New Zealand Mountain Safety Council

National Incident Database
2011 Report

(non-snowsports)

Prepared by

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Executive Summary

This report summarises annual results from the non-ski incident reporting in the National Incident Database (NID) from the 2011 calendar year - January 1st to December 31st. It adds to a series of annual reports which summarised results from previous years. Some of those previous reports also included review of the status and development needs of the NID. This 2011 report should be read with reference to those earlier reports, some content of which is included in the Appendices here. These full reports can be viewed at: http://incidentreport.org.nz/reports.php

Overall, it is concluded that the NID is a very useful tool both in current practice and future potential, but that:

- **content review and software updating is required to enhance its accessibility, useability and performance**

- **stronger engagement by key sector organisations/providers must be facilitated, with industry/sector leaders setting the example.**

- **better use of case study analyses be made to advocate benefits from engagement with the NID and its use as a helpful management tool**

Summary points

NID Background

- The number of organisations signed up for the NID system continued to increase, and passed 400 during 2011 (reaching 433 by March 2012)

- But, reporting to the NID was highly inconsistent with the ski sector having very high reporting levels compared with highly variable reporting from other sectors

- The composition of NID member organisations was dominated by schools (34%) and Outdoor Education Centres/providers (15%), although their reporting compliance was highly variable

- 210 incidents (non-ski) were reported in the NID during 2011.

Incident victims

- Only a small number (15) of the 210 incidents involved more than one individual being a victim. Overall 93% were single victim incidents. The total number affected was 237.

- Around 71% of victims were aged 10-19 years, which reflects the high proportion of incident reports from adventure education provider and schools (see below)

- Around 62% of incident reports made in 2011 were from Outdoor Education centres/providers and Schools, which is reflected in the high proportion of youth affected by incidents (see above).

- Incidents appeared to include an overrepresentation of females, comprising 63% of individuals affected by incidents (versus 37% males).

Incident characteristics

- Almost half of all incidents (45%) occurred in the early afternoon between midday and 4.00. This was consistent with previous years. A further 25% occurred in the mornings between 8.00-midday and 18% in late afternoon/early evening (4.00-8.00). The remaining 12% occurred overnight, emphasising that incidents can occur outside of programmed and supervised times.

- Almost all incidents (93%) occurred in situations where qualified instructors and/or activity supervisors were present. This does reflect the preponderance of incident reports being made from some *Outdoor Educations Centres/Providers* and *Schools*

- Most incidents were reported from tramping activities, followed by 'free time'. However this does not mean they have higher incident occurrences, as their participation rates are relatively higher than other activities. Specific analysis of *participant day rates* needs to accompany any incident rate calculations or conclusions. *Participant day rate* analysis across all activity types for all organisations requires extensive manual data extraction and was beyond the scope of this report, although individual organisations can access their own data easily. However, indicative examples are discussed in Section 2.3 and Appendix 1. More flexible options to extract a wider range of participation data from the NID will be required in future.

- Of all the 210 *reported* incidents:
    - none involved a fatality *(although outdoor fatalities did occur in 2011)*
    - 81% (171) involved an '*injury' event*
    - 8% (17) involved a '*psychological' event*
    - 6% (13) involved an '*illness' event*
    - 4% (8) involved and '*equipment' event*
    - 1% (2) involved a '*missing' event*

Incident severity and near misses

- Overall, most incidents (94%) were categorised as being of *low severity* - meaning any harm caused was usually relatively minor and participants were usually able to carry on with their activities immediately or after a short time. In some cases minor first aid, personal attention or physical assistance was sufficient to enable participants to carry on. These types of incidents had severity scores below 6. Full explanation of severity scoring is provided in Appendix 4.

- Only 6% (13) incidents were categorised as being of *high severity* - meaning the incident resulted in hospital treatment for more serious injury or illness, rescue, or that participants were too ill or distressed to continue with their activities. These types of incidents had severity scores above 6. Full explanation of severity scoring is provided in Appendix 4, and examples presented in Appendix 5

- In addition 14% (29) of incidents were classified as *'near misses'* where worse incident results could well have occurred. These were highly diverse and depended on a variety of case specific circumstances across a variety of activities. It is important to note that information on the *potential severity* of incidents (see below) provides a key extension of the 'near miss' concept, highlighting a wider range of incidents where prompt action or luck prevented worse outcomes. Attention to such cases is required to better identify key causal factors and enable more preventative actions that preclude the need for prompt action (or luck).

- Overall there were 24% (52) incidents categorised as being of *'high potential severity'* - meaning they too were effectively *near misses.* Full explanation of '*potential severity' scoring* is provided in Appendix 4, and examples from incident narratives are presented in Appendix 5. These provide very useful analytical opportunities. In many of these *'near miss'* or *'high potential severity'* incidents, problems were noted by leaders during an activity but before any specific incident occurred, when previous checking procedures should have picked these up.

Incident causes

- While it is acknowledged that incidents are usually the result of many causal interactions, the primary causal factors reported for incidents were classified as follows:

  - *Participant* factors were cited in 73% of incidents (151 times) - usually involving bad judgement of not following instructions/procedures

  - *Environment* factors were cited in 44% of incidents (93 times) - usually involving difficult terrain; rough/wet surfaces; or difficult water conditions

  - *Leader* factors were cited in 33% of incidents (70 times) - usually involving bad judgment or deficiencies supervision/checking procedures

  - *Equipment* factors were cited in 22% of incidents (47 times) - usually involving not having equipment or the right equipment type (rarely faulty equipment)

- Incident narratives provide useful additional perspective on causal factors, with a specific *causal narrative* required in NID report entries. This is complemented by a more general *incident description narrative*. Refer to Appendix 5 for examples.

Recommendations

A. Previous Report Recommendations

Most conclusions, recommendations and summary discussion points made in the previous NID reports remain valid today. It is strongly recommended that any analysis of wider issues around the future use and development of the NID take specific account of these past reports and their recommendations – which are often highly specific about what improvements could be made. In more general terms, the key past recommendations to particularly re-emphasize here are that:

- the NID continue to be grown as a **central incident database** for the wider outdoor recreation sector. After several years of operation is it clear that is can provide the utility needed by the sector - subject to sector engagement and support for it.

- more organisations be encouraged to sign up for the NID, **and for current organisations to make greater use of it.**

- in order to highlight the NIDs value, **more cases studies** be prepared and disseminated which demonstrate the range of uses possible from the NID and the accountabilities/reporting requirements it could help meet. This may provide some opportunity to help meet the requirements of recent outdoor recreation tourism safety reviews

- **case-study examples from the ski-sector** data and from Outdoor Education Centres/Providers would be strong sources (assuming better reporting from the Outdoor Education Centres/Providers can be achieved).

- case study examples making better use of the **key lessons embedded in narratives**, especially those related to 'near misses', would provide the best direction on where common themes of risk emerge; how these risks may have been missed in the past or were spotted in time; and how they may be better anticipated and preventative measures developed.

B. Current Recommendations

Beyond the previous recommendations, those <u>new recommendations</u> identified during the development of this report are that:

- **'Participation day rate'** data needs to be made more accessible for wider analysis. In this report the ability to develop participation levels for **different activity types** was constrained by the availability of activity-specific participation data only through extensive and inefficient manual extraction from individual organisation records (e.g. 2010 NID report). There was no systematic capacity to access **all** participation data for any specific activity type (e.g. tramping, free time, initiatives etc). This precluded calculation of **overall activity-specific incident rates**. In the limited organisation-specific cases where such participation day rate data were available - along with good incident reporting - it was possible to calculate specific incident rates (e.g. examples on p35 and 36 from 2009).

- Some sectors and key organisations in them should be targeted for **specific advocacy and initiatives** to enhance their reporting to the NID, or to find ways to make it easier for them. This could include development of indicative case study examples to demonstrate utility.

- **Increased reporting of near misses should be advocated** wherever possible, although given variable interpretations of what constitutes a 'near miss' this cannot realistically be expected to provide a comprehensive record. Rather it should be viewed as an indicative sub-sample of near-misses incident types. Treating any incidents with moderate to **high potential severity scores** as effectively representing 'near misses' will help broaden the baseline of near miss information. Along with this, some more **specific definition** of 'near misses' may enhance their reporting.

- The **definitions** of general activity categories - particularly '*Free time'; 'Initiatives'; and 'Ropes'* - need to be clarified to some standard interpretations.

- The **requirement** that participation day rates be specified before any incident reports can be completed is reviewed to determine if this is an initial barrier to uptake.

- The overall **range and content of the NID be reviewed** to determine what information is useful and what is not. The objective should be to keep the data requirements for completing NID reports as tight and simple as possible. Past recommendations provide many good directions for such review and improvement.

- In any review of the NID, that its potential role in providing a tool for meeting recording and reporting functions in relation to new **Department of Labour requirements** be explored.

Appendices are also provided which:

- outline the background to the NID;
- describe what it can contribute (e.g. examples of *activity incident rates* – p35-36);
- list references to relevant material supporting the NID;
- list the specific data variables recorded in the NID;
- describe the incident-severity scoring scale; and
- provide example of narratives

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1.   Background[1]

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[2]. 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 3. 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[3].

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

For reference, the background to the need for the NID and a discussion of the data types and data issues associated with it are presented in Appendix 1. Technical References for the whole document are included in Appendix 2.

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[1] This section repeats content from some previous NID reports (2007-09), with additional new content or updates included where appropriate. This has been done to keep the background material as accessible and as current as possible through all reports.

[2] Wherever the term *'incident'* is used in this report the term is inclusive of these wider types.

[3] Refer to http://www.incidentreport.org.nz/resources/OER_NID_Guide.pdf

1.2 Development and Current Status of NID

The NID development project was initiated by New Zealand Mountain Safety Council after discussions arising from the Risk 2002 Conference[4]. 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; by March 2010 to 344; and by August 2012 the total number of registered organisations was standing at **433**. This shows a steady ongoing accumulation of registered organisations (however NID reporting is not consistently done across these organisations). The overall categories of organisations included are listed below, and the current numbers of each illustrated in Figure 1:

- 139 Schools - primary and secondary schools *(up 27 from 112 in 2010)*
- 63 Outdoor Education Providers/Centres - site-based or general providers (up 14)
- 44 Adventure Tourism providers - commercial opportunity providers (up 14)
- 32 National Organisation/Club - national associations and clubs (up 11)
- 26 Ski areas - club and commercial fields[5] *(up 2)*
- 24 Tertiary/Training sector - doing courses and training in outdoors *(up 4)*
- 21 Government Department - for outdoor recreation and safety management *(up 3)*
- 16 Recreational Clubs - local area rather than national member ship *(up 3)*
- 5 Outdoor Events - events including competitive outdoors sport *(up 1)*
- 64 Other - individuals and groups not otherwise classified[6] *(up 8)*

Figure 1: Number of registered organisations (March 2010).
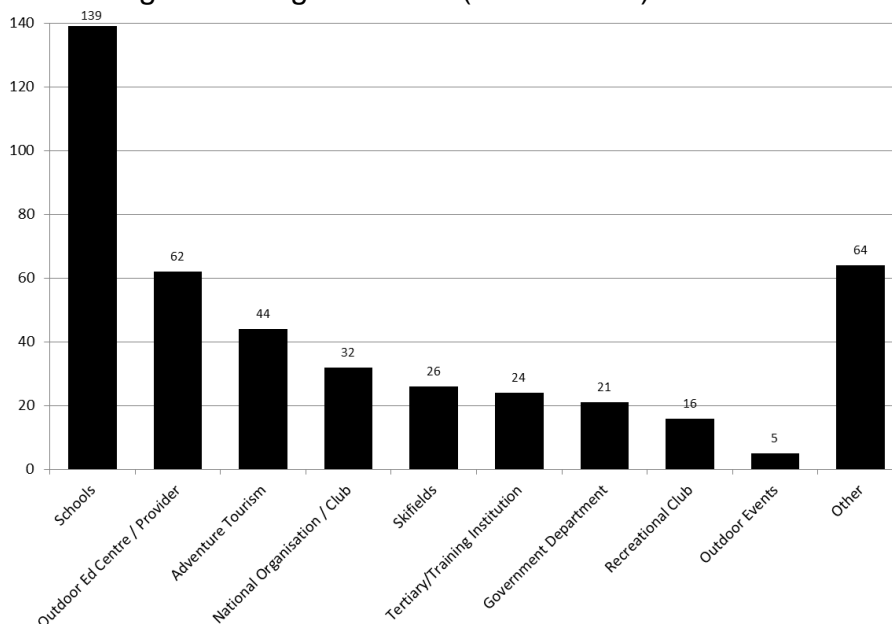
While schools and outdoor education providers comprise around half the total registered organisations (n=201) overall, by far the most significant contributor to the database to date have been the ski areas. As at December 31st 2011 there were approximately 35,500 NID entries recorded overall. Of these 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

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[4] Refer http://www.safeoutside.org/risk/Data/intro.html for details of this conference
[5] Incident data from ski areas is reported separately
[6] This includes some overseas organisations that use the NID for their incident data (excluded from this summary)

its potential utility and value. The extent of the ski area data, made possible by this high level of engagement by most organisations in the ski sector provides strong evidence for judging injury-related issues, trends and needs.

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. 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 others.

Leaving the ski data aside, the remaining 1197 non-ski entries (as at 31st December 2011) represent incidents entered for a range of other outdoor recreation and outdoor education related activities. Here is it important to note that these 1197 entries were individual *event cases*, spread over a smaller number of *Incident events*[7]. 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.

1.3   *Purpose of this report*

Noting these context points, the purpose of this report is to summarise progress and selected results in the 2011 calendar year - <u>January 1st 2011 to December 31st 2011</u>. During this period there were 237 specific *incident events* reported involving 213 individual *incident cases.* Figure 2 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= 237)	Incident events (n=213)	Notes
1	197	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	13	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.
3	2	One incident involved a variety of minor issues occurring during a free time period and the other involved a nail protruding from a wooden mat and cutting the feet of 3 girls (nail was hammered down).
5	1	A school group was slower than anticipated on a day trip and ran out of light, resulting in a stay out overnight.

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[7] 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.

2.   Overall Incident Summary Results

These results represent all 213 incidents reported (incident events), affecting 237 individuals directly (incident cases). The period covered is the year from January 1st 2011 to December 31st 2011.

2.1   What types of incidents?

The breakdown of different incident types is presented in Figure 3. The majority of incident reports included only one incident type, although 17 included more (e.g. *Illness* <u>and</u> *Psychological, Injury* <u>and</u> *Equipment etc*). In these cases the respective types have been added to individual type totals.

Figure 3: Incident types reported (counts, n=219 cases)
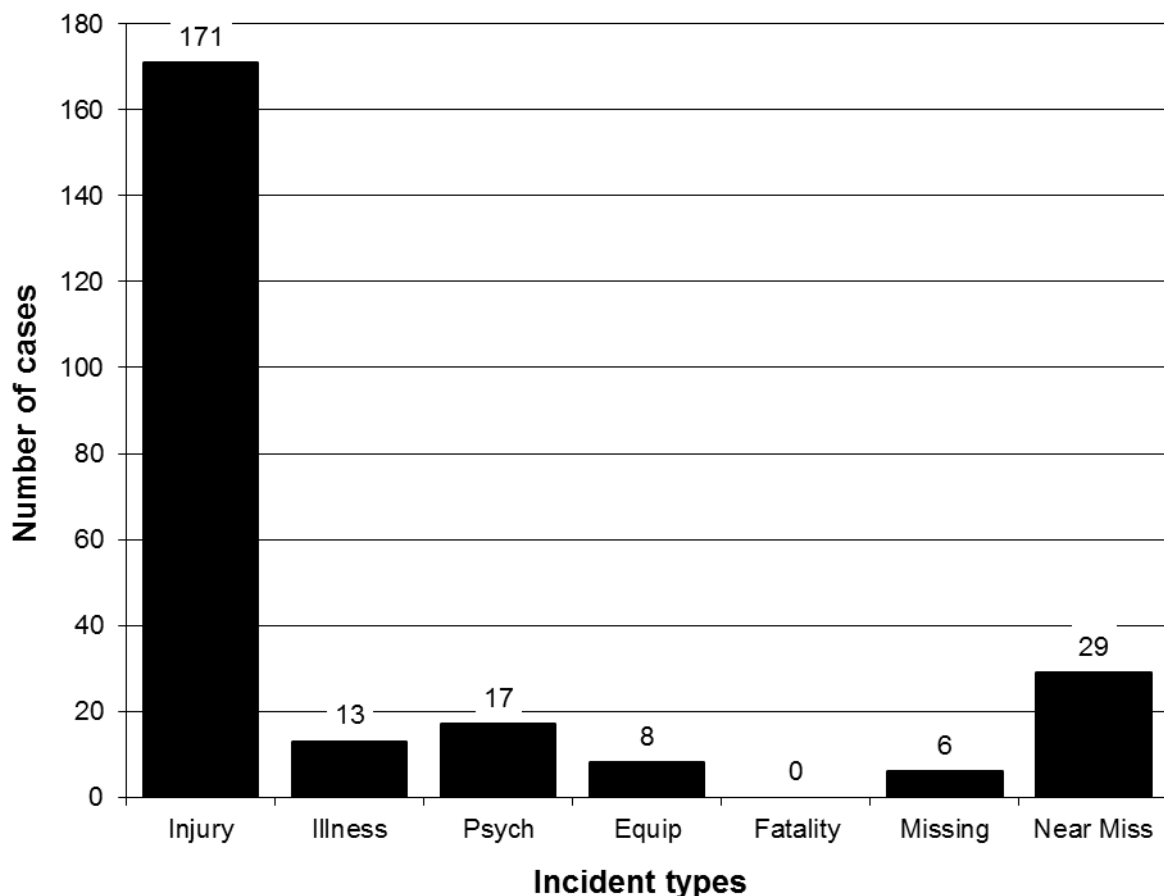
The main incident type was *Injury* (171 cases), followed by *Near Miss* (29) and *Psychological (17).* These are described briefly below. Further details of such incidents can be obtained by viewing the associated descriptive narratives for each respective incident in the NID (subject to confidentiality). The content of the 2010 incident type narratives is summarised briefly below:

- The 171 incidents involving '*injury*' impacts (81%) were predominantly strains & sprains (42); lacerations & cuts (21); stings (2); fractures (21); dislocations (13); bruising (25); head injury & concussion (12); burns (7); and a few each for dental, blister, heat stroke, nose bleed and eye injury.

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- The 29 incidents involving '*near miss*' impacts (14%) were highly diverse and depended on a variety of case specific circumstances across a variety of activities. While 29 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 where 52 incidents (around 24%) were recorded as having *high potential severity* (i.e. scored >5, refer Appendix 4), which could be considered indicative of a near miss situation.

- The 17 incidents involving '*psychological*' impacts (8%) reflected a variety of personal reactions to stressful or hazardous situations they encountered, behavioural problems or mental issues. There were 17 such cases recorded in the 2011 year. Most of these related to anxiety and fear in different situations, or to health concerns such as asthma attacks.

- The 13 incidents involving '*illness*' impacts (6%) arose from a wide variety of causes including allergies, asthma, infections, fainting, diabetes and generally feeling unwell. Full details would require specific further analysis of narratives.

- The 8 incidents involving '*equipment*' impacts (4%) were related to problems or damage related to equipment use, misuse, or failure in adverse conditions. In all these cases the problems arise from accidental misuse of equipment and mistakes rather than from any equipment fault.

- The *missing* cases can be related to a range of situations from temporary delays due to some party members taking a wrong turn through to fatalities where victims were missing for a time. There were only two actual incidents, although 1 involved a walking group of 5 having to spend a night out due to running out of daylight and being ill-prepared.

- There were no *fatality* cases recorded in the NID for the 2011 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 numbers of people, ages, gender and ethnicities.

- **Number involved**

The vast majority (195) of reported incidents (210) involved only one individual. This represented 93% of incidents. The remaining 15 multi-victim incidents included nine with two individuals; five with three individuals; and one with five individuals. The incidents with larger numbers (e.g. 3 or more) were usually associated with tramping groups being caught out by time or conditions and being late for exit.

- **Age**

Most of the 210 incident cases reported were young New Zealanders. Figure 4 shows 71% were in the 10-19 year age group, reflecting the higher number of schools registered as NID users (see Figure 1).

Figure 4: Age groups of individual incident cases (%, n=210 cases)
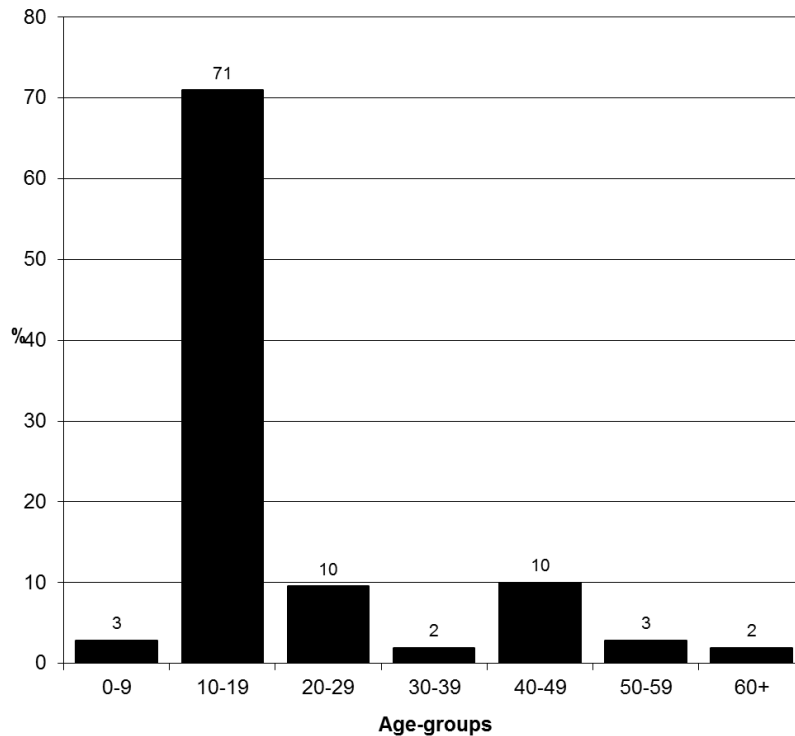
It is unknown if this age-group distribution also reflects the overall pattern of corresponding activity participation, as relevant participation reference data is not available. A bias towards more reports of incidents affecting younger participants is suggested here when comparing these results with 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.

- **Gender**

The gender ratio of individuals reported in incidents was 57:43, comprising 117 females compared with 90 males. This was similar to the 63: 37 ratio found in the 2009 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.

- **Ethnicity**

Figure 5 shows that 67% of incidents involved people who were recorded as 'NZ' for their ethnicity, with the other ethnic groups all at very low levels. There is insufficient participation data detail to determine if this incident pattern is representative of corresponding participation patterns for different ethnic groups.

Figure 5: Ethnicity of individual incident cases (%, n=210 cases)
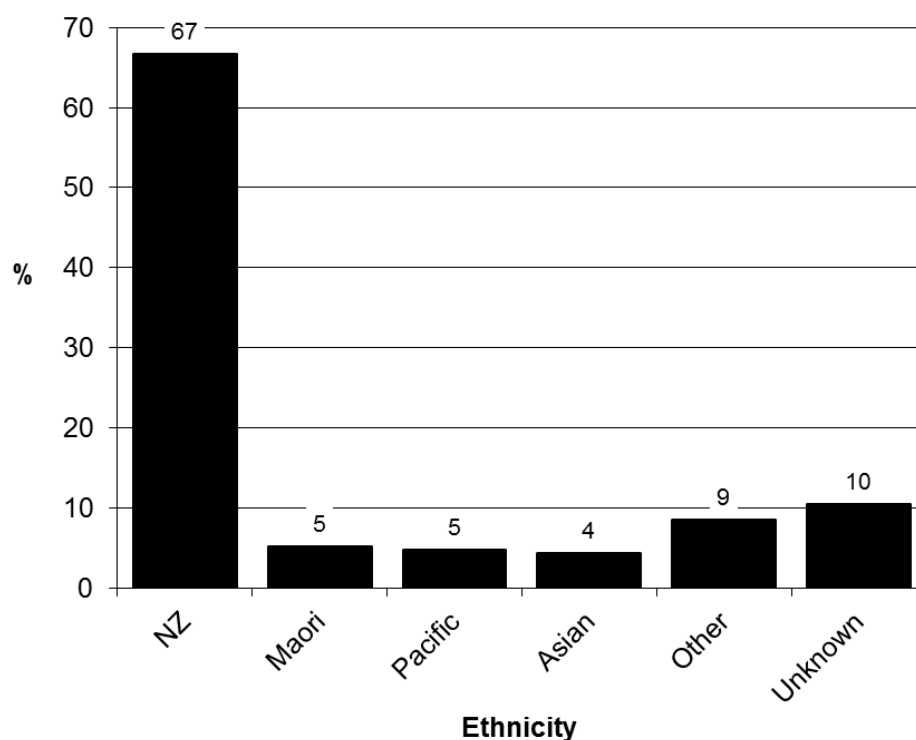
2.3   Where did reported incidents occur?

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**

Over half of the reported incidents (59%) were experienced while participants were engaged in activities associated with 'Education outside the Classroom' (EOTC). This compares with 50% in 2009.

However this would be expected given that around half the organisations within the NID are either schools or outdoor educations centres (Figure 6). This also provides some

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explanation for the very high proportion of 10-19 year olds among those affected by incidents as shown in Figure 4. Figure 6 shows the relative membership of NID organisations and their relative reporting made to the NID in 2011.

Figure 6: Proportion of Reports by Organisation types
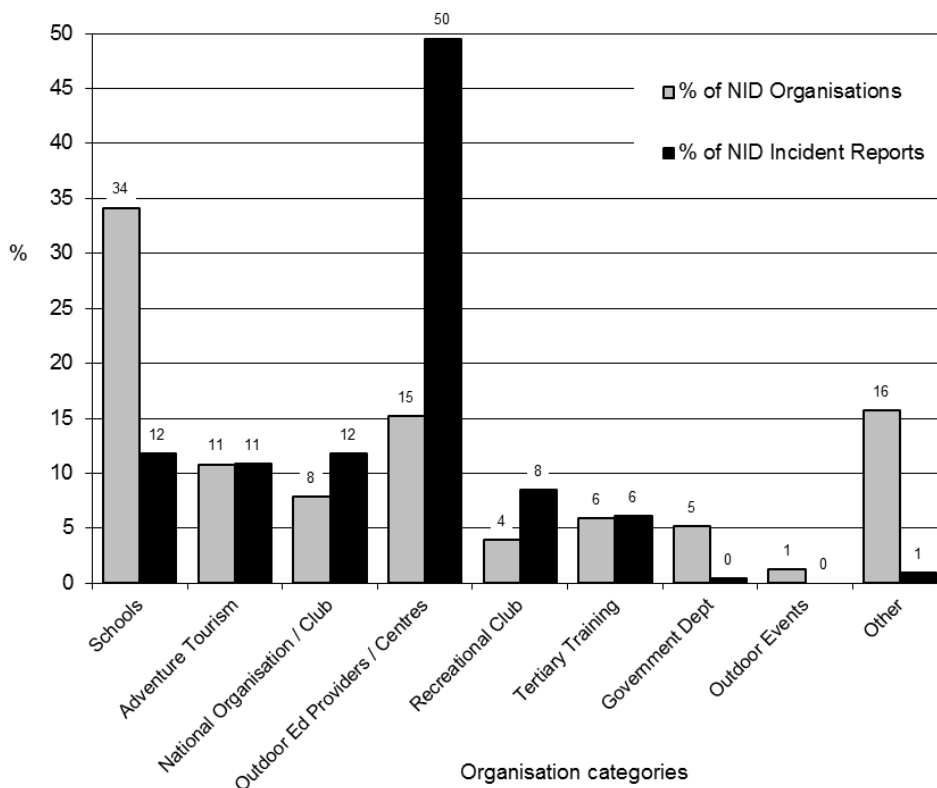
When the percentages of incident reports were compared with the percentage of registered organisations (refer Figure 6), the level of reporting by schools appears disproportionately low. While comprising 34% of registered organisations schools only accounted for 12% of incident reports. By contrast while the outdoor education providers/centres comprised only 15% of the registered organisations they reported 50% of incidents. However it is also worth noting here that some of the larger outdoor education providers/centres who are registered did not make any incident reports in the 2011, and that there is scope for greater engagement particularly by these bigger centres.

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 rates from the outdoor education centres that did contribute. However in the absence of participation data and of reporting from some of the bigger centres/providers there is ongoing uncertainty.

Such conclusions can remain only speculative however in the absence of the reference participation data, which is likely to show far higher participation levels from the outdoor education sector. 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 and 09 NID reports.

- **Activity type**

When reported incidents are viewed by specific activity in Figure 7, it is clear that reported incidents came from a wide variety of activity types, without any particular activity being notably prominent. *Tramping*, *Free Time* and *Mountain-biking/Cycling* were highest, but these only represented 15, 13 and 12% of the reported incidents respectively.

Figure 7: Activities in which Incident cases reported (n=210 cases)
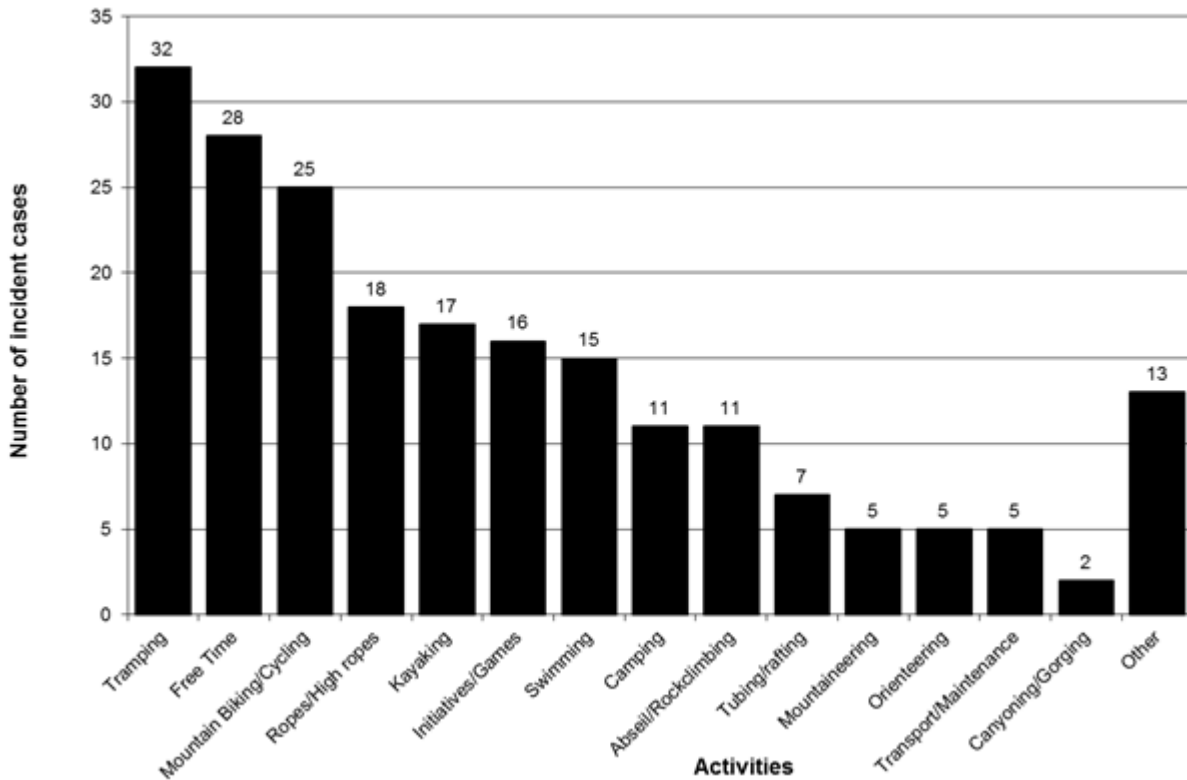
Tramping is typically the highest activity type included for reported incidents, but it is also one that has relatively high participation levels. In the NID 2010 report Tramping was among the highest three specific activity types participated in (along with 'Initiatives' and 'Ropes'). This participation estimation was based on *participation day rates* (number of participants X duration of activity provision), which are described in detail in the section of Appendix 1 – *'Incident Rates by Activity – Examples'* (p35). Using these 2010 rates[8] along with incident reports for tramping resulted in an incident rate of 1 reported incident for every 5880 participant days.

This reference participation level data is essential to calculating any meaningful incident rate figures. Without such data any incident counts cannot be seen as representative of wider outdoor activity levels or incident patterns, and is only reflecting those raw incident numbers reported in the NID. Examples in Appendix 1 present more explanation.

Another interesting point is the presence of incidents reported from people's *free time* (28) Some of these related to problems while cooking at camp, independent activity at camps or in activity 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'.

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[8] Participation day rates for 2010 are used as calculation of these for the 2011 report would have required extensive manual extraction of data from the NID which was beyond the scope and budget for this report. A specific recommendation to make participation day rate data more available in the NID database is made.

- **Incident timing**

Figure 8 shows a strong pattern over a number of years where around half the incidents occurred in the early afternoon, with lesser proportions occurring in the later morning and early evening. A few also occurred in the late evening and overnight. Late evening and overnight incidents were more often related to free time activities around cooking, accommodation and camping settings. These were relatively low in number. The timing of incidents reflected the need for safety concerns to span the entire trip or activity, although the focus of safety concern would be different at different times of the day.

Figure 8: Incident timing 2007-08 to 2011(n=210 incident events 2011)
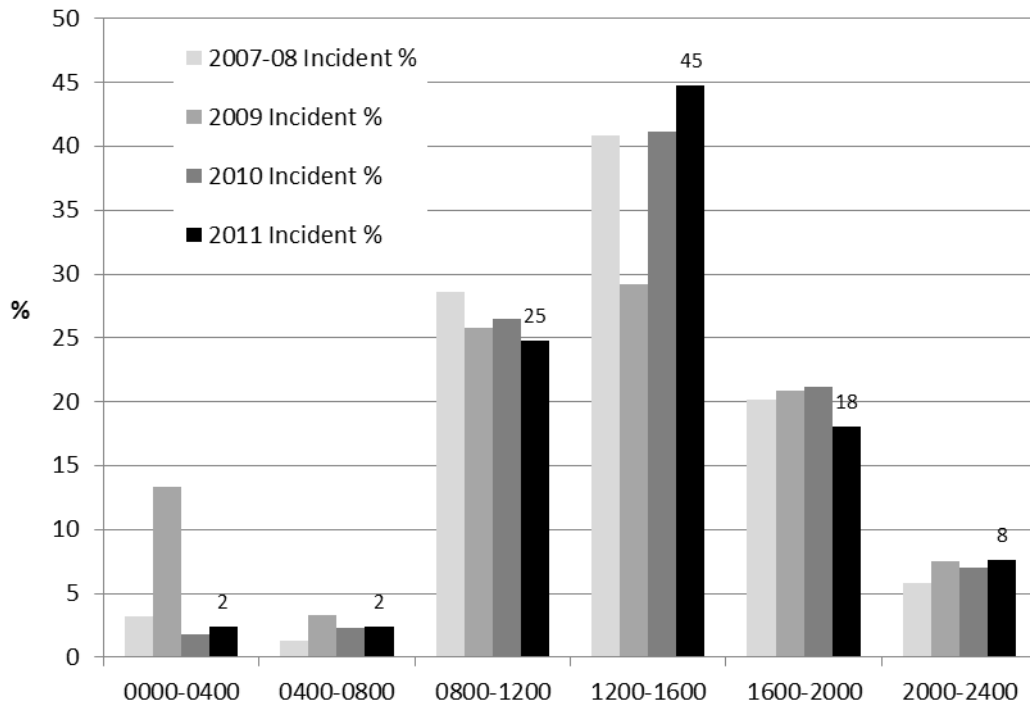
- **Incident regions**

Reported incidents occurred unevenly across different regions, with almost half (85 from 210) being reported from Canterbury. This was followed by Auckland (36), West Coast (26) and Northland (17). However this represents more the pattern on organisation membership of the NID and reporting levels than any regional pattern of incident occurrence. What these results most probably show 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. 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.

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 (refer Appendix 4) based on incident analyses by Davidson (2002,2006). This scale includes 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 approach 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 provides a means of focussing attention on those incidents that have the most power to highlight key issues, learning's and directions.

Figures 9 below and 10 (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 6% (11) of incident events were reported as having a major actual severity, 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 24% (n=52) of incidents judged as being of major potential severity. These also represent major 'near misses'.

Figure 9: Actual & Potential Severity Scores _(n=210 incident events)_

Severity Score Scale	Rating (Actual)	Rating (Potential)	Severity Grouping	Actual freq.	Actual %	Potential freq.	Potential %
0	4	0	**'Minor' injury or near miss incidents**	_198_	**94**	_158_	**76**
1	15	3					
2	42	16					
3	76	39					
4	30	45					
5	31	55					
6	11	30	**'Major' injury or near miss incidents**	_11_	**6**	_52_	**24**
7	1	10					
8	0	8					
9	0	2					
10	0	2					

Figure 10: Chart of Actual and Potential Severity Scores (n=12 events)
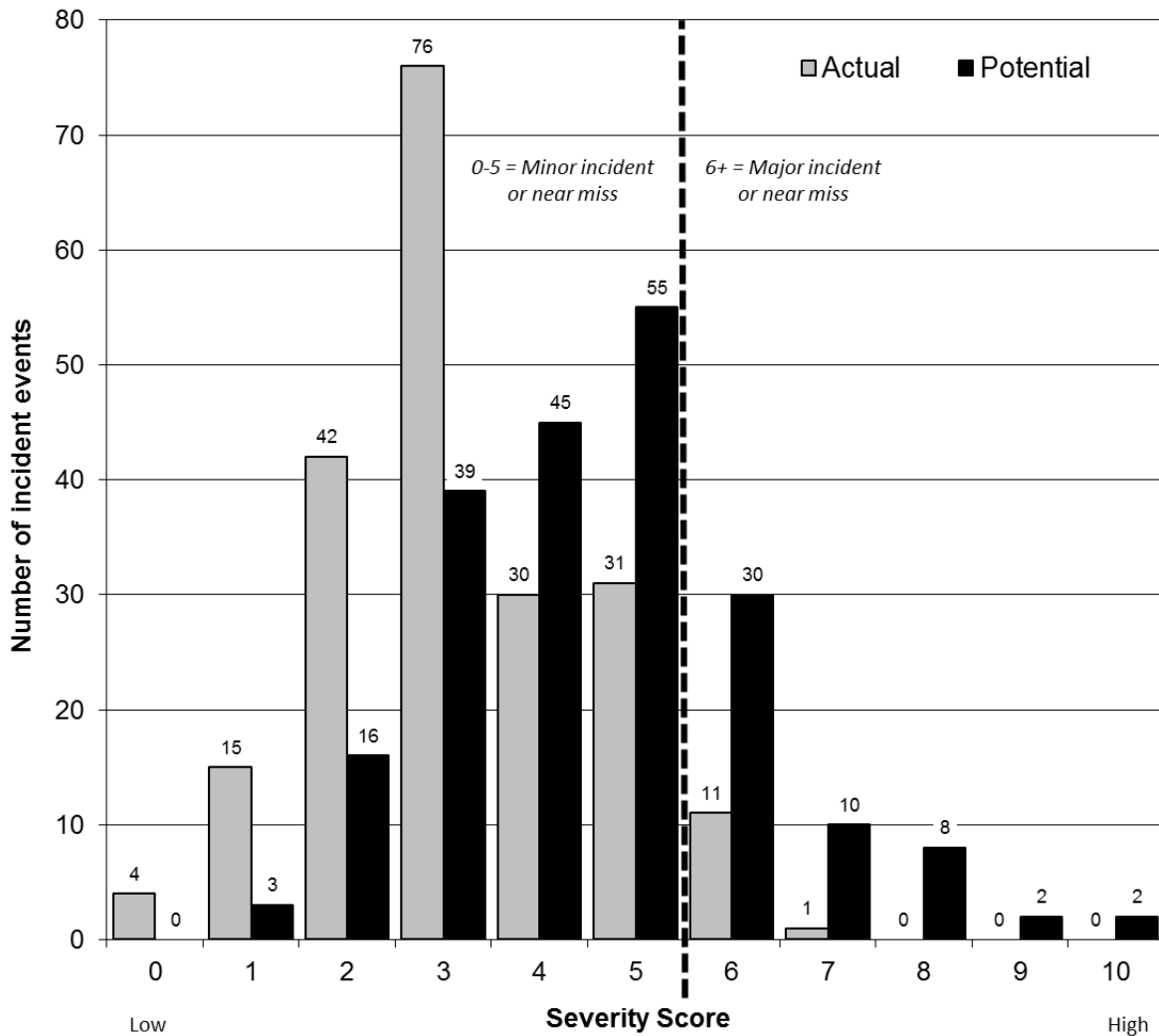
Here is useful to note that incidents could be recorded specifically elsewhere as an incident type of '*near-miss*', along with '*injury*', '*illness*', '*psychological*' etc (see Figure 3). However these near-miss designations tended to apply to those close-call situations where no actual injury occurred. 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 52 incidents reported from the NID as having of major potential severity (scoring 6 or over), only 6 had also been recorded specifically as near-miss incidents under incident-type. This '*near-miss*' incident-type category only picked up 11% of those incidents where those entering the data also considered a very serious negative outcome could have occurred (as shown 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.

2.5 What types of incidents had high severity (actual or potential)?

The descriptive narrative data for high severity incidents from the NID were extracted for inclusion in this report (Appendix 5). These were selected on the basis of having a severity score above 6, which has been used here as an arbitrary break between minor and major severity definition (Figures 9 and 10).

All 12 of the incidents with high 'actual severity' scores were at the lower end of the 'major severity' scale (all scored at 6 or 7). The narratives show that these were mostly falls and mishaps which involved dislocations or fractures. In two cases the incident victims were unconscious to some extent, one from an allergic reaction and the other to a blow to the head. None of these were at the upper level of incident severity.

Narratives from the 22 highest scoring 'potential severity' incidents are also included in Appendix 5. These showed a wide range of incident types which had the potential to have had much worse outcomes that were actually experienced. There were no particular activity types or situations that stood out as characteristic of high potential severity. In some cases the danger was due to environmental conditions, while in others it was related more to not paying attention (participants and supervisors), following instructions, supervision, bad judgement or chance. These issues appeared to cross a wide range of specific activity types.

It was not within the scope of this summary report to undertake a qualitative analysis of these 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). Further exploration of possible causal issues is also provided below.

2.6 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 (refer Appendix 3 for variable list).

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 can be gained here from briefly exploring some of these variables. A good place to begin is with the causal factors indicated for each incident from the lists of drop box options available. These options are available under four main category headings (e.g. Leader, Participant, Equipment and Environment causal categories), which in turn have drop-boxes of specific subcategories. The overall main category results are presented in Figure 11, after which the subcategory breakdowns are listed.

Multiple causal factors were indicated in only 116 (60%) 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.[9]

Figure 11: Causal categories cited for incidents (cumulative, n = 210)

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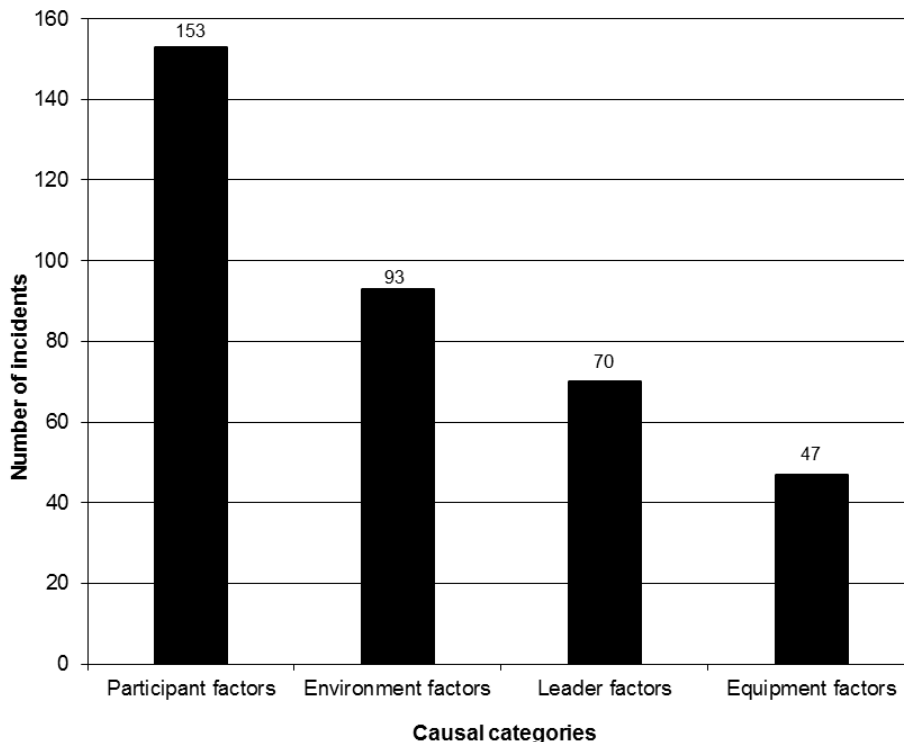
[9] Greater understanding of incident complexity was apparent in descriptive/causal narratives (Appendix 5)

Looking at the specific each of these tick-box categories, a number of different specific factors stood as respective sub-categories:

- *Participant-related factors* were cited in 73% of incidents (151 times) including:
  - 71 cases specified as *judgement error* (including not using the right equipment or using it incorrectly);
  - 28 as *failure to listen or follow instruction*
  - 14 as *inadequate physical condition*,
  - 13 as *bad/incorrect technique*;
  - 11 as *inadequate practice or preparation*;
  - 7 as *inadequate mental/emotional condition; and*
  - other comments about *unsafe acts*, *health issues* and *specific inexperience*

- *Environment-related factors* were cited in 44% of incidents (93 times) including:
  - 53 cases specified as *terrain*;
  - 27 as *water*;
  - 8 as *adverse weather;*
  - 2 as *slippery surfaces* and insects/plants/animals; and
  - *other* comments about *slippery structures* and *darkness*

- *Leader-related factors* were cited in 33% of incidents (70 times) including:
  - 29 cases specified as inadequate supervision (including equipment check);
  - 28 as *judgement error*,
  - 2 each as *inadequate training & experience, poor motivations*, and mis*communications;* and
  - 1 each as *inadequate physical condition and mental condition*

- *Equipment-related factors* were cited in 22% of incidents (47 times) including:
  - 19 cases specified as *not having equipment*;
  - 8 as *faulty equipment*;
  - 7 as the *wrong equipment*;
  - 6 as *inadequate design*; and
  - *other* comment about *unfamiliar equipment* or *slippery equipment*

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 – these results do give valuable guidance 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 then deeper insights can be gained. Appendix 5 presents some examples of these causal narratives, and illustrates 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. Any combination of the causal categories and subcategories could be selected from the database and corresponding narratives extracted (where allowed) to provide more detailed description of what happened. Data and interpretation Issues related to undertaking such deeper causal analyses are discussed in previous NID reports from 2007-08 and 2009.
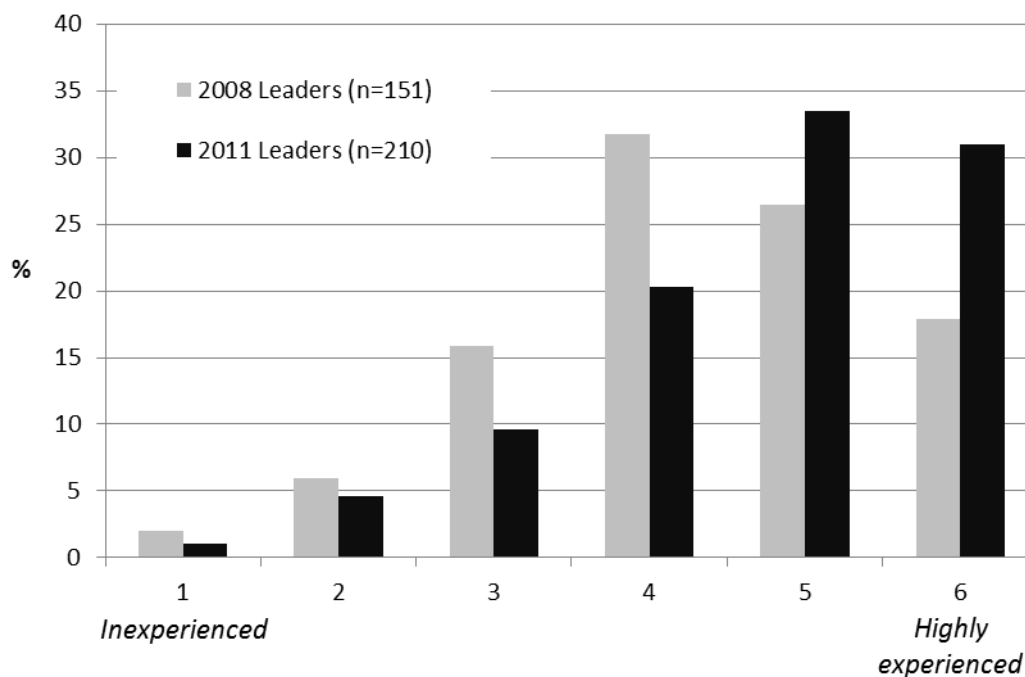
2.7 Activity leaders/instructors

Some general information about leader presence and qualifications is also provided. No definitions were provided around leadership or related qualifications, and there was reference to *'Qualified instructors'*, *'Supervisors'*, *'Volunteer helpers'* and *'Leaders'* in different data entry variables.

Data entries for 2011 indicated that:

- 'Qualified' instructors were present in 177 of the 210 incident cases (84%), although the nature of their qualifications was not specified. Only 16% of incidents were reported as having no 'qualified' instructors present.

- When 'Supervisors' were included then 196 of the 210 incident cases (93%) were under leadership, although the status or contents of any supervisor qualifications were not specified.

- Whatever the qualifications, leadership experience was rated highly (Figure 12)

Figure 12: Rated experience of leaders (2008 and 2011)

Overall, the information provided in the NID suggests that great majority of incidents reported on the NID occurred during activities that had designated leaders/instructors who were rated (by those making reports) as being highly experienced and who usually had some specific qualification.

3.   Summary points and recommendations

3.1   Summary Points

Some key summary results from the 2011 NID data are listed below:

- The number of organisations signed up for the NID system continued to increase, and passed 400 (reaching 433 by March 2012)

- Reporting into the NID remained highly inconsistent across the different organisation types, with very high compliance from the ski sector and variable lower compliance elsewhere.

- The composition of NID member organisations was dominated by schools (34%) and Outdoor Education Centres/providers (15%)

- 210 incidents (non-ski) were reported in the NID

- Only a small number (15) of the 210 incidents involved more than one individual being a victim. Overall 93% were single victim incidents.

- Around 71% of victims were aged 10-19 years, which reflects the high proportion of incident reports from adventure education provider and schools (see below)

- Around 62% of incident reports made in 2011 were from Outdoor Education centres/providers and Schools, which is reflected in the high proportion of youth affected by incidents (see above).

- Incidents appeared to include an overrepresentation of females, comprising 63% of individuals affected by incidents (versus 37% males).

- Almost half of all incidents (45%) occurred in the early afternoon between midday and 4.00. This was consistent with previous years. A further 25% occurred in the mornings between 8.00-midday and 18% in late afternoon/early evening (4.00-8.00). The remaining 12% occurred overnight, emphasising that incidents can occur outside of programmed time.

- Almost all incidents (93%) occurred in situations where qualified instructors and/or activity supervisors were present. This does reflect the preponderance of incident reports being made from *Outdoor Educations Centres/Providers* and *Schools*.

- Most incidents were reported from tramping activities, followed by free time activities. However it is important to note that this does not mean they have higher incident occurrences, as their participation rates are relatively higher than other activities. Specific analysis of *participant day rates* needs to accompany any incident rate calculations or conclusions. *Participant day rate* analysis across all activity types for all organisations requires extensive manual data extraction and was beyond the scope of this report, although individual organisations can access their own data easily. However, indicative examples are discussed in Section 2.3 and Appendix 1. More flexible options to extract a wider range of participation data from the NID will be required in future.

- Of all the 210 incidents:

  - none involved a fatality
  - 81% (171) involved an '*injury' event*
  - 8% (17) involved a '*psychological'* event
  - 6% (13) involved an '*illness'* event
  - 4% (8) involved and '*equipment'* event
  - 1% (2) involved a '*missing'* event

- Overall, most of these incidents (94%) were categorised as being of *low severity -* meaning any harm caused was usually relatively minor and participants were usually able to carry on with their activities immediately or after a short time. In some cases minor first aid, personal attention or physical assistance was sufficient to enable participants to carry on. These types of incidents had severity scores below 6. Full explanation of severity scoring is provided in Appendix 4.

- Only 6% (13) incidents were categorised as being of *high severity -* meaning the incident resulted in hospital treatment for more serious injury or illness, rescue, or that participants were too ill or distressed to continue with their activities. These types of incidents had severity scores above 6. Full explanation of severity scoring is provided in Appendix 4, and examples presented in Appendix 5

- In addition 14% (29) of incidents were classified as *'near misses'* where worse incident results could well have occurred. These were highly diverse and depended on a variety of case specific circumstances across a variety of activities. It is important to note that information on the *potential severity* of incidents (see below) provides a key extension of the 'near miss' concept, highlighting a wider range of incidents where prompt action or luck prevented worse outcomes. Attention to such cases is required to better identify key causal factors and enable more preventative actions that preclude the need for prompt action (or luck).

- Overall there were 24% (52) incidents which were categorised as being of *'high potential severity'* - meaning they too were effectively *near misses.* Full explanation of '*potential severity'* scoring is provided in Appendix 4, and examples from incident narratives are presented in Appendix 5. These provide very useful analytical opportunities. In many of these *'near miss'* or *'high potential severity'* incidents, problems were noted by leaders during an activity but before any specific incident occurred, when previous checking procedures should have picked these up.

- The primary causal factors reported for incidents were classified as follows:

- *Participant* factors were cited in 73% of incidents (151 times) - usually involving bad judgement of not following instructions/procedures
- *Environment* factors were cited in 44% of incidents (93 times) - usually involving difficult terrain; rough/wet surfaces; or difficult water conditions
- *Leader* factors were cited in 33% of incidents (70 times) - usually involving bad judgment or deficiencies supervision/checking procedures
- *Equipment* factors were cited in 22% of incidents (47 times) - usually involving not having equipment of the right equipment (rarely faulty equipment)

- Incident narratives provide useful additional perspective on causal factors, with a specific *causal narrative* required in NID report entries. This is complemented by a more general *incident description narrative*. Refer to Appendix 5 for examples.

3.2   Recommendations

This report reinforces the patterns of results found and extensive conclusions made in previous NID reports from 2007-08, 2009 and 2010. The reports from 2007-08 and 2009 in particular provide background to key improvement recommendations for the NID, and the 2010 report gives useful analyses of combined activity participation rates. These reports can be viewed at:

http://incidentreport.org.nz/reports.php

Most conclusions, recommendations and summary discussion points made in these past reports remain valid today. It is strongly recommended that any analysis of wider issues around the future use and development of the NID take specific account of these past reports and their recommendations – which are often highly specific about what improvements could be made. In more general terms, the key past recommendations to particularly re-emphasize here are that:

- the NID continue to be grown as a central incident database for the wider outdoor recreation sector.

- more organisations be encouraged to sign up for the NID, and for current organisations to make greater use of it.

- in order to highlight the NIDs value, more cases studies be prepared and disseminated which demonstrate the range of uses possible from the NID and the accountabilities/reporting requirements it could help meet. This may provide some opportunity to help meet the requirements of recent outdoor recreation tourism safety reviews

- case study examples from the ski-sector data and from Outdoor Education Centres/Providers would be strong sources.

- case study examples making better use of the key lessons embedded in narratives, especially those related to 'near misses', would provide the best direction on where common themes of risk emerge; how these risks may have been missed in the past or were spotted in time; and how they may be better anticipated and preventative measures developed.

Beyond these previous recommendations, those new recommendations identified during the development of this report are that:

- *'Participation day rate'* data needs to be made more accessible for wider analysis. In this report the ability to develop participation levels for different activity types was constrained by the availability of activity-specific participation data only through manual extraction from individual organisation records. There was no capacity to access all participation data for any specific activity type (e.g. tramping, free time, initiatives etc)

- The definitions of general activity categories - particularly '*Free time'; 'Initiatives'; and 'Ropes'* - need to be clarified to some standard interpretations.

- The requirement that participation day rates be specified before any incident reports can be completed is reviewed to determine if this is an initial barrier to uptake.

- The overall range and content of the NID be reviewed to determine what information is useful and what is not. The objective should be to keep the data requirements for completing NID reports as tight and simple as possible. Past recommendations provide many good directions for such review and improvement.

To conclude - using slightly edited content from NID advocacy material - to make the National Incident Database work we need continued and enhanced:

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 real 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.   Appendices

Appendix 1: Background to the NID and its Justification
Appendix 2: References
Appendix 3: NID data variables list
Appendix 4: Incident Severity Scale
Appendix 5: Narrative Analysis Example - High Severity Incidents

Appendix 1: Background to the NID and its Justification

This appendix summarises the justification for having a NID and some background to the data types and needs associated with it. This material was derived from the introductions sections from the 2007 and 2008-09 reports. It is accompanied by references.

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[10]. In describing the background for a proposed international incident database, Rick Curtis of OutdoorEd.Com and OutdoorSafety.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 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[11]. 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.

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.

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

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[10] 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).

[11] 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)

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 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.

A   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[12]. 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

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

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 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)[13]. 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[14]. However, options are being investigated for continuation, including connection with a proposed international incident database[15]. 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 incidents[16] in 2002 that is 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

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[13] There is an extensive international literature related to specific activity types e.g. mountain biking
[14] Refer to http://www.nols.edu/nolspro/pdf/idrp_project_conclusion.pdf
[15] Refer to www.incidentdatabase.org
[16] Refer to http://www.tki.org.nz/r/eotc/resources/pdf/form-19.pdf

people can report accidents and near misses[17]. And individual organisations in the professional outdoor education/experience sector (e.g. Outdoor Pursuits Centre, Outward Bound etc) do collecting detailed incident and participant data as part of their business management systems.

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 considered to be the possible basis for any significant decision-making.

B   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%

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[17] 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

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/experience 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[18], 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

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[18] 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.

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, '*participation day rates'* and interpretations across a wider arrange of evaluation needs. Brief examples are presented in the subsection below '*Incident Rate by Activity – Examples*' and in '*Appendix 5 – Narrative Analysis Examples'*.

Narratives

Complementing all other data collected in the NID are specific narratives variables where incidents can be described (the '*Descriptive*' narratives) and causal factors 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 or locations 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 include.

Refer to Appendix 5 for examples of *'Descriptive'* and *'Causal'* Narratives

Incident Rate by Activity - Examples

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

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[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

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 A) – 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 *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.

Incident Rate Example B (Figure B) – 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 B: Incident rates for activities run by Organisation B *(2008 and 2009 data)*

Activity	Participation Day Rates			Incidents			Incidents/1000 participant days		
	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 A had an average of only 3, and only two were scored at a severity above 6. Using the standard severity score table in Appendix 4, 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 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 A) comprised an array of only minor injuries. Without such clarification the significance of the apparent incident rates in Figures A and B could be misinterpreted. Some may look at the apparent 2008 rates for '*Initiatives*' in Example B (Figure B) 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 allowed 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

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Appendix 3: NID data variables list

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 4: 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 are 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 OSH							
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 5: Narrative Analysis Example - High Severity Incidents

The data presented below for each 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.

A. Arranged by Actual Severity – narratives for all 12 high *actual severity* incidents reported (scored 6+)

Actual Severity	Potential Severity	Descriptive Narrative	Causal Narrative
7	9	At 1950 XXXX told a teacher that she had some swelling around the eyes. It was thought to be an allergy and so they flushed her eyes and gave her an antihistamine. 15 min later her level of consciousness decreased. 111 was called and a ambulance and helicopter was dispatched. She remained at level where she would respond to voice most of the time. At 2100 the Ambulance arrived and administered O2. The Paramedic arrived 10 min later and her condition was stablised. She was evacuated at 2145 to XXXX hospital where she was met by her mother and the school Rector.	XXXX had no known medical condition prior to the event and there was no way that this event could have been predicted. . . . . While the TIC could have been contacted earlier and the giving of medication wasn't ideal the situation was resolved quickly with a good outcome. At 2300 she was back up and walking.
6	8	XXXX was crossing a stream that came across the tramping just after 3pm.Whilst crossing the small but fast flowing stream ben slipped and was taken swiftly but the current he grabbed on to a rock with his left arm and in the process dislocated his left shoulder. He managed with the help of others to get his feet and out of the stream. By this time his shoulder had popped back in. XXXX was helped into dry clothes checked over for any other injuries and vitals were taken 3 times over 1o minutes. His arm was placed in a sling and given pain relief.	As the group moved along the track members became separated with the fitter and more exited members breaking away. The stream where the accident occurred was within 20 minutes of the hut and the want to get there first had set in. The group had been told to be in eyesight of each but this had lapsed. XXXX's footwear was appropriate but his haste, lack of supervision and the high level of the stream were main causes I believe.. . I would highly suggest that a group is reminded of what is a safe way to travel and ensure as an instructor this adhered to through the whole day.
6	7	The group was in a stream bed and the student was descending a small drop with a hand line. He was a bit eager and went a bit quick his knee ended up below his foot. He dislocated his knee. The instructor straightened the leg and relocated it. The student walked out with the teacher back to the main base (10 mins). He was sent to the doc who sent him to the hospital. which diagnosed a broken/fractured knee.	The student did not follow instructions and started descending before another student had finished. The instructor's radio went flat so she could not communicate with base, resulting in student and teacher walking beck to base. We now make sure instructors have 2 ways to communicate. We also send 2 instructors on this activity now to help manage the drops better.
6	7	At the put in to the XXXX walk-in unpacking kayaks from the trailer. Student has head in the trailer trying to reach paddles. Kayak gets dropped and lands on her head and she blacks out and falls to the ground where she hits head again.	Students not communicating or were distracted and not fully paying attention to what was going on around them.

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6	7	The group was tramping and had been walking all morning. They were aware that they were not far from the hut. The group naturally set a faster pace and were travelling over a rough creek bed when the incident occurred. The student slipped on a rock and fell awkwardly. This plus a large pack on their back caused the student to seriously sprain their ankle.	The group were moving at quite a fast pace to the chances for wrong foot placement was higher than the rest of the morning when they were travelling slower. The reason the student fell was because they stepped on an unstable rock. While the group has been tramping before the slight lapse in concentration and communication by the tutor for allowing the group to speed up was also a contributing factor.
6	6	Whilst moving up the XXXX stream two party members were on one side of the stream and the other was travelling on the other side. One member moved up a scree gully approx 2-3 metres long. When the second party member moved up the same gully a large rock moved from under him. This resulted in him sliding down the gully and the rock hit his leg breaking the tib/fib.	The three party members were traveling up the XXX Stream investigating the best route for an upcoming course. The three were traveling steadily and within voice contact of each other. When the accident occurred the two uninjured members were able to immediately provide first aid and align/immobilize the injured limb. Evacuation was then arranged through the XXXX helo.
6	6	a student slipped off the track just before the lower XXXX hut and landed on their outstretched arm and fractured it	student stepped on loose part of the track and slipped main cause was just a poor choice of footing
6	6	Slide off bike and fell twisted in a spiral fall at slow speed on flat ground while mountain biking.	He was an experienced mountain bike rider and riding well in the 1/2hr he had ridden of the trip. No real reason other than bad luck and an unfortunate fall and outcome.
6	6	Group activity was to go through the frame without touching frame. XXXX carried through the frame when she was put on the ground she fell forward and put her hand out to stop herself. Hand became fixed in the grass as body moved forward and two fingers on right hand dislocated and fractured.	100% accidental. Proper procedure followed. Missed step/imbalanced step fell forward -position of hand totally random. falling body forward caused injuries.
6	6	XXXX flipped in his kayak in a planned "swim with your gear" exercise. He hit his shoulder on a rock and briefly dislocated his shoulder. He swam ashore with his gear but the shoulder rapidly spasmed and he was unable to continue kayaking. We evacuated him with a combination of assisted ferrying and walking out.	At the start of the day we (instructors) discussed the suitability of using this site. Some concern was expressed at the shallowness at low flows, though the same exercise had happened there the day before. We decided not to use that site. At the site we forgot about this decision and 'did what we normally do'. XXXX was known to be prone to shoulder dislocations but wasn't wearing a brace. We debriefed with all including a conversation about "occasionally instructor gets it wrong" and "permission to protest". Recommend investigating having a 'Polytech brace' as this is a common injury students arrive with.

6	6	At end of climbing on a wall. XXXX lifted his leg to attempt to climb over a rope before climbing (he was standing on the ground). His knee popped out. Whilst contacting the ambulance he started to take his harness off and his knee popped back in. It was out for about a minute.	No particular cause or previous condition. Just an accident.
6	5	Tramping from XXXX Hut en route to XXXX Hut two thirds of the way along the track negotiates a steep slippery clay near vertical bank. In the process of negotiating the bank a party member breaks her arm around 3pm.During the next hour we diagnosed the problem and made up a sling for the arm out of a triangular bandage. All her gear including pack was reallocated to other party members. The party member was still able to walk slowly so we walked back to an open creek bed that would be big enough for a helicopter to land in. Once at the creek bed site we activated the locater beacon around 4pm and within an hour of that the XXXX rescue helicopter arrived locating us straight away. The injured party member and trip leader were flown out. Injured party member flown to XXXX Hospital and trip leader flown to XXXX car park to retrieve car. Four other party members were instructed to follow XXXX Track out to road end which they did and reached there on darkness without incident	Near the top of the bank one party member slipped on the bank for around 2 metres to fall heavily to the bottom. Still on the track.

These were the 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. All use of approved narratives must only be undertaken with all identifying reference material removed (e.g. person, place of organisations names, feature names etc**).**

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

Actual Severity	Potential Severity	Descriptive narrative	Causal narrative
2	10	Whilst XXXX was running the 2nd of the class 4/5 rapid on the XXXX creek he became vertically pinned in the 2nd drop of this rapid. He attempted to free himself and during this time he was in a stable position with his head above water. I ran up the bank and threw my throw bag to him where he grabbed on to the line. He managed to free himself using the line but got tangled in it attempting to roll. He performed a wet exit and managed to swim to shore before the ensuring drops in the rapid	A number of things contributed to the accident. These were water levels experience and a competitive nature
2	10	XXXX was remounting his bike at end of walking section of slipped track area. He was standing over his bike and trying to start riding again. He slipped and fell over to left down very steep bank of the washed out track section. His biked rolled over him and got caught in a scrub. He managed to hold onto the scrub as well and did not fall down the drop off into the river canyon.	Guide should have made it mandatory to walk to the very end of each washout section well clear of the drop offs. In addition. XXXX had cleared what looked like the narrowest and dangerous section of the track and to start riding again. Due to this he was inattentive and slipped when getting on the bike. Another contributing factor was the 29er rental MTB. He was more used to riding road bikes or 26er MTB.
1	9	XXXX was abseiling down of high poles with a prussic attached to her leg loop. all gear was checked. began descent and noticed leg loop was slipping out of buckle that had been doubled back. she was talked thru alternative procedure to make safe and then place a prussic above the device attached to belay loop. continued abseil safely	new harness had a design that had less friction in leg webbing and buckle.
7	9	At 1950 XXXX told a teacher that she had some swelling around the eyes. It was thought to be an allergy and so they flushed her eyes and gave her an anti his time. 15 min later her level of consciousness decreased. 111 was called and a ambulance and helicopter was despatched. She remained at level where she would respond to voice most of the time. At 2100 the Ambulance arrived and administered O2. The Paramedic arrived 10 min later and her condition was stabilised. She was evacuated at 2145 to XXXX hospital where she was met by her mother and the school Rector.	XXXX had no known medical condition prior to the event and there was no way that this event could have been predicted. . . . . While the TIC could have been contacted earlier and the giving of medication wasn't ideal the situation was resolved quickly with a good outcome. At 2300 she was back up and walking.

0	8	Group on high ropes session. Student doing balance beam activity. When climber was half way up centipede spotted belayer had one buckle undone. belayers buckle done up / closed and climber continued.	Once set up and done own checks. Students must know they are NOT to climb/start until they are checked by instructor every time before doing each activity. Instructor needs to be vigilant. Students wait if necessary.
3	8	group doing spiders web. passed student thru top hole but group on other side dropped her when instructor called to start again due to touching web	group not paying attention to consequences and instructions. instructor not giving adequate training and progressions to activity.
3	8	XXXX was walking down hill crossing a small stream XXXX slipped on a wet tree stump she fell and hit her head on a rock resulting in a small cut on her temple and a small cut and may have sprained her finger. First aid given.	it seems to be a judgment error on XXXX's part by stepping on a slippery stump. maybe provide clients with the option to take hiking poles prior to all walks.
4	8	XXXX slipped while on our first river crossing of the day (shallow water). As he slipped he had his right arm still tucked behind the pack of YYYY. They were crossing together. XXXX had his shoulder dislocated as he slipped but it popped right back in as he stood back up. We as tutors have decided to not continue the tramp with him but to take him back out to meet at van and get home	This was a freak incident that happened on the day from simply a tippy rock under water that XXXX slipped on. This could have been worse if YYYY was not crossing with him and he had slipped alone in to the water. But this also could have changed if he was alone could have saved him from dislocation his shoulder.. . I sum this up to be a freak uncontrollable accident
5	8	playing a game student stood on post approx. 1m high other students running in hit student and knocked off balance and fell on back. complained off loss of feeling. instructor treated as spinal extra staff called in and emergency services called.	students going higher on stump than needed to and instructor not saying to come down. other students not following instructions for tagging students on stump.
5	8	XXXX was painting the high wall in the bunkroom. She could not reach the very top so went higher on her ladder eventually standing on the very top step of the folding ladder. I t was wobbly and she was unbalanced and fell back to the ground.	XXXX was not given training in the use of the ladder as it was assumed she knew how to use the ladder. She did not put the stabilising arms on the ladder down and also went to the very top step instead of unfolding ladder to lean against wall.. .
5	8	student re injured back on vertical play pen after getting in awkward position. student had a previous back injury. went into shock. emergency services called and student put on back board.	student had previous injury.

6	8	XXXX was crossing a stream that came across the tramping just after 3pm.Whilst crossing the small but fast flowing stream ben slipped and was taken swiftly but the current he grabbed on to a rock with his left arm and in the process dislocated his left shoulder. He managed with the help of others to get his feet and out of the stream. By this time his shoulder had popped back in. XXXX was helped into dry clothes checked over for any other injuries and vitals were taken 3 times over 1o minutes. His arm was placed in a sling and given pain relief.	As the group moved along the track members became separated with the fitter and more exited members breaking away. The stream where the accident occurred was within 20 minutes of the hut and the want to get there first had set in. The group had been told to be in eyesight of each but this had lapsed. XXXX's footwear was appropriate but his haste. lack of supervision and the high level of the stream were main causes i believe.. . I would highly suggest that a group is reminded of what is a safe way to travel and ensure as an instructor this adhered to through the whole day.
2	7	Student fell down a small bank while completing a burma trail.	Student failed to follow the instructions of the instructor and student helpers with regards to following the rope through the burma trail. he let go of the rope and got off course. This course caused no other injuries for those that followed the instructions.
4	7	student climbing up centipede on high ropes belayed up and spotted from ground. spotters left and then student fell from the centipede. with the rope stretch the student hit the ground but with some force absorbed by the rope. student fell and hit in a half sitting/flat position. was assessed and then taken to medical centre at a later time.	students left he spotting of the student way to early and the belay team possibly did not have the rope tight enough. spotting needs to be maintained till feet are on the second rung.
5	7	XXXX collapsed after he got out of a private hot pool	a better briefing (before and)after hiking to re hydrate especially if they are going in the hot pools. also only recommend short swims in the hot pools.
5	7	The Sheep came out of the scrub and ambushed the rider while speeding down a relatively easy farm track. A warning was given regarding dealing with sheep - this was observed but the sheep came from a blind scrub covered bank	Sheep can be unpredictable - and when you can't see it coming even when expected accidents like this happen. warnings and explanations with dealing with sheep will still be given and same instruction given-

5	7	Tramping in the YYYY. End of a hard day's slog uphill and we are on the downhill stretch before camp. It has rained most of the morning and early afternoon. Very steep downhill section just after the saddle. XXXX slips on a root falls 5m down the hill and complains of a sore left ankle. We walked back to the ZZZZ hut sharing out XXXX's load.(approx. 25 minute walk. Stayed the night at ZZZZ hut and decided in the morning that WWWW will walk out with XXXX to the road where they will drive to the hospital to get an x-ray. XXXX is mobile but slow to move. By splitting up the tutors we are operating with a greater ratio of students to staff than allowed in the SOP's	At the end of a long day there is a steep downhill section. that is very slippery as it has been raining just a few hours prior. The whole group are seasoned trampers. and are all competent. XXXX had good boots that were near new. but provided no traction on the slippery log. XXXX's pack was about 23kg which meant that any fall he took would get amplified. XXXX is able to hobble on his ankle. so we decide that he and YYYY are going to walk out the next day. while the rest of the group will continue on the tramp with myself as a leader.
5	7	Packed down tents began tramping at 9 am came to a part of track at 11am where group had to walk across a fallen tree. XXXX slipped of the tree and fell 2 metres stopping his fall with his outstretched arm. Arm was sore and swollen decided to walk out to road end called for van to pick us up.	Students had very heavy packs to start day off. It had been raining a lot. track was muddy. the fallen log was very slippery. Slippery log and carrying a heavy pack. made students unbalanced. As the instructor should have got students to spot each other. or chosen an alternate route to walking across log.
5	7	On the second day of a four day alpine tramp the group left the hut in a hurry to make the next camp site. At about 9:25AM when we reached a section where the track crossed a slip. One of the less fit students XXXX tripped on a poorly tied shoelace causing him to land hard on his knee and dislodge a bile of rocks which when tumbling past his head.	Due to the rush in the morning. XXXX rushed putting on his boots. so the shoe lace later came undone. . . Because we were in a hurry to make the next camp before dark. the pace was too much for XXXX. who isn't as fit as the rest of the crew. This would have led to fatigue. and loss of concentration which I think were contributing factors when he tripped. Also due to the morning frost. the clear path on the slip was slick with frost and some ice. . . . . This could have potentially been avoided by producing a more adequate trip plan to suit the lowest fitness level. The instructor could have initiated a quick hazard talk to raise awareness. This could have also covered what to do when approaching a slip to avoid loosening rocks.
6	7	The group was tramping and had been walking all morning. They were aware that they were not far from the hut. The group naturally set a faster pace and were travelling over a rough creek bed when the incident occurred. The student slipped on a rock and fell awkwardly. This plus a large pack on their back caused the student to seriously sprain their ankle.	The group were moving at quite a fast pace to the chances for wrong foot placement was higher than the rest of the morning when they were travelling slower. The reason the student fell was because they stepped on an unstable rock. While the group have been tramping before the slight lapse in concentration and communication by the tutor for allowing the group to speed up was also a contributing factor.
6	7	at the put in to the XXXX walk in unpacking kayaks from the trailer. student has head in the trailer trying to reach paddles. kayak gets dropped and lands on her head and she blacks out and falls to the ground where she hits head again.	students not communicating or were distracted and not fully paying attention to what was going on around them.

| 6 | 7 | The group was in a stream bed and the student was descending a small drop with a handline. He was a bit eager and went a bit quick his knee ended up below his foot. He dislocated his knee the instructor straightened the leg and it relocated it. the student walked out with the teacher back to the main base (10 mins). He was sent to the doc who sent to the hospital who diagnosed a broken/fractured knee. | The student did not follow instructions and started descending before another student had finished. The instructors radio went flat so she could not communicate with base. resulting in student and teacher walking beck to base. we now make sure instructors have 2 ways to communicate. We also send 2 instructors on this activity now to help manage the drops better. |

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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).