upper back area.	Loading the kayak trailer requires two people working together in order to minimise the likelihood of such injuries. The injury turned out to be minor and rectified with a few visits to the physio.
3	4	Student was playing a game on site which involved running around the property in bushy areas hiding etc. Jumped over a low wall and landed awkwardly on his ankle.	An accident due to lots of confidence and competitiveness of a 10 year old boy.
3	4	Sliding down mud slide adjacent to track - bent big toe back and dislocated.	Policy on how managing risk involved with getting down track to XXX. 3 points to be reviewed and staff have refresher training. This is the first accident of this type but potentially other accidents could occur if this practice is not carefully reviewed and appropriate risk management policies adopted.
2	6	Participant became cold during coasteering session. Was sent back to camp early to warm up- potential hypothermia victim but didn't eventuate as spotted before it progressed to dangerous situation.	Instructor allowed rest of group to play in surf/kelp for too long - while the participant was sitting still watching. Participant already wet and became cold. Participant only 9 years old and skinny.
2	6	Group exploring the stream at YYY - doing environmental education. Participant slipped on a wet rock and landed on her tail.	Slippery terrain. Participant slipped over. Possibly could have been due to low adult: student ratio to supervise/help those less confident in these circumstances? Buddy system might have prevented?
2	3	Fell off wooden platform (island) in initiative requiring group members to get from one island to the next without touching the ground. Participant stepped off backwards when lost balance twisting her knee.	Participant was fooling around. Unmotivated and wanted to 'hurt herself' so as to get out of activity. . .

2	4	High Ropes course - participant got her pony tail caught in ATC while belaying. Instructor used prussick to 'rescue' belayer on the ground release hair and then allowed the climber to continue with activity.	Hair was pulled back as per activity policy and procedure guidelines. Unfortunately the end of the pony tail still got caught. Instructors need to be vigilant in briefing students/participants about risks so that they are more aware of danger.
2	5	Participant complaining of sore knee during wide game - which was being played at night in drizzle. Slippery ground for a run around game.	Participant had a pre-existing knee problem which caused it to dislocate easily. Knee did not dislocate on this occasion - need ice/rest and student was ok next day to participate in programme.
2	3	Participant abseiling off on-site tower and got hair caught in belay device. Instructor able to perform rescue to release hair from device and lower down to ground on safety rope.	Camper was nervous. Preoccupied with excitement and adrenalin of activity and did not keep his head back from device - although he had quite short hair and it was contained in a helmet. a stray piece was caught.
1	6	Participant doing the coasteering 'cliff jump' and his helmet popped off his head. Catch was faulty. Instructor swapped helmets with participant to prevent recurrence.	Faulty helmet strap.

OUTDOOR **SAFETY**

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