

NATIONAL INCIDENT DATABASE REPORT 2010

→ outdoor education and recreation

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Mountain Safety Council
Research Programme
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OUTDOOR SAFETY
NEW ZEALAND MOUNTAIN
SAFETY COUNCIL

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1 Summary Report

Purpose:

The intent of this report is to provide meaningful and accessible information to enable NID users and others to identify potential areas where they can improve their safety cultures and practices. It does this through summarising and analysing outdoor education and recreation incidents recorded in the National Incident Database (NID) for the 2010 calendar year and identifying emerging incident trends.

Background:

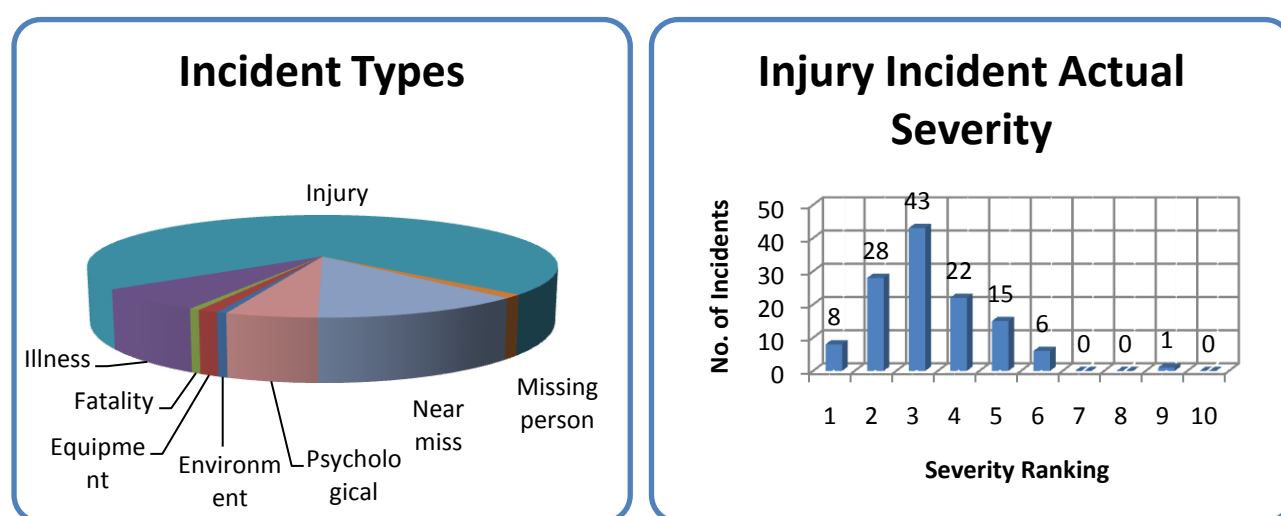
The National Incident Database (NID) has been in operation in New Zealand since 2003 and is managed by the New Zealand Mountain Safety Council (NZMSC) on behalf of a group of project partners¹.

The NID aims to:

- Create a standard method for collecting and analysing outdoor incident data in New Zealand.
- Maximise the collation of data from various sources. More data collection enables a greater ability to identify trends, and make recommendations for safety improvement.
- Provide timely and accurate summary incident data to NID users and varying government agencies.
- Work towards developing an international standard to enable it easier to integrate programme data from around the world.

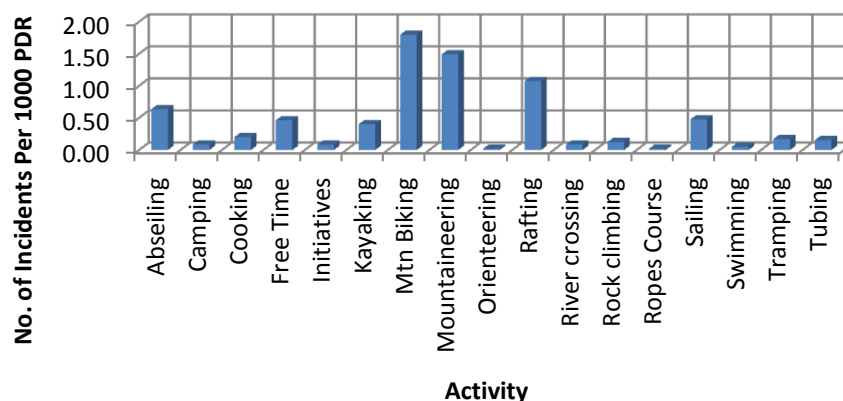
Overall Incident Summary:

From 1st January to 31st December 2010, there were 170 outdoor recreation and education incidents recorded on the NID. These incidents have been summarised and presented in a number of different ways in Chapter 3 of this report. At this point it is useful to consider five key summaries: Types of incidents, Severity of injury incidents, Relative activity incident rates, Incidents during EOTC/non-EOTC activities, and time of incidents.

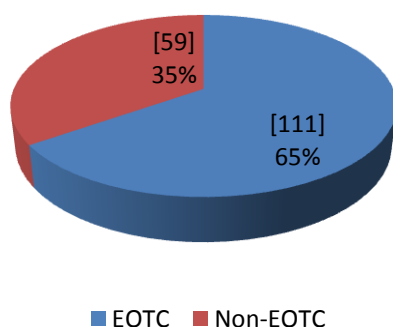


¹ See p. 1 of this report for a full list of these partners

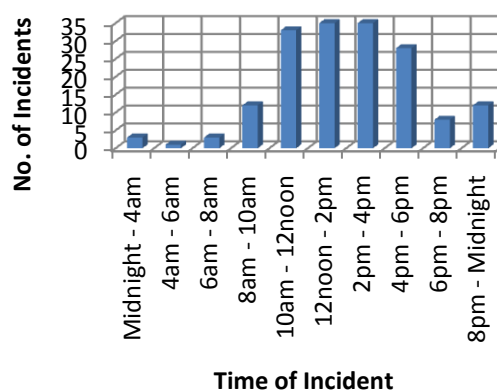
Relative Incident Rates by Activity



Incidents during EOTC v non-EOTC activities



Time of Incidents (2hr)



Further interpretation and discussion of this incident analysis can be found in Chapter 3 of the full report

Learning from Incident Trends:

Analysis of incidents resulted in the following trends or points of interest being identified. Recommendations for each of these trends are provided in the following section of this summary.

1. Free Time Incidents

Free Time incidents occurred at a rate of 0.46 incidents / 1000 PDR. Although *free time* might not be considered 'high risk' these incidents highlight the potential for incidents when there is often reduced supervision and a reduced perception of risk level. 25% of free time incidents occurred whilst playing sports. A number of incidents occurred through people having routine accidents (i.e. slips), some of which seem unavoidable, or through inappropriate behaviour. It may be that these incidents are no more likely to occur in outdoor recreation and education than in everyday day life.

2. Abseiling, Rock climbing, and High Ropes

Upon analysis of 15 abseiling and rock climbing incidents, 9 (60%) of them were recorded as 'near misses'. It is worth noting that of 21 total 'near miss' incidents in 2010, 9 (43%) were attributable to abseiling and rock climbing. Furthermore, 4 other 'near misses' were recorded during high ropes type activities which involved the use of climbing equipment and techniques (i.e. belaying). This gives a total of 62% of all 'near miss' incidents which were recorded during activities that involved height and climbing equipment. The author of this report would suggest that 62% of all 'near miss' incidents being attributed to height based ropes and belaying type activities is a trend worthy of serious consideration. See the following section and Chapter 4 of the full report for further detail and recommendations

3. Confidence Course, Initiatives and Low Ropes Courses

There were a significant number of total incidents that occurred during initiative type activities or on confidence or low ropes courses in 2010. It must be noted here that the participation rates for these activities were among the highest of any activities recorded on the NID (see p. 5 of this report). Consequently the incident rates relative to participation days was low, particularly for ropes courses. Given the high participation rates in these activities however, it was useful to examine a few incident narratives.

There was a trend in confidence course incidents of participants falling from 'high walls'. It appears in some of these cases 'spotting' and assisting techniques were not sufficient to avoid falls and minor injuries.

60% of initiative and low ropes incidents involved trips or falls with one resulting in a fractured wrist.

4. Mountain Biking

Although mountain biking only had a small number of incidents (3) it was the activity that had the highest incident rate relative to participation (1.8 incidents per 1000 participant days). Mountain biking also contains a factor likely to increase the chance of serious harm – speed. It is therefore important for leaders of mountain biking to use appropriate progression levels and ensure that riders are on terrain that is suitable for their ability level.

5. Moving Water

There were a number of incidents that involved moving water in 2010 including kayaking (14), rafting (3), surfing (3) and tubing (1). These activities had relatively high incident rates per 1000 participant days when compared with other activities (see Figure 10 on p. 10). There is a significant psychological / 'near miss' incident detailed in Chapter 4 of this report pertaining to a tube rafting activity. This and other incidents highlight that any water environment has increased exposure to potentially serious harm or fatality due to drowning. In the interests of fatality prevention it is imperative that all precaution and care is taken in all moving water activities.

6. Tramping

Tramping has a high participation rate for both users of the NID and general outdoor recreation and education. Although incident rates relative to participation days are small for tramping, as it is such a popular activity, it was worth detailing some of the incidents that occurred in 2010.

Of all 33 tramping incidents, 75% of these were injuries, 12% were illness, 9% were 'near misses', and 3% were missing people. There were five incidents (20%) that involved bee or wasp stings. This

highlights the need for groups to be careful, particularly at times of the year when bees and wasps are more prominent or when entering areas that are known to have populations of bees/wasps. 70% of tramping injury incidents involved trips, slips, or falls, due to terrain hazards, which resulted in soft tissue injuries such as sprains.

7. Environmental Incidents

There is currently no category for entering incidents of environmental damage in the NID. However, there was one example of environmental damage recorded in 2010 and it was important to highlight that this type of information is worth collecting.

Recommendations:

Recommendations for users of the NID and other outdoor recreation and education organisations.

The following recommendations could potentially apply to all users of the NID and other outdoor recreation and education organisations. It must be noted that due to the nature of NID data, this report has used descriptive statistics and author interpreted trends rather than trying to produce definitive facts or statements. Consequently not all recommendations will necessarily apply to all organisations. It is up to each reader of this report to ascertain what is useful learning for them, given the information provided.

General recommendations

- All users of the NID are encouraged to record all relevant participation and incident data on the NID and keep this up-to-date and accurate.
- For any outdoor recreation and education organisations not registered on the NID it is **highly recommended** that you register and use the NID to record your incident and participation data.
- It is recommended that organisations record incidents where environmental damage has occurred.
- Encourage more active use of Participation Day Rates and to update these regularly.

Severity of Incidents

- Incidents that have high actual or potential severity ratings deserve careful and considered examination from organisations. As fatality prevention becomes a greater priority in outdoor safety management it is important for outdoor recreation and education organisations and providers to closely monitor and mitigate against all incidents that could result in fatalities.
- In particular, 'near miss' incidents with high potential severity should be carefully examined.
- Encourage more reporting of near miss incidents as they provide valuable information for individual users and other outdoor recreation and education organisations to improve safety cultures and practices.

Incidents by activities

- The following activities had higher incident rates relative to participation: Abseiling, Mountain biking, Mountaineering, and Rafting. It would be prudent to carefully examine safety process around these activities.

- In particular Abseiling, Rock climbing and High ropes activities had a significant proportion of 'near misses'. It is recommended that all organisations involved in these activities check and revise (if necessary) their systems to reduce the likelihood of 'near miss' incidents, particularly those related to people attaching themselves to rope belays.
- It is recommended that all outdoor recreation and education programmes and providers should monitor incidents that occur during *free time* to identify potential trends and reduce the likelihood of incidents occurring.
- It is useful for organisations using initiatives and confidence courses to examine activities that involve heights or increased potential for trips and falls to see if improvements can be made.
- Mountain biking incidents highlight the importance of mountain biking leaders to use appropriate progression levels and ensure that riders are on terrain that is suitable for their ability level.
- It is recommended that activities involving moving water should have rigorous safety plans and competent people managing these activities. It is also useful for organisations/providers of such activities to have plans to manage unexpected outcomes such as missing take-out-points, and have procedures in place to ensure important guidelines are followed.
- Tramping incidents highlight the importance of good quality footwear which is appropriate for the terrain and ensuring that people's ability/competence is also suitable for the terrain.

Leader Factors in Incidents

- It is recommended that organisations analyse their incidents to identify any possible trends that may be emerging with regard to age and experience levels of their leaders.
- It is recommended that organisations analyse their incidents to identify any possible trends that may be emerging with regard to the gender of their leaders.

Recommendations for the managers and governors of the NID

There are a number of points that apply to the managers of the NID that may help improve its usefulness in the future.

- That the managers of the NID improve the capture of participation data. This could be done in several ways.
 - Increasing the range of participation data, i.e. age of participants, school or other groups, gender of participants.
 - Encouraging users of the NID to be vigilant at keeping their participation data accurate and up-to-date.
 - Working collaboratively with other organisations in the outdoor recreation and education sectors to capture more comprehensive participation data.
 - Enable easy migration of incident data from organisations that already have existing incident databases.
- It is important for the managers of the NID to continue to actively promote and publicise the NID in an attempt to capture as much information from the sector as possible. A goal of 95% participation in the NID is not unreasonable
- Currently there is no facility for recording environmental damage incidents. It would be useful for this to be added to the NID.

2 Introduction and Background

2.1 Report Purpose

The purpose of this report is two-fold. First, the report summarises and provides analysis of outdoor education and recreation incidents recorded in the National Incident Database (NID) for the 2010 calendar year. Second, the report identifies emerging incident trends and provides case study vignettes² which are intended to be useful for individual and organisational learning about safety and incident management.

The intent of this report is to provide meaningful and accessible information to enable NID users and others to identify potential areas where they can improve their safety cultures and practices.

2.2 Background

The National Incident Database (NID) has been in operation in New Zealand since 2003 and is managed by the New Zealand Mountain Safety Council (NZMSC) on behalf of project partners who include: Outdoors New Zealand (ONZ), Education Outdoors New Zealand (EONZ), New Zealand Snow Sports Council, Tourism Industry Association, and the New Zealand Ministry of Education.

The NID aims to:

- Create a standard method for collecting and analysing outdoor incident data in New Zealand.
- Maximise the collation of data from various sources. More data collection enables a greater ability to identify trends, and make recommendations for safety improvement.
- Provide timely and accurate summary incident data to NID users and varying government agencies.
- Work towards developing an international standard to enable it easier to integrate programme data from around the world.³

Any organisation, business, or institution involved in outdoor activities can become a registered member and user of the NID. Currently, membership and use of the NID is voluntary. Examples of outdoor education and recreation organisations who contribute data to the NID include: outdoor education/pursuit centres, schools, tertiary institutions, national outdoor organisations/clubs, and commercial adventure businesses. This data is presented below in Figure 1.

The NID is also used extensively by ski areas. Data and analysis for ski area incidents is presented in separate report, therefore it is not present in this report.

² All case-study vignettes are anonymous and have any identifying features removed.

³ National Incident Database aims retrieved and modified from the home page of the NID, www.incidentreport.org.nz, 17 May 2011.

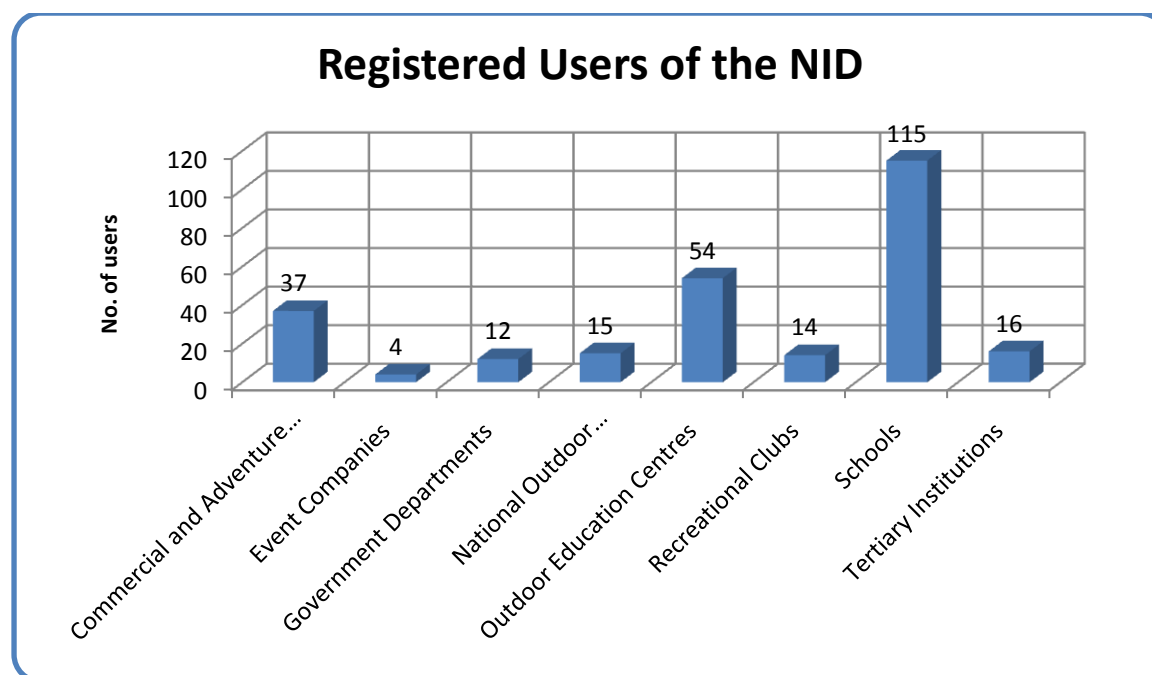


Figure 1. Current registered users of the NID as at May 2011.

2.3 Terms and Assumptions

This section outlines terms used in this report and details assumptions or issues which influence the way the report might be interpreted and utilised.

Incident data

The term *incident* is defined in the NZMSC *Outdoor Safety* manual as an umbrella term which refers to “an undesired event that could or does result in a loss. The loss may involve harm to people, damage to property, and/or loss to process”.⁴

The National Incident Database attempts to capture as many incidents as possible that occur in New Zealand outdoor recreation and education. These incidents include

actual harm to people, i.e. injury, illness, psychological distress, and fatality

damage to equipment

‘near misses’, i.e. incidents which did not result in harm or damage but could have if circumstances had been different

Note: Although there is scope to do so, no incidents of environmental damage were recorded in the NID for 2010.

The severity of incidents recorded in the NID is graded according to the Incident Severity Scale⁵ (see Appendix A). Whilst the NID is primarily concerned with incidents graded as level 3 or above, this report does include incidents of lower severity, particularly where there was potential for greater loss, i.e. ‘near misses’.

⁴ Haddock (2004) *Outdoor safety: Risk management for outdoor leaders*. Wellington, NZ: New Zealand Mountain Safety Council.

There is wide range of additional information about incidents gathered through the NID, such as:

Incident type, location, time, weather, activity, and causal factors or hazards.

Participant age, gender, and number of participants.

Leader age, gender, relevant qualifications, experience.

Some of these factors will be considered in Chapter 3 which summarises overall incident data. Other factors will be identified and summarised in Chapter 4 if they emerge as a trend from which learning and recommendations could be made.

There are two important caveats to note at this point about outdoor recreation and education incident data in New Zealand.

At present reporting incidents on the NID is voluntary. Most, but not all of those registered, actually input data into the NID. Consequently the data in this report does not represent an exhaustive account of incidents in the New Zealand outdoors.

For incident data to provide meaningful and relevant information for the improvement of safety cultures and practices there must be some comparisons made with participation rates. This is somewhat problematic as discussed below.

Participation data

Gathering sufficient and appropriate participation data is an important part of being able to accurately analyse and present information on incidents. To gain an accurate picture into significant factors which contribute to incidents, such as activity types, it is important to compare incident and participation data so that incidents can be view relative to participation rates. In New Zealand gathering accurate participation data for outdoor recreation and education activities is somewhat problematic, as discussed by Dignan and Cessford⁶.

The most current participation data is available for the Sport and Recreation New Zealand (SPARC) Active NZ Survey.⁷ Included in the objectives of this survey was the measurement of participation levels in various sport, recreation and physical activities. The Active NZ Survey was interview administered to a randomly-selected, cross-sectional sample of 4,443 New Zealand adults. Participants were recruited throughout New Zealand and stratified across each month of the survey year (March 2007 to March 2008) to account for seasonal differences. The data was then weighted to be representative of the New Zealand adult population. Results for outdoor recreation and education activities are show in Figure 1 below.

⁵ Davidson (2005) *Incident severity scale*. Adapted and expanded from the Accident Frequency Severity Chart (Priest, 1996).

⁶ Dignan and Cessford (2009) *Outdoor recreation participation and incidents in New Zealand: A scoping study relating incidents to participation levels*. Wellington, NZ: New Zealand Mountain Safety Council.

⁷ SPARC Active NZ Survey 2007/2008. Retrieved from www.activenzsurvey.org.nz on 18th May, 2011.

Active NZ Survey Adult Participation Percentage

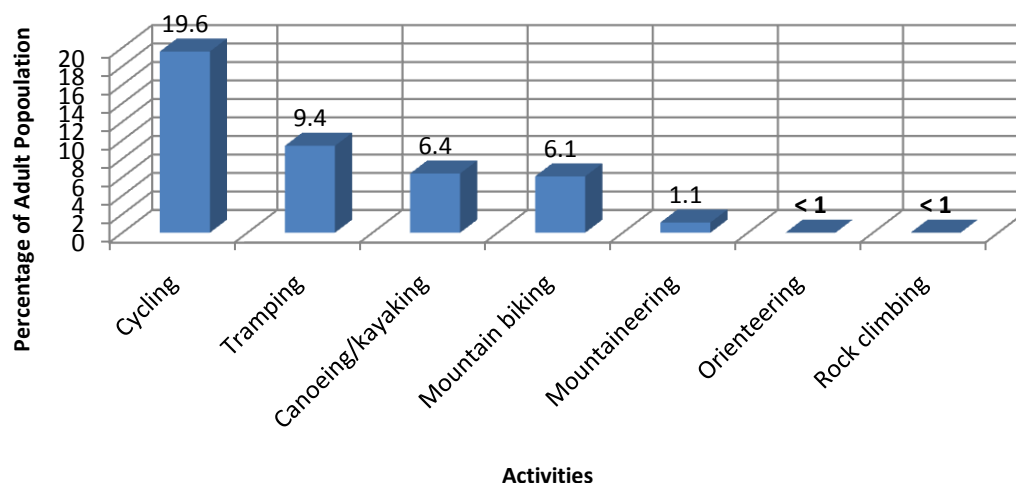


Figure 2. Outdoor recreation activity participation data. SPARC Active NZ Survey 2007/2008.

The data in figure one only provides a snapshot for participation in some outdoor recreation and education activities for the New Zealand adult population. Although this data may be of interest to readers, it has limitations for this report in that it does not address youth or educational participation in outdoor recreation and education activities.

Of greater interest to this report is the participation data that all users of the NID are required to enter upon registering and entering incidents. This data is recorded for different activities in the format of Participation Day Rates (PDR). PDR is calculated by multiplying activity course duration (CD) by attendance (A) (i.e. the number of people participating). $PDR = CD \times A$

The PDR for different activities is shown in Figure 3 below.

NID Activity Participation Day Rates

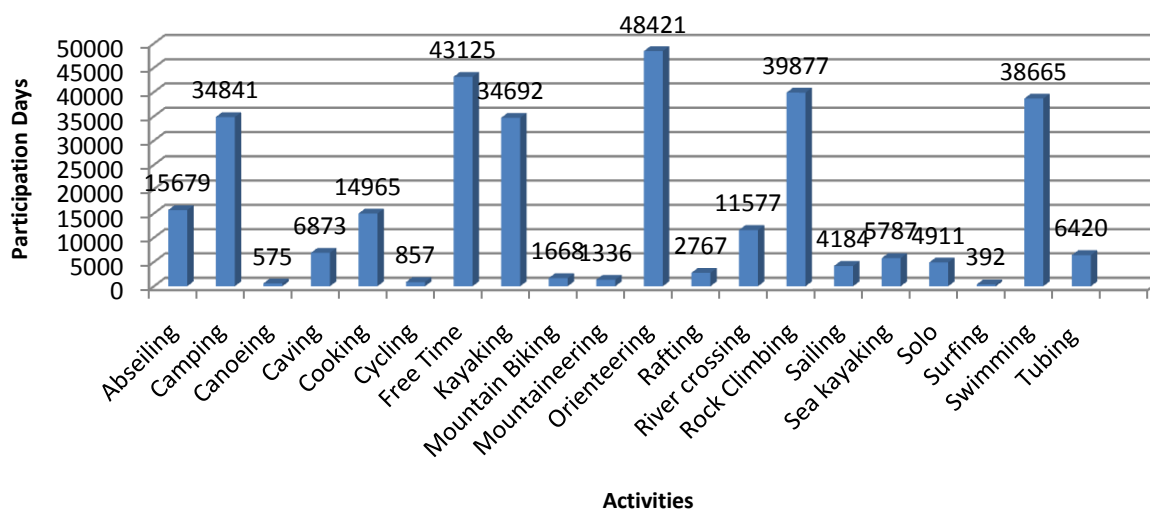


Figure 3. Activity Participation Day Rates for registered users of the NID

Three activities (Initiative, Ropes, and Tramping) were excluded from the above chart due to the large amounts of participation days. If these activities were included, the scale on the vertical axis would need to be more than 800 000, which would mean the PDR for all of the activities in Figure 3 would be difficult to see. The Participation Day Rates for Initiative, Ropes, and Tramping were:

Initiatives = 143510 PDR

Ropes = 807265 PDR

Tramping = 191397 PDR

The above chart and data indicates PDR only for registered users of the NID. There is no way of knowing how indicative this data might be of all outdoor recreation and education providers and organisations throughout New Zealand. However, this data is very useful when analysing incidents by activity as it allows for relative incident rates to be calculated. These rates can help us to identify incident trends and activities that may have more relatively more incidents than others.

3 Overall Incident Summary

From 1st January to 31st December 2010, there were 170 outdoor recreation and education incidents recorded on the NID. There were a large number of variables recorded with each incident. This section presents those variables which are thought to be of the most interest to NID users and other outdoor recreation and education organisations.

3.1 Incidents by Type

The NID records incidents by type. These include: Injury, Illness, Psychological/emotional, Equipment loss/damage, Missing/overdue, Near miss, and Fatality. The total number of incidents in each of these categories is presented in Figure 2 below. Currently there is no environmental damage category for incidents on the NID although the data below does show one environmental damage incident as interpreted from the database information.

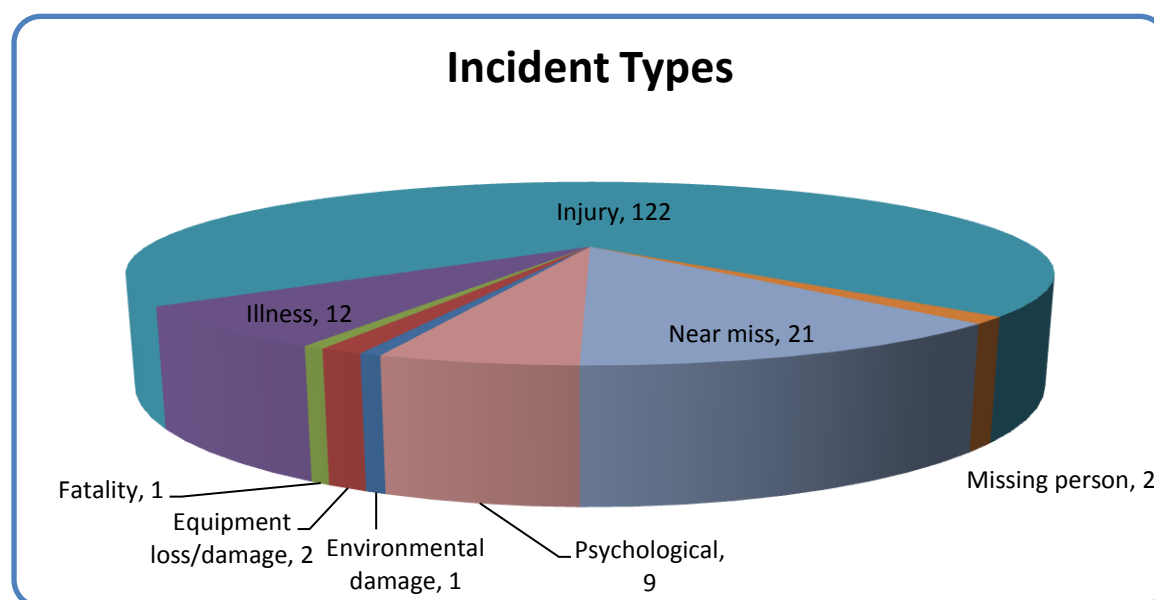


Figure 4. Types of Incidents, 2010

The chart above shows that 72% of incidents recorded in 2010 were injuries. These injuries were wide ranging and are addressed in more detail in the next section. The second most recorded type of incident was 'near misses' (12%), followed by illness (7%), and psychological distress (5%). On a more detailed examination of the data it is worth noting that the majority of psychological distress incidents could also be considered near misses. Some of these incidents will be explored in the following chapter.

It is recommended that NZMSC and its partners in the NID consider adding environmental damage as an incident type.

3.2 Incidents by Severity

As noted in the introduction, users of the NID are asked to indicate the actual and potential severity of the incident based on the Incident Severity Scale⁸ (see Appendix 1). For ease of use, the severity of incidents in this section is broken down into the four most significant incident types: Injury, 'near misses', illness, and psychological distress.

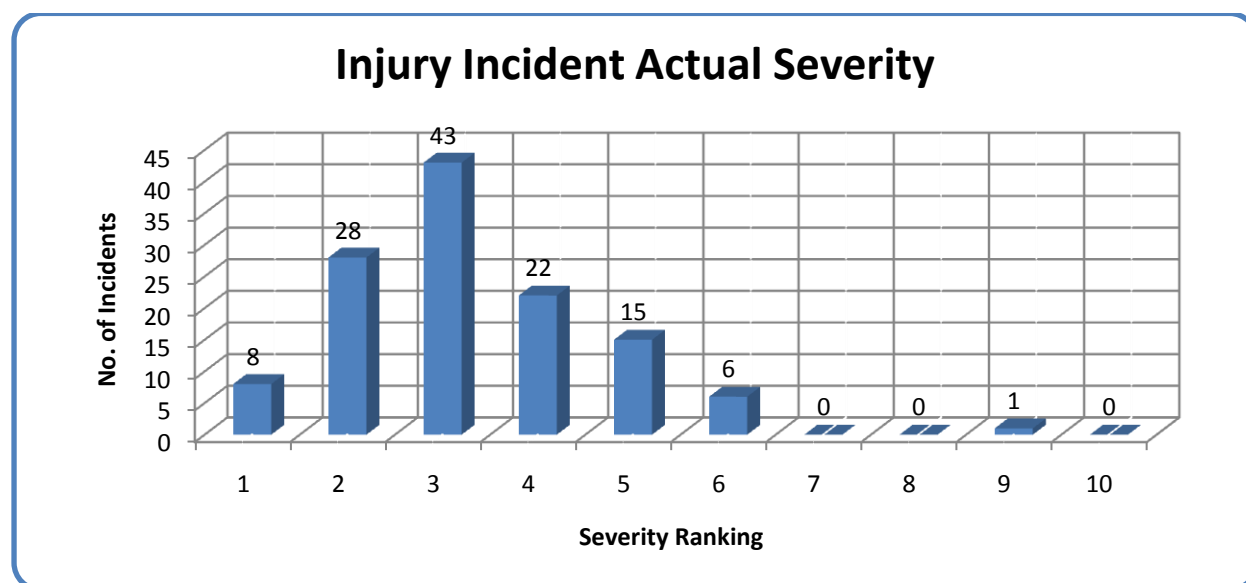


Figure 5. Injury Incident Actual Severity

There are several points worth noting from the above information.

65% of injuries were minor and of short term impact to activities or programmes. It is pleasing to see these incidents being recorded as they can lead to good organisation learning about safety, particularly where incidents are re-occurring frequently or developing trends. It is recommended that all users of the NID examine their own incident summaries for each year to attempt to identify and address such trends.

30% of injuries were of medium impact where participation in activities or programmes could not continue in the short term.

5% of injuries had a major impact on people, and programmes, although these were at the lower end (severity grade 6). It is important to note that it is recommended that all incidents with severity rankings of 6 or above should be reported to the Department of Labour.⁹

For 69% (84) of injury incidents reported, the potential severity of the incident was greater than the actual severity. This indicates that had some circumstances been different these incidents could have resulted in more severe injuries or even fatalities. As fatality prevention becomes a greater priority in outdoor safety management it is important for outdoor recreation and education organisations and providers to closely monitor and mitigate against all incidents that could result in fatalities.¹⁰

⁸ Davidson (2005) *Incident severity scale*. Adapted and expanded from the Accident Frequency Severity Chart (Priest, 1996).

⁹ Information on reporting incidents to the Department of Labour can be found in the guide to the NID, www.incidentreport.org.nz

¹⁰ As noted by Dr Andrew Brookes in his key note address at the 2010 Outdoors New Zealand (ONZ) Forum, Wellington.

Near Miss Incident Potential Severity

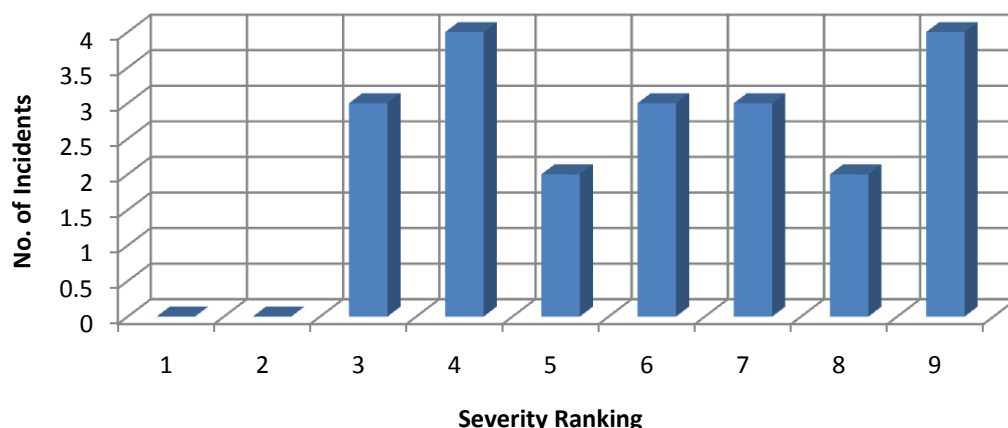


Figure 6. Near miss incident potential severity

The above graph shows that 'near miss' incidents have the potential to cause severe loss. This graphic representation is limited in its ability to help us learn from 'near misses' and improve safety cultures and practices. Some 'near miss' case study vignettes will be examined in the following chapter to indicate useful learning and recommendations.

Illness Incidents Actual Severity

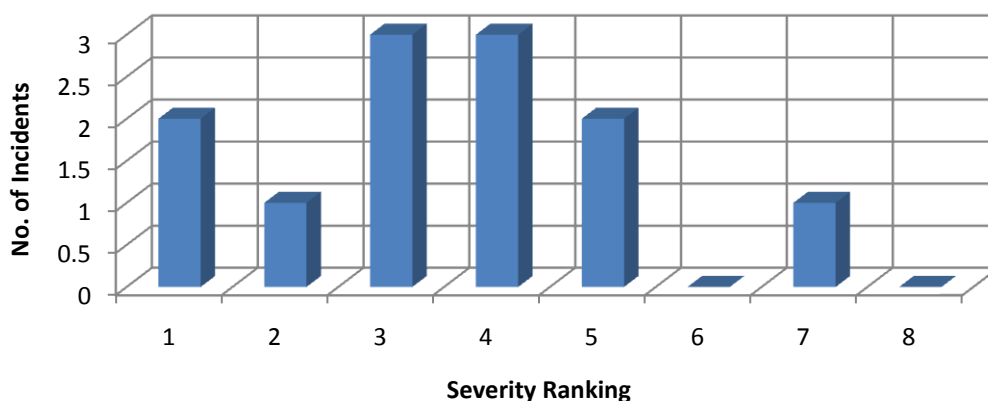


Figure 7. Illness Incidents Actual Severity

Given the smaller amount of illness data and the relatively even spread towards the low/medium severity end it is difficult to comment further on this data.

Psychological Distress Incidents

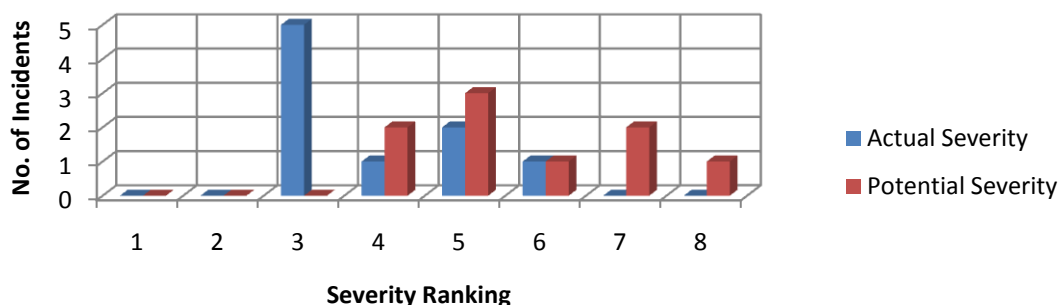


Figure 8. Psychological Distress Incidents

The most important feature from the above graph is the relationship between actual and potential incident severity. In all but one incident above the potential severity was indicated as greater than the actual severity. The data does not indicate whether the potential severity is limited to psychological distress only or also related to other incident outcomes such as injury. However, upon examination of incident descriptions it is reasonable to suggest that some psychological distress incidents could have resulted in significant harm or loss had some circumstances been different. It is therefore reasonable to suggest that a majority of psychological distress incidents could also be considered 'near misses'.

3.3 Incidents by Activity

The following section presents all incident types that occurred in 2010 distinguished by activity.

All Incidents by Activity

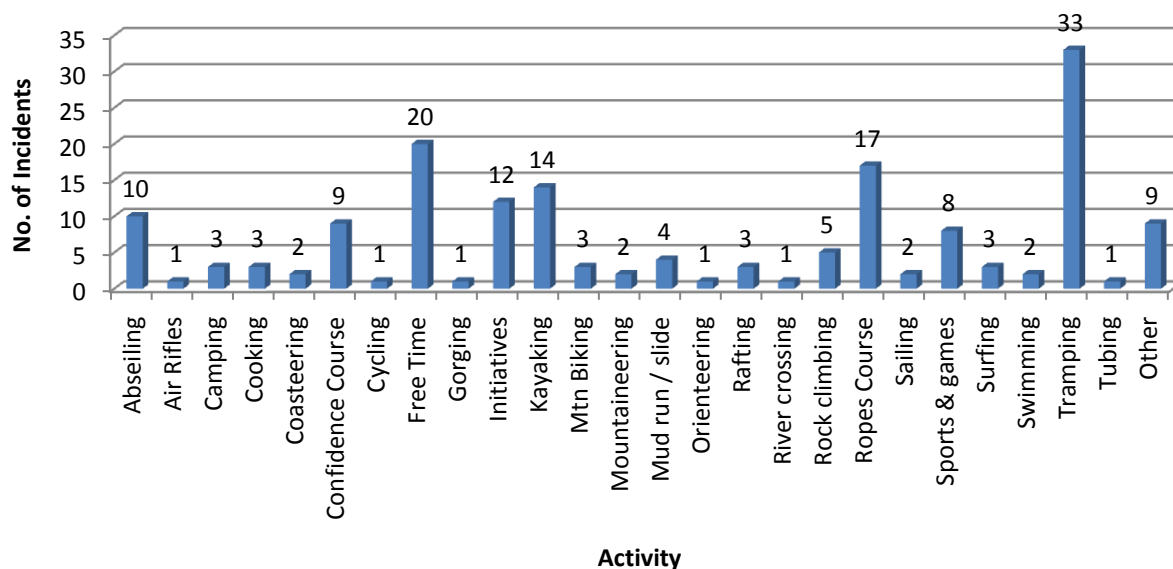


Figure 9. Breakdown of incidents by activity

The above chart shows the raw number of incidents that occurred in different activities. This data is **not** relative to participation rates. Therefore, it **cannot** be read to mean that activities with more incidents are

more dangerous. This data becomes useful to us when we consider it in a descriptive way. In the next chapter more descriptive information will be given on activities that had higher numbers of incidents or those where a trend is emerging. These will include tramping, ropes course and initiatives, free time, abseiling, and kayaking.

It is useful at this point to look at activity incidents relative to participation day rates.

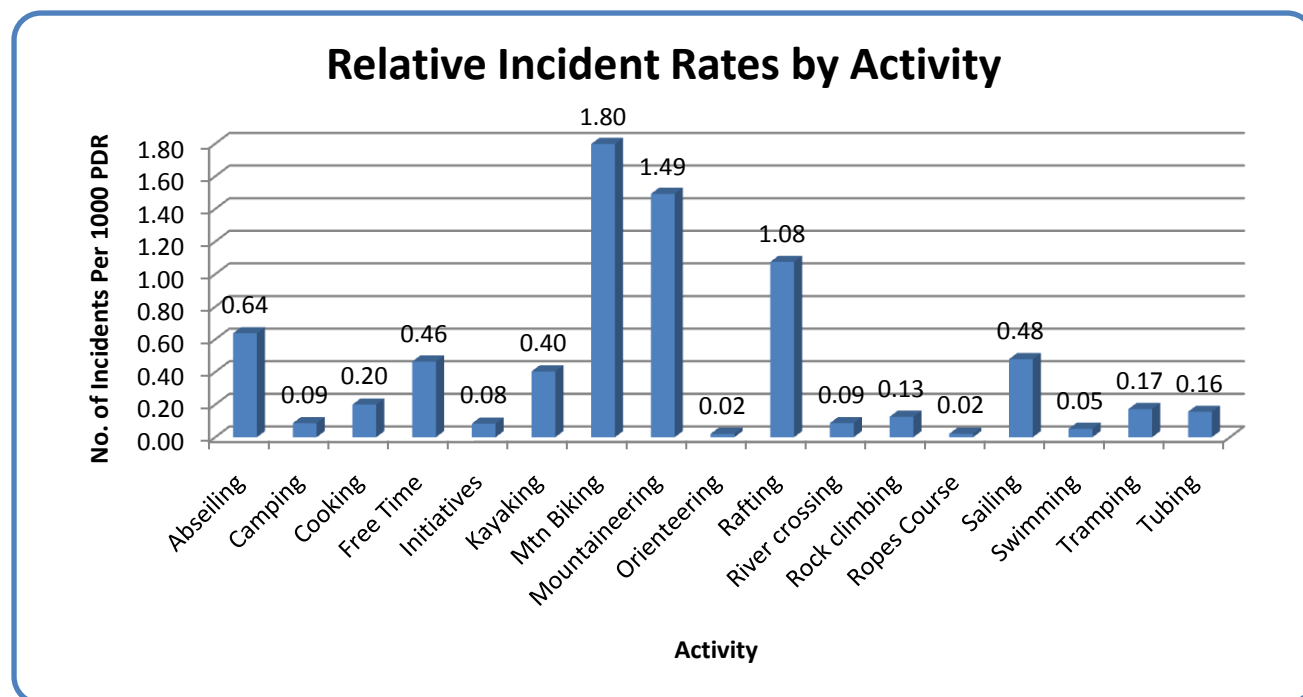


Figure 10. Relative activity incident rates per 1000 Participant days (PD)

The above chart indicates the number of incidents that occurred in each activity in 2010 for every 1000 participant days. This chart provides a more accurate reading of the incident data as it is proportional to the amount of participation in each activity. There are several points worth noting in the above chart:

- Confidence course incidents do not appear in the above due to there being no direct PDR entered for confidence course activities. These may have been entered under initiatives but it impossible to extract this data.
- All activities where there was less than 1000 PD were removed from the chart due to the potential for these to skew the data.
- Activities that appeared to have the largest incidents per 1000 PD, i.e. mountain biking, mountaineering, rafting, and sailing had relatively low participation rates which also may have skewed the data in the above chart.
- Three activities with higher participation rates and higher relative incident rates were abseiling, free time, and kayaking. Incidents from these activities will further examined in the next chapter.

When considering the potential for incidents from certain activities it is useful to consider factors that might exacerbate the seriousness of these. Davidson¹¹ suggests that these factors include:

- Height
- Speed
- Changes in weather
- Moving water
- Fire and or heat
- Any water environment

Organisations are encouraged to analyse their own incident data with respect to these factors to identify any potential trends that may be emerging.

As many of the users of the NID are school or outdoor education centres, it is useful to consider how many of the total 170 incidents occurred during school related EOTC (Education Outside the Classroom) activities. These activities could be facilitated either by schools themselves, outdoor education centres, or other providers.

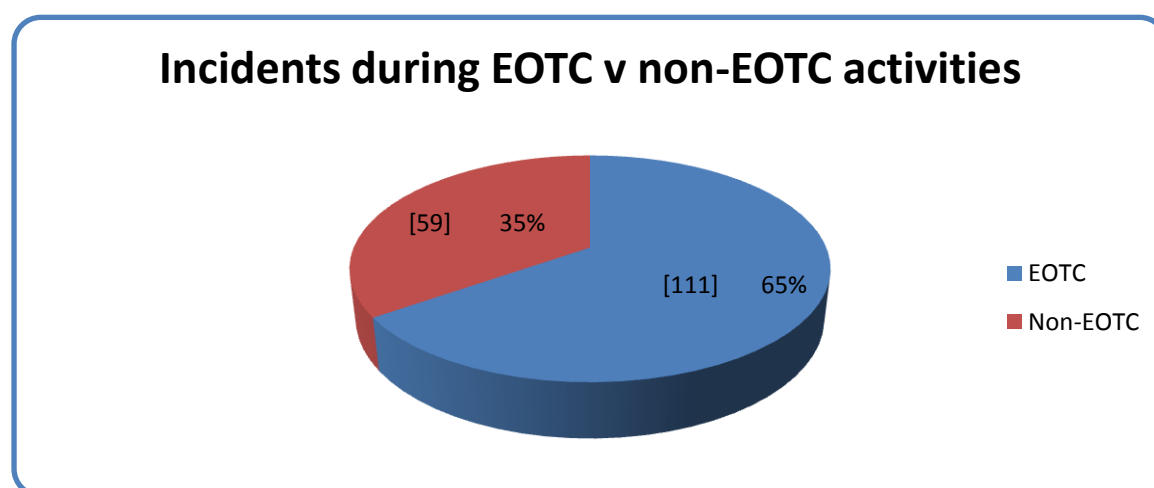


Figure 11. Incidents during EOTC vs non-EOTC

The above chart indicates that two thirds of all incidents recorded in 2010 happened on EOTC activities. This does not mean that EOTC is more dangerous or prone to incidents than other non-EOTC activities. Rather it is probably a reflection of the large number of schools and outdoor education centres or providers who record incidents on the NID. Presently there is no way of extracting participation data which is relative to EOTC of non-EOTC activities from the database.

A further analysis of activity incident data that may be useful to users of the NID and others is a breakdown of incidents by whether they occurred in water or land-based activities. The chart below takes into account participation rates.

¹¹ Davidson (2006) Fact or folklore? Exploring “myths” about outdoor education accidents: Some evidence from New Zealand. *New Zealand Journal of Outdoor Education*. 2(1). Pp.50-85

Relative Incidents: water vs land-based per 1000 PD

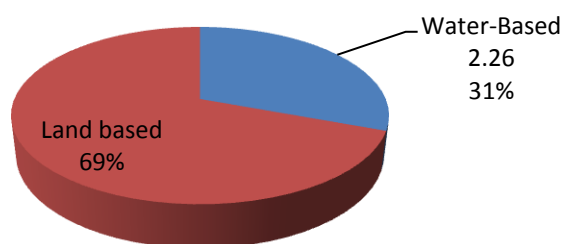


Figure 12. Water-based vs Land-based incidents

It is overly simplistic to suggest from this chart that land based activities are more likely to have incidents than water based activities. This chart is a reflection on actual incidents relative to participation rates for one calendar year. Many other factors must be considered when looking at this data. For instance, what are the actual and potential severity ratings of land based versus water based activities, and more particularly in what types of incidents is there greater potential for fatality. It is recommended that individual organisations and users of the NID analyse their own annual incident summaries to identify any possible emerging trends with regard to water-based or land-based activities.

3.4 Incidents by Time

The following chart shows the time of occurrence for all incidents including 'near misses'.

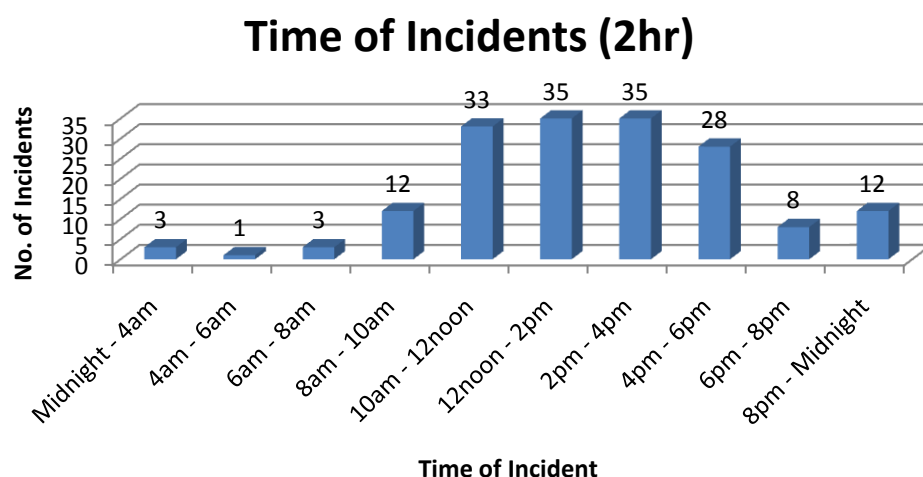


Figure 13. Time of incidents

The above chart shows that the majority of incidents were spread relatively evenly over the times between 10am and 4pm. This time period could be considered to be the main times where outdoor recreation and education activities take place. It is therefore not surprising that the majority of incidents occur during these times.

There are two further points worth noting here:

- There were a reasonable number of incidents in the time period 4pm – 6pm. Of the 28 incidents that occurred in this time, 24 were injuries and 80% happened on supervised activities.
- Free time incidents were spread throughout the day from 8:00am to 9:00pm, although 75% of these did occur in the afternoon or evening.
- Davidson¹² suggests there is evidence pointing to a greater proportion of incidents in the afternoon. This appears to be not inconsistent with the data shown in figure 12. It is therefore recommended that organisations examine their incident data to see if any time-of-day trends are developing for their programmes and activities.

3.5 Incidents by participant age

The following chart breaks down incidents into age categories. These categories were chosen to represent primary school age (8-12), secondary school age (13-18), and then 10 year intervals.

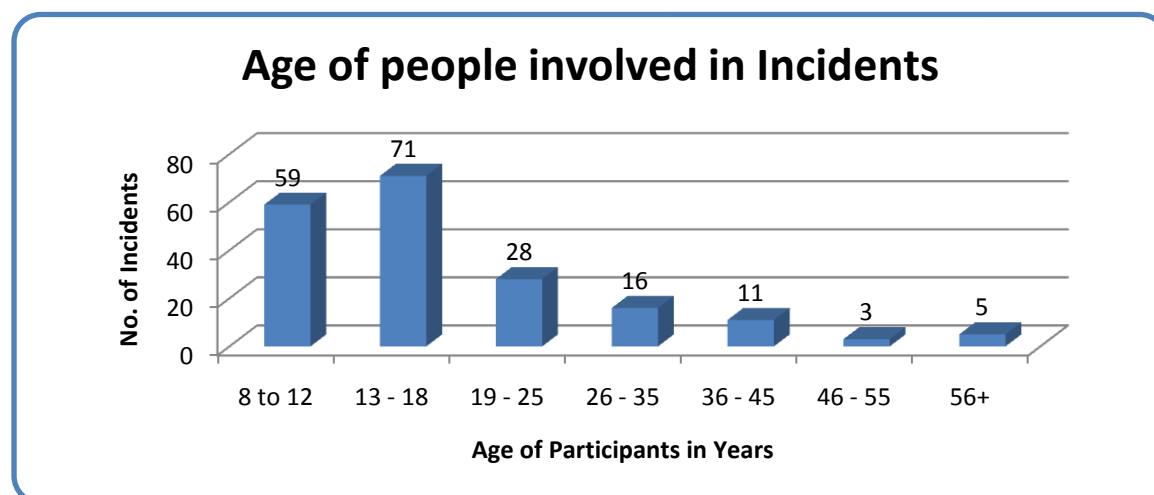


Figure 14. Age of people involved in incidents

The above chart must be read with some caution as it represents actual incidents rather than incidents relative to participation. Currently there is no age information related to participation day rates (PDR) available from the database. Given that 65% of registered users of the NID are schools or outdoor education centres it is reasonable to suggest that these organisations might have a higher PDR. Therefore a possible reason for the high proportion of incidents in age ranges 8 to 18 might be that there are far more people of these ages participating in outdoor recreation and education activities with organisations registered with the NID.

¹² Davidson (2006) Fact or folklore? Exploring “myths” about outdoor education accidents: Some evidence from New Zealand. *New Zealand Journal of Outdoor Education*. 2(1). Pp.50-85

3.6 Activity Leadership

This section comments on a few points of interest specifically related to leadership of activities.

1. Qualifications

- a. Only four incidents (2.5%) were reported to have occurred with no leader or supervision.
- b. 92% of all incidents were reported to have qualified people/instructors leading or involved with the activity.
- c. Only 55% of those leaders/instructors were reported to have 'relevant qualifications'
- d. Of those activities reported a not having qualified leaders, 52% happened during 'free time'.

Note: The database gives insufficient information as to what types of qualifications were held, to what level and by whose standards were those qualifications deemed to be 'relevant'. There is significant opportunity for further investigation into the relationship between qualifications and incidents.

2. Leader Age

The following chart shows the ages of leaders who were responsible for activities when incidents occurred.

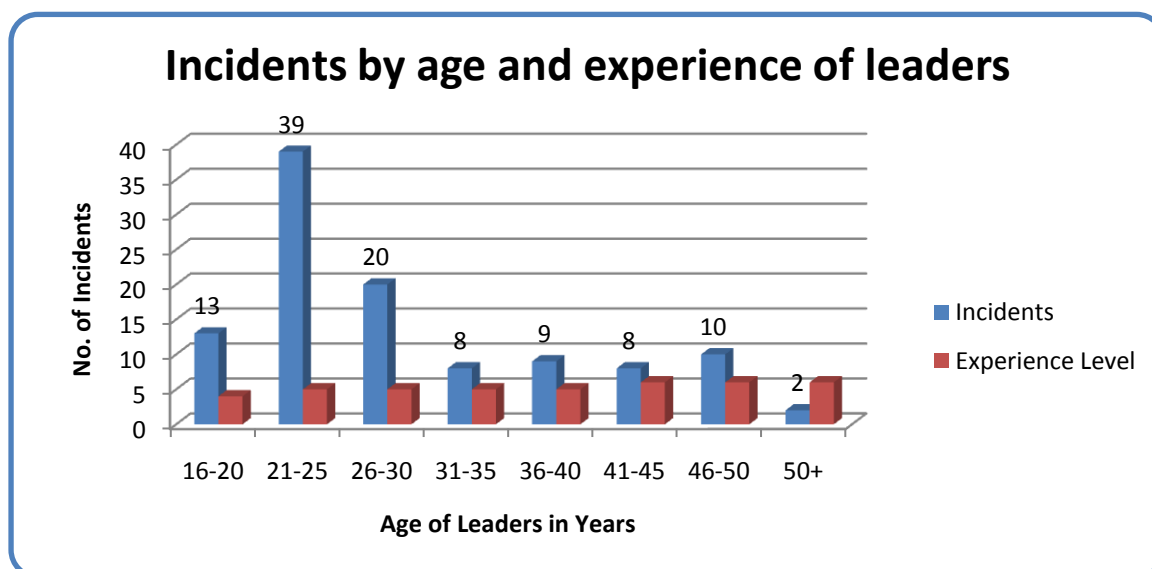


Figure 15. Incidents by age and experience of leaders

This data is not proportional to the numbers of leaders in each age category. Given the demographics of people who work in outdoor recreation and education it is likely that a greater number of young people (19-30 yrs) are involved in leading these types of activities. It is therefore expected that there would be a greater number of incidents for these age categories. It would be of interest to be able to compare the data above to the total numbers of leaders in each age category to be able to identify trends with regards to age of instructors.

It is interesting to note from the above that as age increased so to did perceived levels of experiences.

3. Leader Gender

The chart below show the gender of leaders who were responsible for activities when incidents occurred.

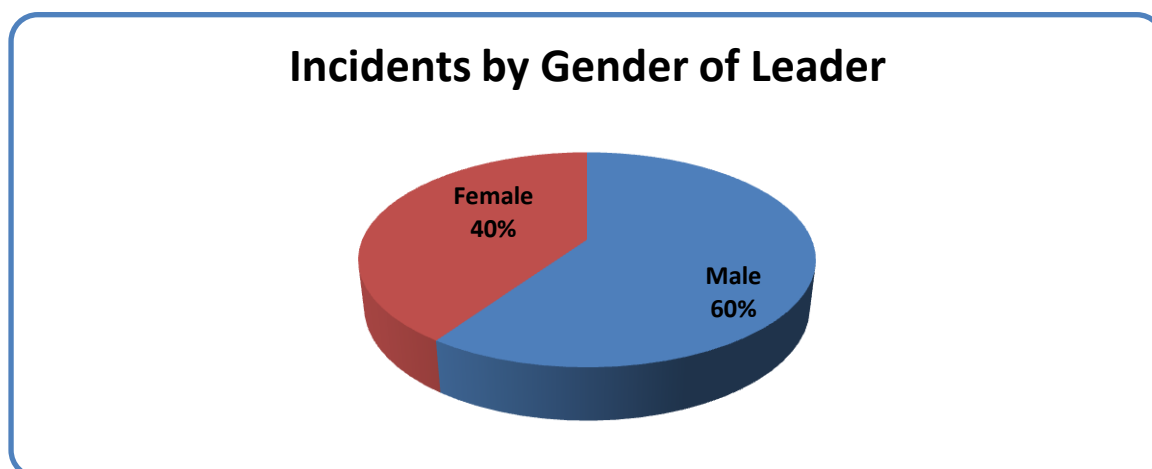


Figure 16. Incidents by gender of leader

As for the age of leader chart in figure 14 above, the gender of leader chart is not proportional to the number of male or female instructors/people who lead activities for organisations who use the NID. Again demographics of people who work in the outdoor recreation and education sector would probably show a greater number of males. A greater raw number of incidents for male would therefore be expected. It would be of interest to be able to compare the data above to the total numbers of leaders in each gender category. Notwithstanding this caveat, Davidson¹³ suggests there is evidence to support the notion that male instructors are more likely to expose their groups to greater risks and therefore have a higher ratio of higher severity incidents. It is recommended that organisations analyse their incidents to identify any possible trends that may be emerging in this area.

¹³ Davidson (2006) Fact or folklore? Exploring “myths” about outdoor education accidents: Some evidence from New Zealand. *New Zealand Journal of Outdoor Education*. 2(1). Pp.50-85

4 Incident Trends and Possible Learning

This chapter has two aspects: First, possible incident trends are identified, and second narrative vignettes from selected incidents are presented. The purpose of these is to contribute to possible learning and improvement for individuals and organisations with regard to safety culture and management processes. The trends presented here are derived from the interpretations of the author of this report rather than through mathematical statistical analysis. They also tend to focus on incidents or activities that may have the potential for more serious consequences through containing factors such as height, moving water, heat, or changeable conditions, as described by Davidson¹⁴. All narrative vignettes have had identifying features removed to ensure anonymity of individuals and organisations.

4.1 Free Time

Free Time can be a contentious term which is open to multiple interpretations and uses. Although the users of NID do not provide specific details of how they might understand *free time*, it is useful to briefly outline possible interpretations here. *Free time* unusually refers to unstructured time when a specific activity is not being engaged in. This does not necessarily mean that free time is either unsupervised or has reduced supervision, although that could be the case for some programmes and providers.

In 2010 a reasonable number of incidents occurred during *free time* (0.46 incidents / 1000 PDR). Although *free time* might not be considered 'high risk' these incidents highlight the potential for incidents when there is often reduced supervision and a reduced perception of risk level. 25% of free time incidents occurred whilst playing sports. A number of incidents occurred through people having routine accidents (i.e. slips) or through inappropriate behaviour. The following narrative vignettes provides an example of a typical *free time* incident.

Students were sliding down a minor hill on cardboard sheets. One student fell off and broke and dislocated his little finger.

While playing touch rugby on field one student fell over onto their thumb. First aid was administered and they were taken to be checked out at a medical centre.

A person was running on the verandah of the cabin and ran into the door. His head banged into the glass panel on the door and shattered.

A student tripped and twisted her ankle as she was coming down her cabin stairs. The injury was iced and checked over by a parent who was an off duty advanced paramedic.

These vignettes demonstrate that a variety of incidents can occur during *free time*, some of which seem unavoidable. It may be that these incidents are no more likely to occur than in everyday day life.

It is recommended that all outdoor recreation and education programmes and providers should monitor incidents that occur during *free time* to identify potential trends and reduce the likelihood of incidents occurring.

¹⁴ Davidson (2006) Fact or folklore? Exploring "myths" about outdoor education accidents: Some evidence from New Zealand. New Zealand Journal of Outdoor Education. 2(1). Pp.50-85

4.2 Abseiling, Rock climbing, and High Ropes

Upon analysis of 15 abseiling and rock climbing incidents, 9 (60%) of them were recorded as 'near misses'. These incidents all contained height as a contributing factor and had the potential for serious harm. It is also worth noting that of 21 total 'near miss' incidents in 2010, 9 (43%) were attributable to abseiling and rock climbing. Furthermore, 4 other 'near misses' were recorded during high ropes type activities which involved the use of climbing equipment and techniques (i.e. belaying). This gives a total of 62% of all 'near miss' incidents which were recorded during activities that involved height and climbing equipment.

It is therefore useful to look at some of these 'near miss' incidents in more detail.

Abseiling 'near miss' 1.

After being in sun for day the instructor went to get a drink, in the process unclipping his safety line. Upon returning to the abseil facilitation site he forgot to reattach his safety line began to bring student down to him to abseil. At this point he realised he was not attached to the safety and re-clipped himself.

This situation may sound familiar for those facilitating abseil sessions, and highlights how easy it is to make a small mistake. The potential harm from such a mistake could result in serious injury or even death from a fall. There are two learning points to consider here:

- Instructors who are facilitating abseil session need to have self-check, and where appropriate peer-check systems in place to try to avoid such incidents.
- Whilst working for prolonged time in difficult environmental conditions (i.e. hot sun), instructors / leaders should ensure they have systems in place to have appropriate breaks and adequately attend to their own essential needs.

Abseiling 'near miss' 2.

A student almost abseiled off the end of their rope. Only one of the 2 strands was on the ground. The student saw one end of the rope on the ground and began abseil. They were able to stop self and swing across to another rope.

Again this 'near miss' had the potential for serious harm had the student abseiled off the end of the rope. This again highlights the need for robust systems for double checking prior to abseiling.

Rock climbing 'near miss'

Day one of a six day programme with beginner climber – top rope session. By 2.00pm the two instructors had agreed that given they were comfortable with students thoroughness to that point that they would not require each pair to check with an instructor before climbing commenced. One instructor then noticed a climber approx 7-8m above the ground on belay but climber was attached to their gear loop rather than their rated attachment point. Instructor took action to mitigate the situation returned the climber to the ground and debriefed the incident with all climbers. They resumed but subject to an instructor check before climbers left the ground.

This near miss, once again highlights the need to have robust checking systems when dealing with ropes, height and climbing. Organisations should also pay attention to sequencing of teaching and activities to ensure that appropriate learning takes place, that students develop suitable competence for the activity, and that appropriate levels of supervision is provided.

High ropes 'near miss'

A trainee instructor noticed a student being lowered from a high ropes element with their karabiners only in one loop of the rope (double bowline). Both karabiners still done up. Neither the trainee instructor nor the supervising instructor noticed this prior to the student starting the element (the supervising instructor was positioned by another element at that specific time).

This incident highlights a breakdown in checking systems for attaching correctly to the rope belay. Clipping into only one loop of the double bowline knot compromises the strength of that knot and the whole belay system. There was potential for serious harm in this incident.

The author of this report would suggest that 62% of all 'near miss' incidents being attributed to height based ropes and belaying type activities is a trend worthy of serious consideration. It is recommended that all organisations involved in these activities check and revise (if necessary) their systems to reduce the likelihood of 'near miss' incidents, particularly those related to people attaching themselves to rope belays.

4.3 Confidence course, initiatives and low ropes courses

There were a significant number of total incidents that occurred during initiative type activities or on confidence or low ropes courses in 2010. It must be noted here that the participation rates for these activities were among the highest of any activities recorded on the NID (see p. 5 of this report). Consequently the incident rates relative to participation days was low, particularly for ropes courses. Given the high participation rates in these activities however, I think it is useful to examine a few incident narratives.

Confidence course incident

Patient was lifted onto the high wall but could not reach. Patient fell and landed on her left ankle and sprained it.

Five out of nine incidents on confidence courses in 2010 involved individuals or groups moving over some type of 'high wall'. Most of these incidents (as in the one above) involved people falling off the wall resulting in some type of sprain or bruising injury. From the incident narratives recorded on the NID it is evident that such activities usually have other people involved in 'spotting' and assisting people get over such obstacles. These incidents suggest that in some cases 'spotting' and assisting techniques are not sufficient to avoid falls and minor injuries. It is recommended that organisations who use confidence course activities examine their procedures around 'high walls' to see if improvements can be made.

Initiatives / low ropes incidents

Student leaders were facilitating the electric fence activity. One student was standing on the plank being help by 2 other students. They struggled to keep the plank still, the student lost her balance and fell from a low height onto her hand, subsequently injuring that arm.

Child lost balance on low ropes. Spotters were not in correct position and child landed on his back on the ground.

10 out of 17 (60%) of initiative and low ropes incidents involved trips or falls with one resulting in a fractured wrist. It must be remembered that initiatives and low ropes activities have very high participation rates and therefore relatively few incidents. Notwithstanding this, it is useful for organisations using initiatives and confidence courses to examine activities that involve heights or increased potential for trips and falls to see if improvements can be made

4.4 Mountain biking

Although mountain biking only had a small number of incidents (3) it was the activity that had the highest incident rate relative to participation (1.8 incidents per 1000 participant days). Mountain biking also contains a factor likely to increase the chance of serious harm – speed. The following narrative vignette captures a typical mountain biking incident.

The group was riding a technical single track with many challenging sections. On one section a student fell forwards over the handle bars landing on the back of his shoulder with a hard enough impact to fracture his clavicle.

This incident highlights a number of points:

- In 2008/2009 there were 356 ACC claims for mountain biking.¹⁵ Of these, 117 (33%) were shoulder related injuries, including fractured clavicles. It would therefore appear that this type of injury is relatively common in mountain biking.
- From the 2008/2009 ACC data¹⁶ mountain biking (356) had a higher number of injury related claims than other popular outdoor recreation activities such as tramping (232), Surfing (252), Rock climbing (41), Mountaineering (12), Kayaking (56), and Hunting (136).
- When mountain biking in a facilitated group context with a leader, that leader often has very little direct control over the how each individual will handle their bike. It is therefore important for leaders of mountain biking to use appropriate progression levels and ensure that riders are on terrain that is suitable for their ability level.

¹⁵ ACC (2010) ACC Injury Statistics 2008/2009. Section 20. Sport Claims

¹⁶ ACC (2010) ACC Injury Statistics 2008/2009. Section 20. Sport Claims

4.5 Moving water

There were a number of incidents that involved moving water in 2010 including kayaking (14), rafting (3), surfing (3) and tubing (1). These activities had relatively high incident rates per 1000 participant days when compared with other activities (see Figure 9 on p. 10). These incidents also take place in environments where there is increased potential for serious harm incidents.¹⁷ The following narrative vignettes detail injury and 'near miss' incidents across a range of moving water activities.

Kayaking incident

1. *One paddler hit their head on bottom while practising rolling in current.*
2. *Both participants got cuts on the feet while carrying kayaks back from water to the road. No footwear was worn at the time of incident.*
3. *While we were getting off the water one person tripped on a rock on the shoreline and grazed both of her shins.*

The above incidents reveal some of the inherent hazards related to kayaking.

- Incident 1 highlights hazards on river bottoms and the importance of wearing appropriate kayaking helmets whilst engaging in that activity as is standard practice.
- Incidents 2 and 3 detail how less serious hazards can cause injury and disruption. In these cases it may be worth organisations examining their policies or guidelines around wearing footwear such as booties.

Tubing /rafting incident

This activity was considered a fun and easy tractor tube raft down a relatively gentle (low grade) river. Students had some prior paddling experience but none in tractor tube rafts. The students build the rafts which consist of a plank of ply wood and two tractor inner tubes. And then paddle down the river to a pre-assigned take-out point. This incident occurred after two rafts missed the take out point. One raft was successfully towed into the right bank about 500 metres below the take out by a support leader/instructor who was accompanying the group on a jet ski. These students walked themselves and the raft up the bank to the vehicles, however, one student fell off this raft and could not swim, her buoyancy aid was loose fitting and it came up around her arms. Another student jumped of the raft and swam to her, and the support leader/instructor then gave her a ride to the bank after it had pulled the raft to the bank.

The second raft floated significantly past the take out and one leader/instructor was able to get to the raft and helped tow the raft to an eddy on the right side of the river which had a willow tree at the bottom of it with the river flowing through. The raft drifted down the eddy line onto the willow strainer. Two students then stepped off the raft onto the branch of the tree where they helped the others get from the raft onto the branch all the student s walked down the branch onto the bank. The students then pulled the raft onto the bank above the tree.

¹⁷ See Davidson (2006) Fact or folklore? Exploring "myths" about outdoor education accidents: Some evidence from New Zealand. New Zealand Journal of Outdoor Education. 2(1). Pp.50-85

The leader/instructor on the Jet Ski then began shuttling students back up the river two at a time, to the original take-out point. After successfully taking 3 loads of students, on the last run the Jet Ski flipped over as it crossed the eddy line with two students on board. The Jet Ski, and the leader/instructor washed passed the willow tree into the main flow. Meanwhile the two students washed onto the willow tree at the bottom of the eddy. Two leaders/instructors immediately paddled into the eddy. One instructor grabbed one of the students and pulled her up so that her arms were able to wrap over a willow branch. The other student was able to pull himself up so he was resting on the branch in the water. While this was going on the other leader/instructor paddled below the tree got out of her kayak and ran up the branch where she grabbed the student pulled her further up so that her torso was almost all out of the water. Meanwhile a fourth leader/instructor got out of his kayak and threw a throw rope. The student supporting himself held the rope and rolled over the branch and was pendulumed into the eddy below the tree and to the bank. The rope was thrown back and the other student was helped over the branch and was also pendulumed into the eddy below the tree to the bank. The students were then taken back to the take-out point and the raft was dismantled and transported back to the take out by the Jet Ski.

The above narrative vignette provides a sobering reminder of the potential hazards that moving water can pose to outdoor recreation and education groups. Whilst readers of this report who have high levels of expertise in rivers will be able to form their own judgements, there are several points worth noting here that may contribute to learning.

- Expect the unexpected – Despite the best laid intentions such as defined take-out points, and a number of adult leaders or supervisors, two rafts managed to get into trouble in this case. Moving water environments often have unpredictable elements and hazards.
- Seemingly “low grade” or gentle rivers can still pose significant potential hazards and dangers, particularly from trees in or beside rivers (strainers). This incident highlights the importance of effectively managing such hazards.
- The importance of having adequate supervision – In this case there were four leaders who were readily available to take action to manage the incident. This may have been an important part of avoiding more serious harm from this incident.
- Any water environment has increased exposure to potentially serious harm or fatality due to drowning. In the interests of fatality prevention¹⁸ it is imperative that all precaution and care is taken in all moving water activities.

4.6 Tramping

Tramping has a high participation rate for both users of the NID and general outdoor recreation and education. Although incident rates relative to participation days is small for tramping, as it is such a popular activity, it is worth detailing some of the incidents that occurred in 2010.

¹⁸ Brookes (2010) Licensing and Bubble Wrap? Guided outdoor pursuits for youth in the wake of the ‘Mangatepopo tragedy’. Key note address and the Outdoors New Zealand Forum. Wellington: NZ

Of all 33 tramping incidents, 25 (75%) of these were injuries, 4 (12%) were illness, 3 (9%) were 'near misses', and 1 (3%) were missing people.

Tramping Injury Incidents

The teacher and a student were both stung by wasps on their right legs. Both received stingose cream on sting and cooled with water. No allergic reactions occured. There was a wasp nest located in a tree stump near the track.

There were five incidents (20%) that involved bee or wasp stings in 2010. This highlights the need for groups to be careful, particularly at times of the year when bees and wasps are more prominent or when entering areas that are known to have populations of bees/wasps. It is also important that organisations, groups, and or individual carry first aid for stings and are aware of any allergies.

Students were walking along track which is rough. One student stood on a tree root and sprained her knee.

John was climbing a ridge with a group. As he reached the 1st meeting point he placed his boot on an unstable rock and rolled his ankle.

70% (17/25) of tramping injury incidents involved trips, slips, or falls, due to terrain hazards, which resulted in soft tissue injuries such as sprains. The two incidents detailed above are typical of these types of tramping injuries. These incidents highlight the importance of good quality footwear which is appropriate for the terrain and ensuring that people's ability/competence is also suitable for the terrain.

Tramping 'near miss' incident

One person was following others off track sidling a slope and descending when he suddenly dropped 2 meters down steep bank. His foot slipped off wet tree root.

This incident is similar to two other 'near misses' recorded on the NID in 2010. These types of incidents are worth noting because they often involve falls from heights which is a factor which can increase the potential for serious harm. In the case above, a slip was the cause of the fall; this is not uncommon. This incident highlights the importance several points

- People having suitable competence/ability levels for the terrain.
- People having suitable equipment for the terrain.
- Groups / organisations having appropriate policies/guidelines for movement in difficult or dangerous terrain.
- Having appropriate levels of leadership and supervision and good decision making in the field to reduce the likelihood of such 'near miss' incidents.

4.7 Environmental Incidents

AS noted in section 3.1 there is currently no category for entering incidents of environmental damage in the NID. There was one example of environmental damage recorded in 2010 and it is worth noting to highlight that this type of information is worth collecting.

Group of year 9 students were camping after a days sea kayaking and tramping. Students had 15 mins of free time before dinner which was spent hanging out on the beach. A group of 4 boys drifted out of the direct sight of staff and began playing with a lighter igniting small twigs on the sand. 3 boys egged another on to light a bush which quickly caught fire and began to spread up a bush covered slope. Screams were heard. Staff rushed to investigate and discovered a small but well established fire. Staff (with assistance from staff from another school and a sea kayak guide who were also camping) organised a human chain of students carrying dry bags filled with water and extinguished the fire within 5 minutes.

The above incident highlights a number of points

- Environmental damage can occur not only through outdoor activities but also during times when students are unsupervised.
- Unsupervised or 'free' time can lead to environmental damage incidents that are potentially very serious (and could be very costly for organisations or individuals).
- Learning about environments and places including learning to appreciate and care for the environment should be important parts of all outdoor recreation and education activities. An increased focus on these learning objectives might reduce the chance of such environmental damage incidents occurring.
- It is useful to record environmental damage incidents to help improve learning about our interactions and relationships with the environment.

5 Concluding Comments and Recommendations

The National Incident Database is a valuable management and educative tool in helping organisations and individuals in the New Zealand outdoor recreation and education sectors to learn about and improve their safety cultures and practices. It does this in several ways:

- The NID provides a centralised 'one-stop-shop' for organisations to record all of their incidents. Combined with annual incident summaries this provides organisations with excellent information to help identify incident trends for their own programmes and activities.
- The long term collection of incident data across outdoor recreation and education organisations in New Zealand allows for the identification of incident trends. This can provide meaningful learning for all organisations and individuals involved in outdoor recreation and education.
- The preparation of an annual NID report provides some useful analysis of incidents over twelve month periods.

In order for the NID to be a successful educative tool it requires good management and facilitation, robust governance, and most importantly active participation and use by organisations in the outdoor recreation and education sectors. The more information or data that can be collected about outdoor recreation and education participation and incidents the more accurately trends and issues can be interpreted. This also provides for more useful and accurate learning opportunities that can be derived from incident analysis. To this end, the following recommendations are made with improving the educative value of the NID in mind.

5.1 Recommendations for users of the NID and other outdoor recreation and education organisations.

The following recommendations could potentially apply to all users of the NID and other outdoor recreation and education organisations. It must be noted that due to the nature of NID data, this report has used descriptive statistics and author interpreted trends rather than trying to produce definitive facts or statements. Consequently not all recommendations will necessarily apply to all organisations. It is up to each reader of this report to ascertain what is useful learning for them, given the information provided.

General recommendations

- All users of the NID are encouraged to record all relevant participation and incident data on the NID and keep this up-to-date and accurate.
- For any outdoor recreation and education organisations not registered on the NID it is **highly recommended** that you register and use the NID to record you incident and participation data.
- It is recommended that organisations record incidents where environmental damage has occurred.
- Encourage more active use of Participation Day Rates and to update these regularly.

Severity of Incidents

- Incidents that have high actual or potential severity ratings deserve careful and considered examination from organisations. As fatality prevention becomes a greater priority in outdoor safety management it is important for outdoor recreation and education organisations and providers to closely monitor and mitigate against all incidents that could result in fatalities.

- In particular, 'near miss' incidents with high potential severity should be carefully examined.
- Encourage more reporting of near miss incidents as they provide valuable information for individual users and other outdoor recreation and education organisations to improve safety cultures and practices. Indeed, it could be argued that a high level of near miss reporting is an indicator of an 'open' organisation mindful of its risk identifications and incident management.

Incidents by activities

- The following activities had higher incident rates relative to participation: Abseiling, Mountain biking, Mountaineering, and Rafting. It would be prudent to carefully examine safety process around these activities.
- In particular Abseiling, Rock climbing and High ropes activities had a significant proportion of 'near misses'. It is recommended that all organisations involved in these activities check and revise (if necessary) their systems to reduce the likelihood of 'near miss' incidents, particularly those related to people attaching themselves to rope belays.
- It is recommended that all outdoor recreation and education programmes and providers should monitor incidents that occur during *free time* to identify potential trends and reduce the likelihood of incidents occurring.
- It is useful for organisations using initiatives and confidence courses to examine activities that involve heights or increased potential for trips and falls to see if improvements can be made.
- Mountain biking incidents highlight the importance of mountain biking leaders to use appropriate progression levels and ensure that riders are on terrain that is suitable for their ability level.
- It is recommended that activities involving moving water should have rigorous safety plans and competent people managing these activities. It is also useful for organisations/providers of such activities to have plans to manage unexpected outcomes such as missing take-out-points, or procedures in place to ensure important guidelines are followed.
- Tramping incidents highlight the importance of good quality footwear which is appropriate for the terrain and ensuring that people's ability/competence is also suitable for the terrain.

Leader Factors in Incidents

- It is recommended that organisations analyse their incidents to identify any possible trends that may be emerging with regard to age and experience levels of their leaders.
- It is recommended that organisations analyse their incidents to identify any possible trends that may be emerging with regard to the gender of their leaders.

5.2 Recommendations for the managers and governors of the NID

Whilst making recommendations for managers and governors of the NID was outside the scope of this report, there are a number of points that apply to the managers of the NID that may help improve its usefulness in the future. This topic was considered in the 2007-2008 NID report¹⁹ in more depth and I reiterate some of these points below.

- That the managers of the NID improve the capture of participation data. This could be done in several ways.
 - Increasing the range of participation data, i.e. age of participants, school or other groups, gender of participants.
 - Encouraging users of the NID to be vigilant at keeping their participation data accurate and up-to-date.
 - Working collaboratively with other organisations in the outdoor recreation and education sectors to capture more comprehensive participation data.
 - Enable easy migration of incident data from organisations that already have existing incident databases. These organisations include but are not limited to Outward Bound, Water Safety New Zealand, and the Sir Edmund Hillary Outdoor Pursuits Centre.

NOTE: it is important to acknowledge the difficulty of these tasks and the work that has already taken place in this area (for example see Dignan and Cessford²⁰).

- It is important for the managers of the NID to continue to actively promote and publicise the NID in an attempt to capture as much information from the sector as possible. A goal of 95% participation in the NID is not unreasonable.
 - This goal is particularly relevant in light of the recommendations of Department of Labour Review into commercial outdoor adventure activities which highlights the importance of incident recording and analyse.
 - This recommendation could be more easily achieved if the functionality and aesthetics of the public interface of the database was updated to meet the increased expectations of a more computer savvy society. While updating the NID would be an expense, the increased functionality and level of engagement could well make this a worthwhile investment.
- Currently there is no facility for recording environmental damage incidents. It would be useful for this to be added to the NID.

¹⁹ See Cessford (2009) Chapter 3: Summary and recommendations. National Incident Database Annual Report 2007-2008. Wellington, NZ: New Zealand Mountain Safety Council.

²⁰ Dignan and Cessford (2009) Outdoor recreation participation and incidents in New Zealand: A scoping study relating incidents to participation levels. Wellington, NZ: New Zealand Mountain Safety Council.

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