

MONASH
UNIVERSITY

ACCIDENT RESEARCH CENTRE

Feasibility of Identifying Family Friendly Beaches along Victoria's Coastline

December 2002

Funded by **Sport and Recreation Victoria**



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Funded by
Sport and Recreation Victoria

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Summary



Summary

Sport and Recreation Victoria (SRV) commissioned Monash University Accident Research Centre (MUARC) to investigate the feasibility of developing a system to identify Family Friendly Beaches in Victoria. Within the framework of the Safer and Improved Aquatic Recreation Program, SRV sought to enhance the safety of recreational beach use by providing families with a means of identifying a suitable beach destination.

The study aimed to identify the nature and level of hazard at Victorian beaches and to draw on the knowledge and expertise of key stakeholders to determine the feasibility of identifying beaches that were suitable for family recreation. To address these issues a working group was established and additional stakeholder consultation was undertaken. Reviews of local, national and international literature and electronic resources were conducted. Victorian beach related injury and incident data from several sources were also analysed.

Broad support was identified for the development of a beach classification or information strategy that would be of benefit to beach users, and a marked preference was shown for a strategy that served the needs of both beach users and beach managers.

The results of consultation indicated some concerns about identifying beaches as “family friendly”. A framework for a beach classification/information strategy was proposed to meet the needs of the broader community.

A number of hazards at Victorian beaches were identified, the main ones being submersion in water, falls, collisions with objects or people, animal related injuries and sun exposure. Criminal activity was also identified as a hazard at beaches. Corresponding hazard prevention strategies were identified.

A review of existing beach information strategies identified several possible directions with regards to the development of resources suitable for the use of beach visitors.

The study also identified some limitations relating to the availability of suitable data to inform the development of beach safety strategies and recommendations were made to address these problems.

The observed level of commitment to achieving a positive outcome following from this study indicated the need to convene a forum of key stakeholders to take forward the processes begun and to develop and implement an appropriate strategy.

Key Findings & Recommendations



1. THE CONCEPT “FAMILY FRIENDLY BEACH”

Consultation with key stakeholders indicated that the concept of a Family Friendly Beach is undesirable for the following reasons:

- The scope of the concept is too narrow as beach safety is an issue for the whole community not just families.
- There is the risk of litigation in the event of fatality or serious injury at a beach identified as being “family friendly”.
- There is a lack of clarity as to what “family” actually means and in a culturally diverse community it is likely to have many meanings.
- Focusing on a stereotypical family may fail to meet the needs of many Victorian families and may be offensive to those who do not fit the stereotype.
- There is no strong commitment to the concept by beach managers.

A preference was found for a system of beach classification that was able to meet the needs of both beach users and beach managers (see Chapter 2).

Recommendation I

It is recommended that a beach classification concept be developed, focussing on the needs of both beach users and beach managers.

- Develop a Levels of Service (LOS) classification system for beaches (based on a similar model developed by Parks Victoria, see Chapter 4) encompassing the entire range of beach types and beach users and incorporating safety and amenity issues as identified in this report.
- Underpin the beach LOS system by the Australian Beach Safety and Management Program (ABSAMP) database (Chapter 5) with modification to incorporate additional information required by beach users.
- Conduct pilot study to determine effectiveness and appropriateness of system, incorporating trials of auditing processes for hazard reduction, amenities, signage, crime prevention etc.

2. FUNDING

The development and implementation of a beach classification system has considerable funding implications. Concern was expressed concerning the cost effectiveness of pursuing such a strategy. Additionally, while the need to develop amenities at some beaches was acknowledged, concern was expressed about the need to obtain funding for the installation, upgrading or maintenance of beach amenities.

Recommendation II

- Undertake an economic feasibility evaluation of a LOS beach classification strategy and identify funding sources.
- Identify sustainable sources of funding for the development and maintenance of amenities at beach locations.

3. BEACH USER FACTORS

The development of strategies that seek to direct people to suitable beach destinations needs to be based on an understanding of several factors concerning beach users. Firstly, it is necessary to know what characteristics or facilities beach users need or prefer, and secondly, to understand how people choose which beach destination to visit.

Preferences and needs

While there are studies investigating the preferences and needs of beach users at overseas beach locations, there are no comparable studies of Victorian beach users (Chapter 6). Some information has been obtained from a general population telephone survey (Department of Natural Resources and Environment 2000), but a more accurate picture would be obtained by use of rigorously designed research conducted at beach locations.

Recommendation III

- Develop a program of research to determine preferences and needs of users of Victorian beaches.

Choosing destination

Similarly, the way Victorians choose a beach destination is not well understood (Section 6.4). However, an understanding of this choice process is a fundamental prerequisite for the development of effective information strategies. More extensive research is also needed to address this issue by considering questions such as:

- Who makes the decision?
- What factors and information are considered?
- How is the information accessed?

Recommendation IV

- It is recommended that research is conducted to determine the factors and processes involved in the choice of a Victorian beach destination by beach users.

4. MODE OF DELIVERY

While a LOS model would incorporate an extensive array of beach information, much of which would be of interest to beach users, the question arises as to how this information would best be made available to beach users. Several methods of delivery of recreational information were identified as providing possible models.

Recommendation V

It is recommended that the following methods of delivery be considered:

Option 1. Extension of Bay Beach Guide

- Provide beach users with beach safety and amenity information through a beach guide, based on the process employed to produce the *Bay Beach Guide: Beaches of Port Phillip* (see Section 8.2.1), by extending the resource to include outer coastal beaches and including additional information from this report.
- Maximise community access to the resource by making it available in both hard copy and electronic formats, and by ensuring effective promotion and distribution strategies.
- Develop procedures for review and updating of the resource.

Option 2. Victorian Beach Website and Guide

- Develop a web-based resource and hard copy guide for Victorian beaches including safety and amenity information and drawing on features of resources such as Parks Victoria's *Parkweb* and *A Visitor's Guide to the Parks, Forests and Coasts of the Great Ocean Road*; and *The Marine Conservation Society (United Kingdom) Good Beach Guide* (See Section 8.2.1).
- Develop effective promotion and distribution strategies.
- Develop procedures for review and updating of the resource.

Option 3. Beaches Bulletin

- Publish current beach safety information in daily newspapers and on website with daily updates (see Environmental Protection Authority Beachwatch Bulletin, Section 9.2.1.)

5. BLUE FLAG PROGRAM

Discussions have begun concerning adoption of the European Blue Flag Program as a national beach accreditation system for Australia (see Section 8.4). It may be possible to incorporate the Blue Flag within a LOS framework, as it would be expected that the criteria for high level beaches would at least meet, and possibly exceed, the criteria for Blue Flag accreditation.

Recommendation VII

- Ensure representation from Sport and Recreation Victoria and main stakeholders at March 2003 meeting in Melbourne to discuss the establishment of an Australian Blue Flag Program.
- Consider incorporation of the Blue Flag program within the "Levels of Service" beach classification model.

6. PREVENTION

A number of effective or promising injury or hazard prevention strategies were identified. These included lifeguard patrols, signage programs, community education and awareness programs, beach safety audits, litter management and beach cleaning. Several additional preventative needs were identified: crime management and use of new technologies (Section 7.6).

Recommendation VII

- Maintain and, where possible or appropriate, extend current programs addressing safety at beaches based on findings in this report.
- Encourage the development of partnerships between beach managers, local government and Victoria police to devise, implement and monitor crime prevention plans for beaches and foreshores (see Section 7.6.9).
- Explore the ways in which new technologies may be developed to support beach safety strategies.

7. MANAGEMENT OF BEACHES

The complexity of management and regulatory processes related to beaches requires coordinated action on issues of beach safety and amenity. It is important that current mechanisms of coordination are maintained and, where possible, extended to ensure communication and transfer or sharing of information or resources between agencies (Section 3.7).

Recommendation VIII

Establish an ongoing network or alliance of the key agencies involved in this project and any other relevant agencies or individuals, to enable and facilitate coordinated action on the planning and development of beach safety and amenity by:

- Overseeing the development of strategies recommended in this report
- Devising implementation, evaluation and monitoring plans for beach strategies
- Providing a forum for identification of problems, and development of solutions relating to beach management and use
- Allowing the coordination of beach promotion/information strategies
- Enable the sharing of information and resources between agencies
- Facilitating implementation of these developments

8. IDENTIFICATION OF WATERCRAFT HAZARDS

Identification of the impact of watercraft on the health and safety of bathers is limited by the failure of the current health classification system to uniquely identify such incidents.

Recommendation IX

- International Statistical Classification of Diseases and Related Health Problems (ICD) coding be modified to allow identification of injury to bathers by powered and non-powered water transport, by means of application to the ICD-10-AM National Centre for Classification in Health.

9. ADDITIONAL RESEARCH NEEDS

Decisions are best made on the basis of accurate and reliable information and the study identified a number of information development needs.

Recommendation X

- Regular update and analyses of beach hazard data to identify new hazards and observe changes in existing hazards.
- Measurement of community awareness of beach hazards and their ability to identify hazards to inform education/awareness programs and prevention strategy development.
- Development of appropriate measures of exposure to beach hazards to enable determination of the relative incidence and severity of hazards.
- Development of standard data collection and quality control procedures for collection of beach incident data by lifeguard services to maximise the value and reliability of these data.
- Investigate the value of extending the recommendations from this report to include beaches on inland lakes and rivers.
- Evaluation of the implementation and outcomes of the proposed beach classification and management model.
- Development of a beach hazard rating to reflect those hazards not included in the ABSAMP hazard rating.

10. NEXT STEP

It is important that the processes and lines of communication established by this study are maintained and taken to the next stage. The high level of commitment from those consulted indicates the need for this study to result in positive action towards addressing the issues raised.

Recommendation XI

- Convene a forum of all key stakeholders to develop an implementation strategy and an action plan based on the recommendations of this study.

1. Introduction



Introduction

Beaches can be safe and enjoyable places for recreational activity. But there needs to be a correct matching between the needs and abilities of beach users and the characteristics of the beach. Victorian beaches vary greatly in terms of their suitability for recreational swimming for people with limited swimming skills or water safety knowledge. Some of Victoria's beaches pose serious challenges even for highly skilled swimmers or surfers with sudden increases in water depth, presence of strong rips, large waves, treacherous rocks and little or no facilities. Other beaches, however, provide calmer shallow water suitable for less skilled or non-swimmers, lifeguard patrols, well-developed facilities and easy access.

The effects of a mismatch between beach and beach user can range from irritation, when those wanting facilities find there are none, to tragedy, when people with limited ability and knowledge enter hazardous waters.

Beaches, as places of recreation, also tend to be associated with more relaxed attitudes and unaccustomed behaviours. There is the risk that, in this leisurely environment, people may be less vigilant in attending to issues of safety and may engage in physical activities for which they have inadequate fitness, knowledge or skill levels.

To maximise the chances of safe and enjoyable recreation at beaches it is important that beach users have access to appropriate information about possible beach destinations to enable them to assess the suitability of the beaches for their abilities and needs.

The Victorian Government's *Safer and Improved Aquatic Recreation* program seeks to encourage participation in aquatic activities in the safest possible manner. It aims to provide Victorians with information to increase awareness and understanding of water safety issues (Madden 2002).

Working towards this aim, Sport and Recreation Victoria (SRV) commissioned Monash University Accident Research Centre (MUARC) to explore the feasibility of developing a system, based on evidence, to provide families with a means of determining the suitability of beaches for their needs and abilities. In particular the project was to explore the feasibility of identifying "family friendly beaches".

The main concern of this study was the enhancement of safety in recreational beach use. However, safety appears to be only one of the factors considered by the beach user in deciding on a destination. There are a number of amenity issues that may contribute to the destination decision; access, facilities etc (Nelson, Morgan et al. 2000). Therefore the issues of beach safety and beach amenity were both addressed by this study. A corollary of providing beach users with relevant beach information is the development, management, monitoring and review of a structure to inform and support such a system.

1.1 AIM

This study aimed to identify a system that would provide family beach users with information relating to the suitability of individual beaches for their needs, and thereby promote the safe recreational use of Victoria's beaches. To achieve this aim, the study sought to:

- Identify the type of information required by potential beach users to enable an informed choice of destination:
 - beach safety and amenity issues
 - the needs and preferences of beach users
- Determine the extent to which this information is currently available
- Review current methods for informing beach users nationally and internationally
- Identify a beach information system that:
 - is appropriate for use in Victoria
 - takes account of beach safety, beach amenity and the needs/preferences of beach users
 - is useful and acceptable to beach users and beach managers.

1.2 OUTLINE OF PROCESS

1.2.1 Involvement of stakeholders

As the involvement of the main stakeholders was of paramount importance both in the development of an effective system and the success of its subsequent implementation, relevant agencies contributed to the project in several ways. At the commencement of the project, a working committee was established to support and inform the process. Membership of this committee is given in Appendix 1.

Additional consultation with agencies was also conducted in face to face interviews with agency representatives, project staff and a representative from Sport and Recreation Victoria. Further information was obtained through telephone discussions and electronic communication. A broad range of information was collected in this manner including: details of the operation of the agency and the role it might play in any proposed system; beach and coastal management issues; details of data collected by the agency and its availability; feedback and suggestions regarding possible systems and beach safety and amenity issues. A listing of agencies consulted is given in Appendix 2.

1.2.2. Researching the main issues

The main areas of relevance to the study were:

- Beach safety
- Beach amenity
- The needs and preferences of beach users
- Existing beach and other information/classification systems
- Beach resource management

Research was conducted to collect local, national and international information relating to these issues. The general research strategy involved identification/analysis of material/data available from local or national agencies or sources; review of national and international published literature, search of electronic resources and e-mail communication with international agencies.

1.2.3 Data analyses

- *Death data*

Deaths occurring at Victorian beaches, and reported in the National Coronial Information System, have recently been analysed as part of a Ph.D. research thesis (Morgan 2002). A summary of the findings are included this report (Appendix 8).

- *Injury data*

Data from several sources were used to determine the characteristics of injuries occurring at beaches: Victorian Emergency Minimum Dataset, Royal Life Saving Victoria, Surf Life Saving Victoria and Marine Safety Victoria.

- *Crime data*

Data relating to criminal offences occurring at beaches and foreshores was obtained from the Victoria Police Statistical Services. This data reflects only those offences which were made the subject of a completed crime report.

2. Evaluation of “Family Friendly Beach” Concept



Evaluation of “family friendly beach” concept

Identifying beaches as “family friendly” has considerable appeal. It would be very useful to be able to direct families to beaches that provide minimal hazards and adequate facilities. The subject of “family beach” or “family friendly beach” has been mentioned in parliament on a number of occasions (Marple 1995; McCall 1996; Dixon 1998; Madden 2000) and the Government is seeking to bring identification of family friendly beaches into effect by commissioning the current study.

However, the results of consultation suggest that, though appealing, the concept raises several issues that need resolution. While there was widespread support for some form of classification of beaches to provide guidance for beach users, there was concern about identifying beaches as “family friendly”. The concerns involve the term “family friendly” itself, potential liability issues and the limited scope of such a program.

2.1 “FAMILY FRIENDLY”

During consultation considerable concern was expressed about the term “family friendly”:

- Lack of clarity as to what “family” actually meant, in a culturally diverse community it is likely to have many meanings.
- Diversity of family structures and cultures is likely to be matched by a diversity of needs and preferences.
- Focusing on a stereotypical family may fail to meet the needs of many Victorian families.
- The “family” focus was offensive as it excluded all those who did not fit the family stereotype.
- No strong commitment to this term. Beach managers and others had adopted the term in the absence of a more suitable one, thus there is scope for enhancement or development of a more appropriate term or concept.

2.2 LIABILITY

A major concern with the use of the term “family friendly” to promote beaches related to the potential for litigation in the event of death or injury at a designated beach. Identification of a beach as “family friendly” could be interpreted as implying that there are no hazards at that beach, and that the beach was completely safe. As no beach is without some hazards, such a misunderstanding could have disastrous consequences for the beach user, and costly consequences for beach managers. In the event of mishap there is the potential that beach managers and/or the accreditation agency may be held responsible. The reality of this threat has been demonstrated in a recent case in New South Wales. The NSW Supreme Court found the local council responsible for the injuries of a swimmer who became quadriplegic after he dived into the water and struck a sandbar while swimming between the flags at Bondi Beach, the decision resulting in a payment of nearly \$4 million. It had been argued that when swimming between the flags the swimmer was entitled to assume it was safe, and that the council should have put up a sign warning of the channel and sandbar (Crichton 2002).

2.3 SCOPE

A further objection to the “family” focus was that beach safety and amenity was thought to be a broader issue than just for families with children. This contention is supported by the injury data presented in this report. While children are at risk of injury at beaches, the overall injury rates for adolescents and adults under 30 years of age are as high as those for children. There are also substantial numbers of injuries for adults 30 years and older (Figure

1, Appendix 3) and adults are more likely to need rescuing from the water than children (Appendix 4).

Consultation with stakeholders indicated that while there is a need to provide families with information about beaches, the need extended to the whole community, and a program limited to the needs of families would be inappropriate.

2.4 MANAGEMENT TOOL

A number of stakeholders viewed a classification of beaches based on user needs as a potentially useful device to assist and guide beach planning and management. Coastal Management Plans are developed within the framework of the Victorian Coastal Strategy and relevant legislation. The Coastal Strategy seeks to ensure ecologically sustainable development and maintenance of the diversity of coastal locations. An overlay of beach classification, recognising the diversity of the needs of beach users, could provide a valuable additional layer to the structure.

A broad system of beach classification, taking into account the full range of safety and amenity needs of users, could comfortably sit within the Victorian Coastal Strategy framework and provide a unifying structure to guide planning and development.

Such a system, drawing from a centralised database of information, would have the potential to provide for the information needs of both users and managers. To this aim, a proposed model of beach classification is outlined in Chapter 4.

3. Management of Victorian Beaches



Management of Victorian Beaches

3.1 MANAGEMENT

Approximately 96 per cent of Victoria's coastline is in public ownership. One third of Victoria's coastal Crown land is reserved as national parks under the *National Parks Act* 1975 and managed by Parks Victoria. The majority of the remaining coastal Crown land is reserved under the *Crown Land (Reserves) Act* 1978 for a variety of public purposes. Approximately 60 committees of management are in day to day control of the rest of the coastline. Approximately 17 of these committees of management are local governments, and 45 are local foreshore committees (Victorian Coastal Council 2002).

Local governments in Victoria are also responsible for numerous beaches on inland lakes and rivers (Victorian Coastal Council 2002). However, the current study addresses only the issue of coastal beaches.

A large number of agencies have input into the management and regulation of Victoria's coastal areas (Victorian Coastal Council 2002):

- Victorian Coastal Council
- Parks Victoria
- Department of Natural Resources & Environment
- Local Government
- Environment Protection Authority
- Environment Conservation Council
- Regional Coastal Boards
- Fisheries Co-Management Council
- Department of Infrastructure
- Catchment Management Authorities
- Committees of Management
- Private freehold landowners
- Marine Safety Victoria
- Victorian Channels Authority
- VicRoads

Consultation has indicated that this diversity and complexity may pose barriers to the development of a statewide system of classification of beaches. While each agency has well developed expertise and information, there is only limited transfer, communication and coordinated action between agencies. It was suggested that a mechanism for providing some coordination between agencies may be necessary to enable any program that seeks to encompass beaches across the state.

A similar lack of coordination among agencies was addressed by the establishment of the Victorian Litter Action Alliance (VLAA). The VLAA, the peak body for litter management, was formed in April 2000 to coordinate efforts made on behalf of state and local government agencies and the voluntary and private sectors to reduce litter in the Victorian environment to acceptable levels. The VLAA is reported to have been an effective mechanism for overcoming coordination problems and it has been suggested that an alliance of agencies involved with beaches may be similarly beneficial.

3.2 REGULATION

Key legislation guiding strategic and statutory planning for the Victorian coast includes the *Crown Land (Reserves) Act 1978*, *Coastal Management Act 1995* and the *Planning and Environment Act 1987*. There is a range of other legislation that provides for the management of specific uses and spaces within the coastal and marine environment, including the *Heritage Act 1985*. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* will be increasingly important in guiding decision making regarding matters of national and environmental significance (Victorian Coastal Council 2002).

3.3 COASTAL POPULATION

Approximately 20% of Victoria's population live on the coast, and this coastal population is growing faster than that of Victoria as a whole (Victorian Coastal Council 2002), especially for people in the 35 years and above age group. The increase and aging of coastal populations may impact on the requirement for facilities and services. Additionally, visitor numbers to coastal areas are expected to increase as a result of improved mobility and regional access.

3.4 COASTAL POLICY

The State Government's Victorian Coastal Strategy 2002 establishes the overall framework for sustainable use and development of the Victorian Coast. The framework:

- Establishes Ecologically Sustainable Development principles to guide future decision making
- Outlines broad zoning for coastal use
- Encourages a risk management approach to coastal investment and activity
- Seeks to maintain diversity in coastal experience
- Encourages continuous improvement in management practice and
- Seeks to protect significant coastal values

The objectives of the Family Friendly Beach project are placed within the framework of the Strategy Objective 3.1 "Improve enjoyment and safety for beach and water users".

The Strategy indicates that:

"Opportunities will be actively sought to carry out improvement works along the coast that will provide safe, family friendly beaches (eg. access tracks, disabled access, signage, car parks and amenities)."

The Department of Natural Resources and Environment is identified as the lead agent in meeting this objective in partnership with the Department of Tourism, Sport and the Commonwealth Games, Parks Victoria, Local Government and Committees of Management.

3.5 THE VISION

Any proposed program that may recommend the development of beaches needs to consider the limitations posed by the Coastal Strategy's Vision. The aspects of the Vision of relevance to this study are:

"Coastal villages will retain their seaside and village characters, remote locations will be preserved so you feel you're the first soul who has trod them."

“Local native vegetation will be encouraged along our coast.”

“Skilled and professional coastal managers and staff will continue to work to keep you safe and make sure you find the facilities you need where you need them.”

“Townships will no longer grow like topsy. They will be recognisably coastal in character and grow within planning frameworks which respect the environments within which they're built. Ecologically, culturally, aesthetically.”

“Much of the coast between townships will be preserved undeveloped while metropolitan beaches will be more intensively utilised and will vary from cosmopolitan through to quiet places to relax.”

“The quality of the tourism experience on the coast will increase. Choices for recreation will diversify while still allowing people to 'get away from it all'. The recognition, use and re-use of cultural heritage assets along the coastline will positively contribute to local communities and economics.”

“Safe access will make it easier for more people to get to many places. Vehicle access will be managed so that it does not detract from the environment that is the attraction.”

“...broadening of recreational boating choices, from private pleasure boats to tourism craft will be encouraged. Increasingly people will experience the coast from above and below the water.”

These suggest that any development needs to occur within the limitations of the principle of the maintenance of diversity. Within this framework improvement of amenity to beaches would need to be selective and appropriate.

3.6 FUNDING OF BEACH DEVELOPMENT

The travel and tourism industry is becoming increasingly dominant in the economies of developed countries and beaches are a key element in this industry (Houston 2002). It has been estimated that, in Victoria, overnight visitors to the coast pay a premium that equates to \$700 million per annum, and day visitors spend \$166 million per annum to get to coastal destinations (Victorian Coastal Council 2002).

While the development and maintenance of coastal facilities are an important part in servicing this industry, identifying sources of funding for these facilities has been identified as a problem. Most funding for beach development is provided through the Committees of Management. The state government puts no ongoing funding into the management of coastal reserves with the exception of project grants. For example, the State and Commonwealth governments provide some funding for projects including revegetation, erosion control, habitat restoration, improving recreation opportunities and education through the Coast Action / Coastcare Community Program.

Those consulted felt that the lack of funding may be a major barrier to a program that sought to improve beach amenity. In the absence of a history of government funding for beach facilities, it is unclear where funding for such improvement could be obtained.

Further, the development, implementation, evaluation and ongoing management of any major new strategy delivering information to beach users will have substantial financial implications. Therefore, evaluation of the economic feasibility of strategies is an essential part of the process.

3.7 CO-ORDINATION OF AGENCIES

The management of beaches involves many agencies and organisations from many locations across the state. There is a range of opportunities for the coordination of coastal managers:

- Association of Bayside Municipalities (Port Phillip Bay)
- Regional forums convened by the Department of Natural Resources and the Environment
- Forums convened by Regional Coastal Boards
- Broader forums such as Victorian Coastal Conference
- Through media such as *Coastline* and the web

However, there appears to be less opportunity for communication and coordination across the range of other agencies involved with beaches, for example Environment Protection Authority Victoria, Royal Life Saving Victoria, Surf Life Saving Victoria, Marine Safety Victoria, Keep Australia Beautiful Victoria, Victoria Police etc. There is a need for relevant agencies and coastal managers to have the opportunity to develop strategies and actions relating to the use, management and promotion of beaches in a coordinated manner and to allow for the sharing or transfer of information and resources.

3.8 IMPACT ON LOCAL COMMUNITIES

Strategies that potentially change patterns of beach use need to consider their possible impact on the local communities. Development and promotion of individual beaches may result in conflict with the needs and amenity of local residents. Increased visitation rates, greater demands on local infrastructure, increased traffic and change of social environment may impact negatively on the local community and need to be addressed by any proposed strategy.

4. Levels of Service Framework



Levels of Service Framework

4.1 PARKS VICTORIA MODEL

4.1.1 Background

Parks Victoria is responsible for the management of a diverse portfolio of parks and reserves across Victoria. In response to a recognised need to bring structure and consistency to the management of these assets they developed a Levels of Service (LOS) Framework (Saunders 2002). This framework may well provide an appropriate model for management of Victoria's beaches and a classification structure of value to both beach users and managers. Beach management faces many of the problems this framework was designed to overcome. The LOS Framework aims to:

- define consistent standards for facilities and services throughout the state;
- provide for a range of recreational activities in appropriate settings;
- better manage visitors' expectations by co-ordinating visitor information;
- provide the right services in the right places;
- provide facilities and services that are economically sustainable.

LOS is a useful method for diagnosing service gaps (under- or over-servicing) and priority setting. It assumes that the level of management input at a site needs to be matched with the visitor needs, and visitor needs should be matched with the level of risk at the site. Risk increases when there is a mismatch between the hazards and the visitors' expectations/skills at dealing with those hazards. Facilities and services are provided to reduce the level of risk to visitors, protect the values of the area, and to help shape the market segment attracted to the site.

Parks Victoria consider a major benefit of the concept is the ability to clearly explain to potential park visitors the level of service they can expect when they arrive at a site, so that their expectations match the reality of their visit. This aspect is of relevance to the needs of beach visitors also. If beach safety factors are included in the framework it is likely to be a useful beach management tool.

However, it has been suggested (Saunders 2002) that the diverse nature of beach visitors may pose some difficulty in applying the LOS model to beaches. LOS works best when there is a good deal of uniformity in visitor characteristics (needs, expectations skills etc) but beach visitors have a very broad range of skills and needs. It was felt that with good site design and good targeting of facility development, it may be possible to provide for the diverse groups. This would rely on a detailed planning process that may go beyond the LOS process. There is the need, in defining each visitor site, to view it from the point of view of each type of visitor to that site, and identifying the different zones of use that may be present and suit the needs of different visitors. Further, these zones might be weather dependant or vary over time, and this variability may create added risks to visitors who do not have local knowledge. Nevertheless, it was considered that there was value in the application of a LOS system to beaches to guide the nature of facilities provided.

4.1.2 Parks Victoria process

The Parks Victoria LOS framework employs 5 levels of service categories: Very Basic, Basic, Mid, High, Very High.

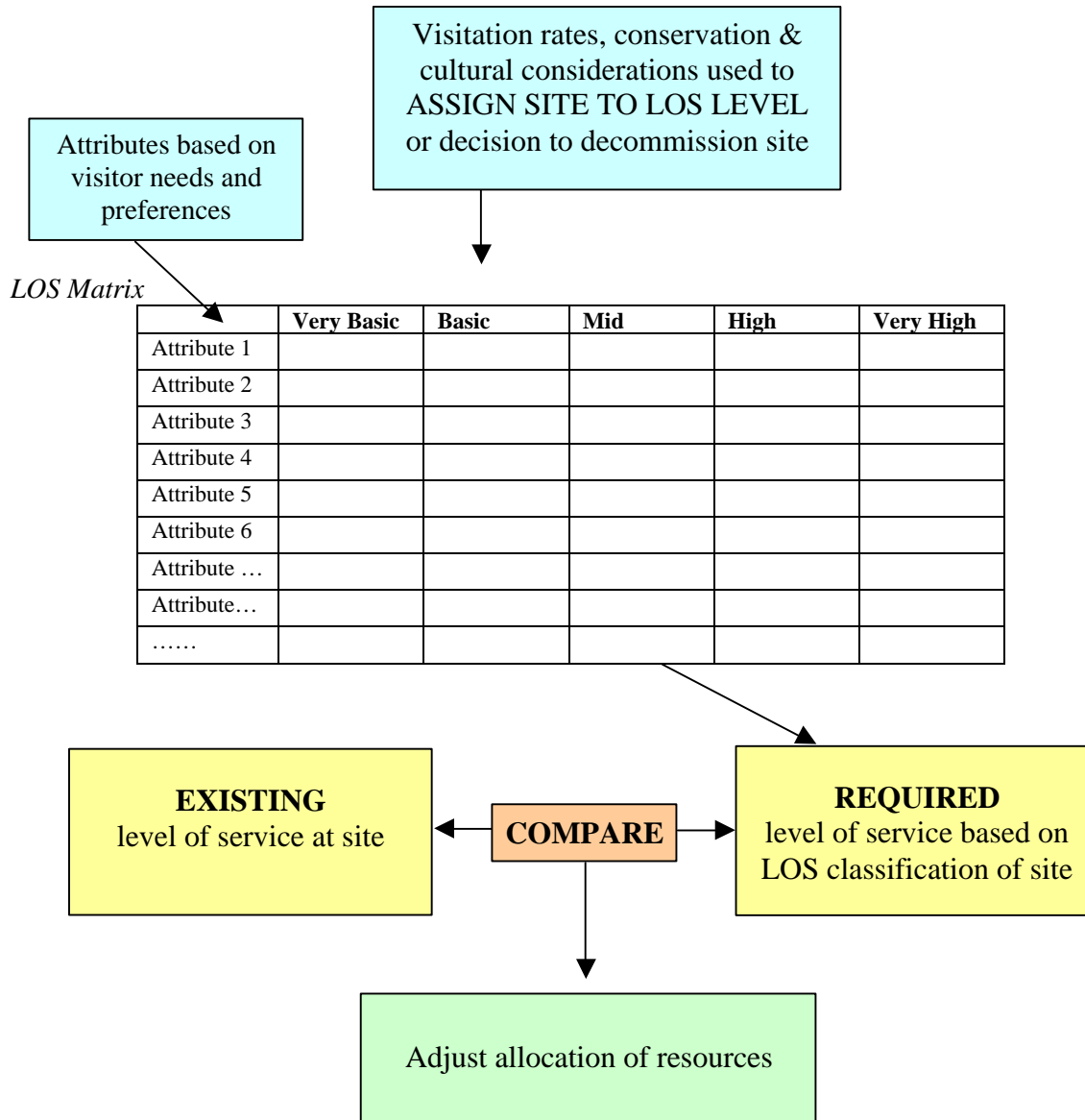
These categories are based on level of visitation. Sites having very few visitors need little or no facilities (Very Basic) while those with high visitation levels require well-developed facilities (Very High). For each LOS category, standards of service are specified for a number of attributes e.g. access, car parking, directional signs to site, seats and tables, shelter, potable water, toilets, camping, ranger presence etc. The resultant matrix of required attributes for each level of service forms the basis of site management, particularly identifying service gaps that need addressing and service over provision where services need to be reduced. Some 1,500 visitor suites are managed by Parks Victoria using this framework.

The LOS Framework functions to allow managers to identify any discrepancies between the required levels of service for each site and the actual level of service existing at a site (see Figure 1).

The process of developing and using the LOS Framework can be summarised as follows:

- Identification of attributes and determination of desired standards for each LOS category
 - The service attributes considered in the LOS framework were based on market research, over a number of years, identifying the facilities and services that visitors believe are most important to their visit.
- Measurement of visitation levels
 - Estimated by rangers
- Allocation of sites to LOS category, or decommission site
 - Based on visitor levels for each site, and conservation and cultural considerations
- Assessment of existing levels of service at site
 - Estimated by rangers
- Comparison of required levels of service with existing levels of service
- Address identified gaps between existing and required levels of service
 - Increase resources to under serviced sites and decrease resources from over serviced sites

Figure 1. Structure of Levels of Service Model of Parks Management



Parks Victoria's LOS categories provide a gradation of facilities designed to meet the needs of a diverse range of visitors (Table 1).

Table 1. Summary of visitor profiles and facility levels used in Parks Victoria LOS Model

VERY BASIC	BASIC	MID	HIGH	VERY HIGH
Self-sufficient highly experienced visitors.	Independent, experienced parks visitors.	Active and passive recreationists	Tourists and park visitors	Tourists and park visitors
Little or no facilities	Limited facilities	Some facilities in a predominantly natural or cultural setting	Quality facilities in a predominantly natural or cultural setting	Well developed facilities in a popular/icon park

A parallel system of classification levels has been recognised for beaches in the United Kingdom (Morgan 1999) where beaches are categorised according to the level of amenity development at each beach (Table 2).

Table 2. Summary of beach categories identified by Morgan (1999)

NO FACILITIES	BASIC FACILITIES	SMALL RESORT	MEDIUM RESORT	LARGE RESORT
Undeveloped beaches with no visitor facilities in the immediate vicinity	Beaches with only basic visitor facilities e.g. toilet, small refreshment kiosk, car park	Beaches at small coastal resorts having toilets, café selling meals, drinks, ice creams etc, large car park	Beaches at medium sized resorts, generally with several cafes, restaurants, fast food outlets, some other shops, washrooms and car parks	Beaches at large highly developed resorts with many cafes, restaurants, shops and other attractions

A modification of these approaches could be applied to Victorian beaches. However, as the matter of prime concern here is beach safety, it would be necessary for the system to include measures of the level of hazard and hazard countermeasures present at the beaches, in addition to information about the level of amenity.

For example, a Victorian beach classification system would need to have as its highest level beaches having high level safety standards and well developed amenities, at its lowest level, beaches with hazardous conditions, minimal safety services and little of no amenities. For instance, using the ABSAMP hazard rating (Short 1996) (where a rating of 1 indicates most safe and 10 indicates most hazardous) beaches could also be classified on the basis of bathing hazard. Possible levels and examples of Victorian beaches classified by both ABSAMP hazard rating (low hazard (1-3), medium hazard (4-6) and high hazard (7-10)) and amenity are shown in Table 3. Using a combination of hazard, safety and amenity information would enable the beach user to make a more informed choice about a beach destination.

Table 3. Examples of possible categories for a Victorian Beach classification system

	LOWEST LEVEL	HIGHEST LEVEL
Possible attributes	Medium to high hazard	High hazard	Medium hazard	Low hazard	Low hazard	Low beach hazard
	Unpatrolled	Patrolled	Patrolled	Unpatrolled	Unpatrolled	Patrolled
	No facilities	Some facilities	Some facilities	No facilities	Some facilities	Management practices in place Public amenity standards met

The full development of a LOS model for beaches is beyond the scope of the present study. The actual number of levels that would need to be employed, and the identification of the attributes appropriate at each level need to be the subject of further research.

Consultation with stakeholders about the desired outcome of Family Friendly Beaches study indicated some seemingly incompatible preferences. Some felt that it was important that the outcome of the study should be a very simple system of classification, analogous to the Pistse (ski slope) colour and shape coding system or European Blue Flag. Others indicated a preference for a more comprehensive system of beach classification that would function both as a source of information for beach users of all types and a tool for effective beach management.

The application of a LOS framework to beaches may well enable both to be satisfied. Within the complexity of the LOS structure is the possibility of identifying the category giving the highest level of safety and amenity as “friendly” beaches suitable for those needing high levels of convenience and minimum hazards. A beach accreditation program, such as the Blue Flag Award, could be incorporated within the highest level category, as it would be expected that the criteria for this level would at least meet, and possibly exceed, the criteria for Blue Flag accreditation.

4.2 LOS AS A MANAGEMENT TOOL

Beach managers have, as one of their tasks, to decide where limited resources will be employed for the maintenance and development of beaches under their jurisdiction. However, availability of funds is not the only factor to be considered in deciding whether to develop beaches. As recognised in the Victorian Coastal Strategy 2002 (Victorian Coastal Council 2002), preservation of diversity and ecological sustainability need to be guiding factors in beach management.

Currently, beach managers make decisions about resource allocation and development on the basis of primarily local considerations. The degree to which these decisions are being based on systematic processes is not known. The structure and process associated with the LOS model would provide a framework for managers to take a systematic approach to beach management. The auditing and monitoring processes that are an essential part of the LOS model would ensure that beach management decisions are being based on accurate and reliable information.

A standardised system of classifying beaches would be helpful for both local and central management, allowing the needs and issues associated with beaches to be addressed with a consistency that is currently not possible.

4.3 ESTABLISHMENT OF BEACH LOS SYSTEM

Development of an LOS system for Victorian beaches would be expected to be a substantial undertaking, although an opportunity to draw on the experience and expertise of Parks Victoria would facilitate the process. Parks Victoria's system has taken a number of years to set up and they have indicated that establishment of a beach LOS system would probably require a two-year timeframe.

5. Central Database of Beach Information



Central Database of Beach Information

Fundamental to the establishment of a beach information resource for beach users is the development of a database of beach related information. Whatever the nature of the resource, be it beach guide, web-site, LOS system or a combination of all these, it will need to be able to draw from an extensive array of comprehensive, accurate and up-to-date information.

A number of agencies are currently collecting good quality data and some degree of coordination or consolidation of these data would be necessary. It would be desirable to establish a centralised database receiving beach-related input from a range of agencies. The degree to which this would be achievable is unclear. Several of the agencies consulted expressed an interest in achieving such an outcome, but had some concerns about how this would be achieved in practice and how such a process would be funded.

Such a development would be in line with State policy. The Victorian Coastal Strategy (Victorian Coastal Council 2002) has as one of its objectives the improvement of community awareness and understanding. This, it suggests, could in part be achieved through the improved sharing and access to coastal information and databases for the community and between government agencies.

Similarly, one of the recommendations of the Victorian Beach Cleaning Best Practice Guidelines (Department of Infrastructure 2001) was:

That the opportunity to develop and implement an integrated cross-agency data collection framework on beach management be investigated. Relevant organisations will include responsible authorities, lifesaving associations, the Environment Protection Authority, the Victorian Litter Action Alliance, the Department of Natural Resources and Environment, the Victorian Coastal Council, Parks Victoria and Keep Australia Beautiful Victoria.

5.1 AUSTRALIAN BEACH SAFETY & MANAGEMENT PROGRAM

A suggested starting point for the development of such a database is the database established by Surf Life Saving Australia for the Australian Beach Safety & Management Program (ABSAMP). ABSAMP has developed a comprehensive, standardised and scientific information base on all Australian beaches with regard to their location, physical characteristics, access, facilities, usage, rescues, physical and biological hazards, and level of public risk under various wave, tide and weather conditions (SLSA 2002). Data on each beach is acquired from a range of interrelated sources: topographic maps and aerial photographs, aerial and ground site inspections, beach conditions (produced on a daily basis by patrolling lifesavers filling in beach maps) and published data.

The ABSAMP database covers a very extensive range of beach information, and it has been suggested, during consultation, that with the inclusion of a small number of additional fields of information the ABSAMP database could provide the basis of a beach information program for community use. Much of the information required by beach users is already being collected for ABSAMP including:

- presence of lifeguards
- signage
- suitability for bathing, surfing and fishing
- access information
- characteristics of beach
- characteristics of surf zone
- characteristics of barrier/foreshore
- characteristics of sand
- safety information such as hazard rating, presence of rocks, reefs, rips, stormwater/sewerage outfalls, hazardous winds
- information about facilities including –
 - distance to nearest facilities
 - presence of drinking water
 - number of toilets
 - number of dressing sheds
 - number of showers
 - kiosk at beach
 - shops near beach
 - public phone at or near beach
 - park near beach
 - BBQs at or near beach
 - picnic area at or near beach
 - shade available at beach
 - shelters at or near beach
 - playground at or near beach

It was suggested that relatively minor additions to the ABSAMP database would enable it to serve as the information base for a beach classification system. The additional data on hazards presented in this report would also need to be considered.

6. Beach User Preferences



Beach User Preferences

The primary aim of this study is to identify a means of providing information to beach users concerning the characteristics of potential beach destinations. It is therefore necessary to have some understanding of which characteristics users see as important or desirable. Reviews of both international and local studies were undertaken. Most research into this issue has been undertaken in the United Kingdom and, given the considerable differences in climate and culture between Victoria and the United Kingdom, application of the findings to Victorian conditions needs to be treated with caution.

6.1 INTERNATIONAL STUDIES

Several studies from the United Kingdom have suggested that beach users are not a homogeneous group with similar preferences. One study found that the psychological profile of beach users who tended to be located in dunes differed from those who were on the beach (Williams, Miniarski-Jones et al. 1992). A survey of 59 people attending the Merthyr Mawr dune complex and adjacent beach found that dune users prefer solitude, are local, usually male and keenly interested in the educational aspect of coastal management. Those on the beach are more gregarious and travel some distance to arrive at the beach, usually as a group, and likely to play games and swim rather than absorb knowledge.

Similarly, a study of beach user preferences in Wales found a distinction between people in terms of the type of beach experience they wanted (Morgan 1999). In a study of 23 beaches, the results from 859 questionnaires showed that more than half of the beach users wanted relatively undeveloped beaches with basic (toilet, kiosk, car parking) or no facilities, while the remainder wanted to go to beaches with greater levels of commercial development. The preferences for beach characteristics were found to differ for these two groups. For example, with regards access and parking, those wanting fewer facilities preferred narrow access roads with car park 200m-1km from the beach, while those wanting more facilities preferred wide signposted roads and parking within 200m of the beach. The results of the study suggested that many beach users do not necessarily desire beaches to be “improved by managers and planners, either in terms of supplementation of near beach facilities or infrastructure development such as wider roads or constructed paths”.

Overall, the Welsh study found that the priorities for beach users were landscape and scenery, bathing safety, and a variety of factors associated with beach environmental quality such as bathing water quality, absence of sewage debris, litter and unpleasant odours.

The presence of refreshment facilities was identified as being important for both types of beach users. A large proportion of those who stated they preferred beaches with no facilities nevertheless indicated a preference for some refreshment provision. Similarly, both groups agreed on a preference for water sports to be restricted to one area only. Most beach users also wanted dogs and vehicles banned from beaches.

A study of the attitudes of beach users in the UK found that priorities given by beach users (n=859) (Nelson, Morgan et al. 2000) to aspects covered by European Blue Flag and Seaside Awards were ranked in order of decreasing importance:

- bathing water quality
- absence of litter
- cleanliness of toilets
- prohibition of vehicles on beach
- dog control
- lifeguard provision
- water sport control
- absence of fishy/seaweed smells
- absence of sewage debris
- absence of oil on beach
- adequacy of toilet provision
- absence of floating debris in sea
- car park provision
- access onto beach by path
- washing/drinking water availability
- control of seaweed on beach

6.2 VICTORIAN STUDIES

While the international studies provide some indication of the type of beach characteristics that may be of interest to people, the extent to which these findings apply to the Australian situation is not known. Of more direct relevance are those studies conducted in Victoria.

• Victorian Coast 2000

(Department of Natural Resources and Environment 2000)

In 2000, the Department of Natural Resources and Environment, Victoria conducted market research into community attitudes and behaviour in the Victorian coastal and marine environment.

They conducted 9 clinic workshops (N=151) and 701 telephone interviews.

There were a number of findings of relevance to the current study. It was found that:

- The coast has year round appeal
- Escapism and coastal environment ‘feeling’ are key drivers for visiting the coast
- Beach cleanliness and water quality are key public concerns – beaches free of litter
- Need for more and better ‘basic’ foreshore facilities and amenities in key localities; toilets, changing rooms, picnic areas
- Café/kiosk facilities were valued in already developed areas
- More sensitive development needed to maintain coastal character and appeal
- Public are wanting more effective input into development

The stated reasons for visiting the coast were:

- | | |
|--|-----|
| • Escaping from pressure of everyday life | 61% |
| • Being in fresh clean air and healthy environment | 52% |
| • Spending time with family | 51% |
| • Getting feeling of open space or freedom | 47% |
| • Being away from crowds and other people | 38% |
| • Enjoy coastal landscape and sight seeing | 36% |
| • Inexpensive leisure or holiday | 29% |
| • Spending time with friends outside family | 27% |
| • Short walks or strolls along coast or trails | 27% |
| • Swimming | 26% |

Facilities

There was some evidence indicating that the public feels current foreshore facilities do not adequately meet their needs. Inappropriate location of facilities was also identified as a problem.

The facilities considered appropriate were:

- | | |
|---|-----|
| • Toilet facilities/changing rooms | 77% |
| • Picnic area with one or two tables | 74% |
| • Roofed picnic facilities with tables/BBQs | 61% |
| • Playground | 46% |
| • Paved car park | 40% |
| • Café/teahouse | 32% |
| • Kiosk | 30% |

Older visitors were more likely to appreciate the presence of more trees for shade.

• Sport and Recreation Victoria

(Sweeney Research 2000)

Attitudes to Water Safety

Department of State and Regional Development undertook market research which included conducting focus groups with beachgoers who were parents of children aged up to ten years of age. Two groups were held: one group who regularly go to a surf beach (N=8), and one group who regularly go to a bayside beach (N=8).

The parents indicated that government has a role in educating public and beach safety messages need to be continued as constant reminders.

The “research” also explored the notion of “family friendly” and “safe” beaches.

It reported that a “family friendly” category was well endorsed by parents of younger children. Such a beach would be one having:

- “perfect” facilities ... toilets, showers, kiosk, picnic areas, shelters, car parking, ample rubbish bins etc.
- life saving patrols both in and out of the water
- patrols operating throughout the summer school holidays and on public holidays and weekends from November to Easter ... from mid-morning to dusk
- patrols to have the authority to remove “hoons”
- a clean beach ... one without needles in the sand
- a ban on jet skis and other motorised boats
- a creche
- protected rock pools if at a surf beach

A “safe” beach was also thought to have merit where Government would rate beaches on safety factors.

Beach signage was thought to be desirable with signs prominently displayed at car parks and walkways indicating:

- whether beach is patrolled
- days/hours of operation OR directions to nearest patrolled beach with its days/hours of operation.

While this “research” provides data of direct relevance to the current study its usefulness is limited by the very small sample size employed, and would need to be supported by more extensive research of these issues.

- **Mornington Peninsula Shire**

(Mornington Peninsula Shire 2001)

Health and Wellbeing Status Report: Satisfaction with open space

Mornington Peninsula Shire conducted a focus group of people with young families to discuss use and satisfaction with open space in the Shire.

The results refer mainly to parks, but may also have relevance to beaches eg: good access, adequate parking, good amenities (water and toilets on foreshore), shade, clean (glass and dog litter removed) and well maintained.

- **State Boating Council**

(State Boating Council 2001)

Boat Owner Survey

A survey of 800 boat owners was conducted by the State Boating Council to identify boating issues and demand characteristics. Of relevance to “family friendly beaches” is the finding that water quality was rated most highly as a very important issue impacting on recreational boating, followed by safety signage.

6.3 NEED FOR RESEARCH AT VICTORIAN BEACHES

The studies conducted in the United Kingdom (Section 4.1), directly surveying beach users at beach locations, have set a bench mark for the type of information required when considering the preferences and needs of beach users. It is likely that data collected from people actually visiting a beach location may give a different and possibly better understanding of beach user characteristics compared to data based on responses from the general population.

While the general population market research reported in Victorian Coast 2000 (Section 4.2) gives some useful insights into the preferences of Victorian beach users, it forms an insufficient basis on which to develop a beach information or classification system. It would be preferable to base decisions on information obtained through rigorously designed research studies conducted with beach users at Victorian beach locations.

6.4 INFLUENCES ON CHOICE OF BEACH

In addition to knowing what preferences beach users have with regards to beach attributes, it is also important to understand what information beach users are using in reaching a decision about choosing a beach destination. There is only limited information available concerning this issue.

Market research (Sweeney Research 2000) conducted with Victorian parents of young children has identified a number of factors that can be taken into account when choosing a beach for a young family:

- prefer bayside beach, the absence of undertows, small waves, and lack of depth makes supervision easier, and it's easier for children to play at water's edge, although parental preferences can result in trip to surf beach
- patrolled beach
- shallows
- cleanliness of sand – broken glass, needles

However, this research is based on only a very small sample (N=16) and thus can only be viewed as a preliminary guide.

Nelson (Nelson, Morgan et al. 2000) reported that beach users in Wales identified the most important attributes in choosing a beach destination as distance from home (76%), facilities (40%) and beach award status (10%). Those placing more importance on beach award status tended to be over the age of 40 years.

More extensive research is needed on this issue. Development of a community information resource on beaches would need to be based on a thorough understanding of how a beach destination is chosen and who is making the decision. It is important to understand:

- What factors are considered
- What information is used
- How the information is accessed e.g. electronic media, friends, newspaper etc
- Who is involved in the decision making
- Who makes the final decision

7. Hazards at Victorian Beaches



Hazards at Victorian Beaches

7.1 IDENTIFICATION OF HAZARDS

This study has identified potential hazards at Victorian beaches by drawing on a number of sources of information. Hazards, in this context, are those elements in a beach environment that increase the probability or severity of adverse health outcomes for those exposed to that environment. Reviews of published literature and electronic resources yielded general information about beach hazards. To determine which hazards are of particular relevance to Victorian beaches, several sources of local information were employed.

7.1.1 Injury data

Hazards can be identified by looking at their effects, that is, the injuries and deaths they produce and the circumstances under which the injuries occur. A measure of the severity of the hazard can be estimated in terms of the severity of the resulting injury and the frequency with which it occurs. Therefore, this study employed deaths and injury data as the primary means of identifying hazards at Victorian beaches.

The sources of these injury data used to identify beach hazards are shown in Table 4. Comparison across data sets is limited by differences in time periods covered. It is also possible that some cases may be represented in more than one set of data, and the extent to which this may be happening is not known.

Table 4. Sources of data relating to injuries at Victorian beaches

Data Source	Abbreviation used	Summary in:
Victorian Emergency Minimum Dataset	VEMD	APPENDIX 3
Royal Life Saving Victoria	RLSV	APPENDIX 4
Victorian Admitted Episodes Dataset	VAED	APPENDIX 5
Surf Life Saving Victoria	SLSV	APPENDIX 6
Victoria Police Law Enforcement Assistance Program	LEAP	APPENDIX 7
National Coroners Information System	NCIS	APPENDIX 8

• Deaths

The Australian Bureau of Statistics data for Victoria during the period of 1990 to 2000 allow the circumstances of 59 drownings at beaches to be identified. Details of these are shown in Table 5.

Table 5. Circumstances associated with drownings at Victorian beaches - Australian Bureau of Statistics

Circumstances	Number of drownings
Swimming, paddling or wading at a surf beach	36
Surfing or boogie board	4
Swept off rocks or breakwater	14
Attempting a rescue at a surf beach	5
TOTAL	59

In Victorian open waters for the period of 1 July 2000 to 30 June 2002, 30 people were drowned: 17 in ocean locations and 13 in bay locations (Royal Life Saving 2001) (Evans 2002). The activities associated with the drownings are shown in Table 6, with boating related activities being the major activity associated with these deaths.

Table 6. Drowning frequencies and associated activity in open water 2000/2001 (n=14) (Royal Life Saving 2001) and 2001/2002 (n=16) (Evans 2002)

Activity	Bay	Ocean	Total
Swimming	2	-	2
Playing near water	1	-	1
Walking near water	2		2
Surfing	-	2	2
Fishing	-	3	3
Scuba/Snorkelling	1	2	3
Boating	5	9	14
Rescuing	-	1	1
Unknown	2		2
TOTAL	13	17	30

Other causes of death have also been reported at beaches. Data from the National Coroner's Information System (Morgan 2002)(Appendix 8) show that in Victoria during the period of 2000 to 2002, at beach or ocean locations, there were 51 recorded deaths. Only closed cases were available for analysis, so the final numbers for the period may be higher. While drowning was the most common cause of death (57% of deaths) at these locations, death was also found to occur from a number of other causes. Cardio-vascular incidents were associated with 22% of deaths, and other causes included falls, embolism, hypoglycaemia and strangulation.

- **Severe injuries**

Victorian hospital emergency department presentation data (VEMD, Appendix 3) show a total of 508 people presenting for beach related injuries for the period of October 1995 to December 2001. Although an underestimate of all hospital treated beach injuries these data are indicative of the causes. Of these, 44 cases (8.6%) had injuries that were sufficiently severe to require admission to hospital. Two admissions resulted from near drowning or immersion. The most common type of injury requiring admission was fractures (n=18), including 3 cases of neck fracture. Two of these neck fractures were caused by diving and one by being dumped by waves. Two admissions were due to severe sunburn, and there were 4 cases of injury resulting from assault. Injuries associated with falling onto rocks led to 5 admissions: 4 fractures and 1 injury to internal organs. The main causes of injury requiring admission are shown in Table 7.

Table 7. Main causes of severe beach related injury (VEMD, 1995-2001)

Mechanism of injury	Frequency	% of total admissions	Specific causes
Fall	18 <i>(Up to 1 metre – 14)</i> <i>(Over 1 metre – 4)</i>	41	Up to 1 metre <i>Rocks</i> <i>Roller blades</i> <i>Volley ball</i> <i>Picking shells</i> <i>Walking</i> <i>Slip</i> Over 1 metre <i>Horse</i> <i>Boatshed</i> <i>Flying kite</i>
Collision with person	6	14	<i>Assault</i> <i>Diving</i> <i>Stick</i> <i>Jumped on</i>
Collision with object	6	14	<i>Bicycle</i> <i>Surfing</i> <i>Hit by wave</i>
Animal	3	7	<i>Stringray</i> <i>Jelly fish</i>
Cutting, piercing	3	7	<i>Pipe</i> <i>Glass</i>
Sun exposure	2	5	<i>Boogie boarding</i>
Immersion	2	5	
Unknown	4	10	
TOTAL	44		

- **Less severe injuries**

A total of 464 of the presentations involved injuries that were not severe enough to require admission to hospital. For those cases where the main causes of the injuries could be identified, falls from a height of up to 1 metre were the most prevalent. A summary of the main identified causes is shown in Table 8.

Table 8. Main causes of less severe beach related injury (VEMD, 1995-2001)

Mechanism of injury	Frequency	% of total presentations	Specific causes
Falls	131	28	Up to 1 metre <i>Rock</i> <i>Stair/step</i> <i>Volley ball</i> <i>Tripped</i> <i>Running</i>
	<i>(Up to 1 metre – 125)</i>		
	<i>(Over 1 metre – 6)</i>		Over 1 metre <i>Wall</i> <i>Stairs</i> <i>Rocks</i> <i>Horse</i>
Cutting or piercing by an object	98	21	<i>Needle/syringe</i> <i>Glass/shell</i> <i>Rock</i>
Struck by collision with an object	92	20	<i>Foreign body in eye</i> <i>Rock</i> <i>Glass</i> <i>Shell</i> <i>Surfboard</i>
Animal bites/stings	42	9	<i>Sting ray</i> <i>Jelly fish</i> <i>Sand fly</i> <i>Snake</i> <i>Spider</i> <i>Dog</i>
Struck by collision with person	15	3	<i>Assault</i> <i>Volley ball</i>
Sun over exposure	11	2	
Submersion	5	1	<i>Boat capsize</i> <i>Rocks</i> <i>Wave</i>
Unknown	70	15	
TOTAL	394		

7.1.2. Crime statistics

Offence statistics from the Victoria Police were used to determine the level of hazard associated with criminal activities on Victorian beaches. Information for 116 locations was available for the period of July 2000 to June 2002. A total of 1584 offences were reported at Victorian beaches or foreshores during the 2 year period. While most crimes were committed against property, of particular concern is the substantial numbers of crimes against person, many of which appear to be serious in nature including rape and assault. A full summary of the types of offences committed and the factors affecting crime rates at beaches and foreshores is shown in Appendix 7.

Considerable differences in crime rates were found depending on location, some locations seeming to have substantially high crime risks than others. Eighteen locations (15%) had annual averages of 15 offences or more, and these locations accounted for 62% of the total number of offences. Details of these locations are shown in Figure 4, Appendix 7.

The prevalence of criminal offences at beach locations, in particular crimes directly against people, suggests that crime prevention at beaches may need to be a focus for any program seeking to improve the safety of beaches, especially at those beaches having relatively high offence rates.

7.1.3 Beach visitation rates

Interpretation of many of the statistics relating to beaches is limited by the absence of comprehensive and accurate information about the numbers of people visiting beaches throughout the year. For example, in determining a specific rate for injury from a particular hazard it is necessary to know how many people were exposed to that hazard. Therefore, to be able to make a comparison such as the relative risk rate for different time of the year, or time of day, day of week etc it is necessary to know how many people were exposed to the hazard at those times.

Some visitation rates are available for Victorian beaches. For example, Royal Life Saving Victoria record estimated attendances at patrolled beaches from November through to March. Visitation rates for the patrol season 2000/2001 from 25 Port Phillip Bay beaches are shown in Table 9. These rates show that the visits to the beach increase markedly in December and reach a maximum in January. Very high levels were continued into February and then reduced substantially in March.

However, the accuracy of these figures is open to question. The visitation rates were obtained through “guesstimates” made by patrol personnel and the validity of this method is unknown. Therefore these data need to be interpreted with some caution.

Table 9. Estimated number of people at 25 Port Phillip Bay beaches November 2000 to March 2001: Royal Life Saving Victoria

	November	December	January	February	March	Total
On beach	17,440	169,580	278,705	237,818	82,566	786,109
Go in water	3,435	35,237	75,500	48,624	18,025	180,821
% in water	20%	21%	27%	20%	22%	23%

Surf Life Saving Victoria also record estimated beach attendances, but these data are also subject to questions of accuracy and validity.

Good quality hazard exposure rates are an essential prerequisite for the accurate assessment of the risks faced by people at beaches. It is necessary to develop reliable methods of estimation of visitation rates taking account all relevant factors such as time of year, time of day, length of stay, age and gender.

7.2 ENVIRONMENTAL BEACH HAZARDS

The beach is a complex environment consisting of two main zones: land (beach and foreshore) and water. The two zones present quite different challenges to the beach visitor and the level of exposure of the visitor to the two environments differs. Data from Royal Life Saving Victoria (Appendix 4) indicates that there tends to be many more visitors on the

land than in the water. Patrol records indicate that, on beaches when patrols are present, only approximately 20% of visitors at a beach are in the water.

7.2.1 Hazards in the water

Beach users engage in a variety of activities in the water at beaches including wading, playing, swimming, diving and surfing. All of these activities entail some element of risk of injury from the hazards described below.

- ***Water depth***

Any depth of water is potentially a hazard: deep water can drown the non-swimmer or inexperienced swimmer, and water that is too shallow can result in spinal injury for people diving into surf or catching waves (Short 1996). Diving into a wave at a beach poses a risk of spinal injury (World Health Organisation 1998). The rate of increase in depth can also pose problems. Sudden increases in water depth pose drowning hazards to children and weak-swimmers or non-swimmers.

- ***Waves***

Breaking waves generate turbulence and currents which can knock people over, drag or hold them under water, and dump them on the sandbar or shore (Short 1996). There are three types of waves, each presenting different levels of hazard to swimmers. The least hazardous are spilling waves which occur when the top of the wave tumbles down the face of the wave. Presenting higher hazard levels are plunging waves which break with tremendous force and can easily throw a swimmer to the bottom. They usually occur when the tide is low and are a common cause of spinal injuries. The third type, surging waves, may never actually break, and can knock swimmers off their feet and carry them back into deep water. For this reason surging waves can be very dangerous, especially around rocks (Surf Life Saving Australia 2002).

- ***Surf zone currents and rip currents***

Surf zone currents and particularly rip currents are the biggest hazards to most bathers (Short 1996). They are the hardest for inexperienced swimmers to spot and, when caught by them, can generate panic. Currents in water of chest height depth can sweep the swimmer off their feet, and their ultimately seaward motion can take the swimmer into deeper water and possibly toward or beyond breakers.

These currents also present hazards for those on inflatables or boards with the risk of the unaware being taken out to sea.

While the number of drownings at Victorian beaches is low, the number of rescues reported by life saving patrols is indicative that these hazards remain problematic. For the patrol period of 2001/2002 Surf Life Saving Victoria reported 539 rescues at surf beaches (Surf Life Saving Victoria 2001), and Royal Life Saving Victoria reported 180 rescues during the 2000/2001 patrol season.

- ***Strong winds***

Strong winds can also be a major hazard on exposed beaches (Short 1996) Strong winds may cause irregular surf which makes it difficult to identify rips and currents, or strong waves and currents. Offshore winds may blow those floating on boards etc away from the shore, and make it difficult to paddle back to shore against the wind.

- ***Tides***

High tides produce deeper water and in some cases stronger rips. In low tides, rips are more visible but normally intensified due to restriction of the channels (Short 1996).

- ***Rocks, headlands and sand bars***

Rocks in and beneath the water can pose an impact and entrapment hazard. Strong waves can dump swimmers onto rocks, or swimmers' feet can become trapped between rocks or in rock crevices.

Further, rocks, rock reefs and headlands cause additional wave breaking and generate more and stronger rips (Short 1996).

Rocks and sandbars also provide impact hazards for people diving into waves.



- ***Marine animals***

A number of marine animals present a biting or stinging hazard in Victorian waters. Sharks, while potentially very dangerous, present only a rare threat in Victorian waters. Since European settlement, up to 2001, Victoria had only 20 recorded shark attacks, 8 of which were fatal, with the last fatal attack taking place in 1970 (Florida Museum of Natural History).

Injuries sustained from other marine creatures are more common. A report of 205 injuries related to marine animals (Taylor, Ashby et al. 2002) in Victoria, during the period of October 1995 to June 2000, found that such injuries are seasonal and rarely serious. They found the most common injuries to be spike injuries from fish (30.7%), stings from jelly fish (20.5%), bites from stingray (8.3%) or fish (6.3%), laceration or puncture from stingray (6.3%). Bite injuries from sharks were responsible for 2% of the injuries. The proportion of these injuries that occurred during beach recreation is unknown.

The relatively low number of jellyfish stings reported in VEMD data (Appendix 3) reflects only those of sufficient severity to present to hospital. Records of first-aid administered at beaches by Royal Life Saving patrols (Appendix 4) show large numbers of sting injuries. In the 2000/2001 season, 669 sting injuries were attended to and the majority of these were thought to be caused by jellyfish.

- ***Polluted water***

Chemical or microbiological pollutants can effect water at beaches. Pollutants arrive at beaches primarily through the storm water drainage system which, after heavy rain, may transport materials such as street litter, dog droppings, cigarette butts, leaf litter, oil and silt into the water ways (EPA New South Wales 2002) During sustained periods of heavy rain sewer overflows can also contribute to beach pollution. The activity of people on the beach and in boats also contributes to the pollution load at beaches.

An additional source of pollution in recreational waters is “bather shedding”. Both faecal and non-faecal (e.g. mucous, saliva, skin) materials are shed during swimming (World Health Organisation 1998). Each bather sheds approximately 1 gram of faecal matter. Therefore the greater the number of bathers at a beach the greater the potential for pollution and disease transmission.

Microbiological pollutants have been identified as being associated with several health outcomes for bathers. There is strong evidence of a causal relationship between faecal pollution as measured by indicator-bacteria concentration and gastrointestinal illness and acute febrile respiratory illness (World Health Organisation 1998).

- ***Man made structures***

Man made structures such as jetties and pontoons provide impact hazards for swimmers. VEMD (1995/2001) data identified 7 hospital presentations for injuries associated with rafts or pontoons at beaches.

- ***Submerged objects***

Objects lying beneath the water pose invisible hazards for swimmers and divers.

- ***Water craft***

The shared use of recreational water by people and watercraft poses some hazards. While the use of watercraft is associated with injuries to those who use them (Marine Safety Victoria 2002) of more concern to this study is the impact of watercraft on the beach visitor who uses the water for more passive recreational activities such as wading and swimming. Bathers are at some risk of injury due to collision with power and non-powered watercraft.

State regulations attempt to reduce this hazard by speed restrictions for boats, personal watercraft and skiers: 5 knots when within 50 metres of swimmers or bathers, within 200 metres of the water’s edge, and within 50 metres of a wharf, jetty, slipway diving platform



or boat ramp (Marine Safety Victoria 2002). While these regulations provide some protection against collision injuries, the close proximity of bathers with watercraft has inherent risks which may result in serious injuries or drowning.

Data from hospital admissions relating to marine injury incidents (Marine Safety Victoria 2002) indicates that non-occupants of watercraft are receiving injuries from such craft. This suggests that people in the water for swimming or other activities may be receiving injuries from water craft. However, the data set from which the information is drawn, VAED, employs the ICD 10 coding system that does code for additional information concerning such incidents. The system allows identification of incidents as being caused by *‘other and unspecified water transport accidents’* (Table 10) which includes non-occupants injured by the craft, but does not uniquely identify these cases.

Table 10. Emergency department presentations for marine related injury incidents in Victoria: Victorian Admitted Episodes Dataset, July 1999 to December 2001 (Marine Safety Victoria 2002)

Type of watercraft	Number of cases	Percent of incidents coded <i>‘other and unspecified water transport accidents’</i> including non-occupants being hit by the watercraft
Jetskis/Hovercrafts	57	28%
Unpowered watercraft (windsurfers/surfboards)	34	45%
Fishing boats	17	18%
Sailboats	12	17%
TOTAL	120	

However, there is some earlier data indicating that swimmers are being injured by water craft. Hospital admission information coded under the, now obsolete, ICD 9 coding system enables identification of swimmers injured by water transport (VAED, Appendix 6). Seventeen cases of injury to swimmers in incidents involving watercraft were identified among admissions to Victorian hospitals between 1987 and 1998, although the nature of the craft involved in these incidents is not identified.



- ***Sand pollution***

Bacteria-indicators of pollution and several pathogens have been isolated from beach sand (World Health Organisation 1998) however, the extent to which this constitutes a hazard to human health is unknown.

- ***Rocks***

Walking on rocks or fishing from rocks pose the risks of falling into the water, being swept off the rocks into the water by strong waves, or becoming isolated from the shore by rising tides. In Victoria, over an 11-year period, 14 people were drowned after being swept off rocks (ABS 1990/2000).

Rocks also pose a common injury hazard from slipping, tripping, falling at the same level or from a height. Rocks present an uneven, unpredictable and unstable walking surface, which may be wet and slippery. Rocks are also an unyielding and often sharp impact surface on which to fall. VEMD 1995/2001 data showed that 10.4% of all beach-related injuries were associated with rocks. Similarly, Surf Life Saving Victoria incident reports (Appendix 6) show a frequent involvement of rocks in incidents requiring first aid attention.

The main types of injuries associated with rocks are open wounds (47%), sprains or strains (28%) and fractures (9%) (VEMD 1995/2001). While most injuries were relatively minor, 9.4% of cases were severe enough to require admission to hospital.



- ***Man made structures***

Man made structures such as walls, stairs, buildings and playground equipment have been associated with injuries at beaches. Low walls or stairs pose tripping or falling hazards, while higher structures which can be climbed have been associated with fall injuries. Poor maintenance of built areas can also pose hazards.



- ***Cliffs***

At the cliff top, edges can be unstable, and wet or sandy ground or rocks can be slippery presenting the risk of a serious fall. At the base of cliffs landslide, falling rocks or collapse of overhangs present hazards to beach users.

- ***Unaccustomed behaviour***

At beaches, people often appear to adopt behaviours and engage in activities that are somewhat unusual for them. For example, an otherwise sedentary person may play beach volleyball, a grand parent may run along the beach with their grand children, or a person with little swimming experience may swim beyond their depth. The relaxed and energising atmosphere of the beach may tempt people to participate in behaviour for which they are not adequately fit or skilled, under possibly adverse physical conditions such as uneven and unstable ground or rough or treacherous water. The occurrence of a number of cardiovascular deaths at beaches (NCIS, Appendix 8) may be related to such factors, although there is insufficient information to determine whether this is the case.

- **Reckless behaviour**

For some, the beach environment is seen as a place to engage in adventurous behaviour, and this can be reckless in nature. Incident reports from Surf Life Saving Victoria (Appendix 6) indicate that some do not observe adequate caution at the beach:

“Cut hands - fell down hill and used hands as brakes”

“Cut hands - same person, same result as above but 3 days later”

“Cut feet and hands from jumping off the pier”

“Cut foot jumping off wall and landing on metal”

- **Crime**

Beaches are not immune from criminal activity. Victorian Police records (Appendix 7) show that a large range of criminal offences are committed on beaches or foreshores. These include rape, sexual assault, robbery, assault, abduction, theft, drugs and disruptive behaviour. A summary of the main types of crimes being committed at beaches and foreshores is shown in Table 11 and a full listing of all types of offence and additional beach crime related analyses are included in Appendix 7.

Table 11. Main type and number of offences occurring at Victorian beaches or foreshores

TYPE OF OFFENCE	Number of offences
Crime against person	
Rape	35
Sex (non-rape)	147
Robbery	25
Assault	114
Abduction/kidnap	7
TOTAL	328
Crime against property	
Arson	38
Property damage	131
Burglary (other)	64
Handle stolen goods	6
Theft from motor car	51
Theft of motor car	3
Theft (bicycle)	22
Theft (other)	757
TOTAL	1072

While some level of all offences occurs across the year, crimes against people and crimes against property show a marked increase during the month of January. The extent to which this may be related to New Year’s festivities is not clear from the data, but as a number of seaside locations are traditionally used as a place of New Year celebration, this may be to some extent responsible for the elevated levels. However, January is also the month of highest attendances at beaches (RLSV, Appendix 4) so the increased rates may also reflect higher exposure rates.

- **Sun and heat exposure**

Exposure to UV radiation can have immediate and long-term harmful effects on human health (World Health Organisation 1998) including harmful effects on the skin and the eye. While only a small number of acute sun exposure injuries were reported in the VEMD

1995/2001 data, sunburn is still a common Australian experience with an estimated 5.7 million Australians getting sunburnt each summer (SunSmart 2001). Sunburn can be severe enough to require admission to hospital (VEMD 1995/2001).

- ***Tides***

People on rocks or sandbars can become isolated from the shore by rising tides.

- ***Shore break***

Waves that break directly on the shore can be unpredictable and dangerous. They have been associated with neck and spinal injuries.

- ***High waves on rocks and ledges***

High waves breaking over rocks or ledges have been associated with people being swept off into the water.

- ***Land animals***

A number of land animals have been involved in injury incidents at Victorian beaches (VEMD, Appendix 3). Bite injuries have been associated with dogs, snakes, spiders, sandflies, mosquitoes and bees; fall injuries have been associated with dogs and horses. Further, consultation has identified dog litter as a nuisance, and its potential as a source of disease is of concern.



7.3 OTHER RISK FACTORS

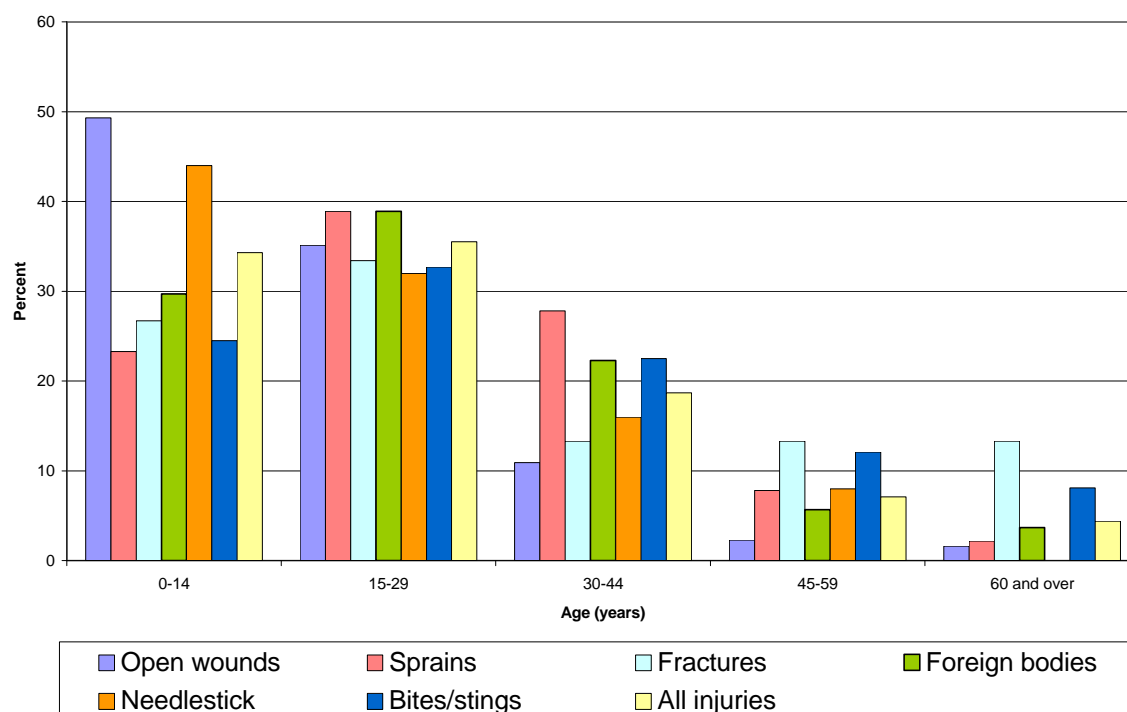
- **Gender**

Males appear to be at substantially greater risk in the beach environment than females. All 14 drownings occurring in open waters in Victoria in 2000/2001 were male. More than twice as many adult males were rescued than adult females (RLSV 2000/2001). There was also a predominance of males (61%) presenting at emergency departments for beach related injuries (VEMD 1995/2001).

- **Age**

People under the age of 30 years are at greatest risk of incurring an injury in the beach environment. The relationship between the types of injury and the age of the patient are shown in Figure 2. The 15 – 29 year age group showed high levels of all types of injury, while the 0-14 year age group showed markedly elevated levels for open wound and needlestick injuries (VEMD 1995/2001).

Figure 2. Beach related injuries as a function of age (VEMD 1995/2001)



- **Alcohol**

The consumption of alcohol has been identified as a risk factor for a number of injuries including water-recreation fatalities (Steenkamp M, Harrison J et al. 2002). Alcohol consumption has been found to be associated with a number of aquatic risk taking behaviours by men (Howland, Hingson et al. 1996): less likely to swim at patrolled beach, less likely to wear life jackets when boating.

Alcohol appears to be a substantial factor in a diverse range of risk taking behaviours, injuries or deaths including train surfing (Strauch, Wirth et al. 1998), boating incidents (reviewed in Howland et al 1993), risky sexual behaviours (Bailey, Pollock et al. 1999) fights (Hingson, Heeren et al. 2001). The extent to which alcohol induced risk taking is leading to injury, death or incidents on Victorian beaches is not known, but given the Australian cultural tradition of linking leisure activities with alcohol it is likely to be having some impact.

- ***Overcrowding***

Beach overcrowding, in addition to creating aesthetic problems, also presents some threats to health and safety. Supervision of children, both in the water and on land, becomes more difficult due to impeded visibility when there are large numbers of people at the beach. The likelihood of unintentional injuries due to collisions between people would be expected to increase, as would the likelihood of disease transmission.

Children becoming separated from parents or guardians is also a problem at beaches. Surf Life Saving Victoria during the patrol season of 2000/2001 reported 175 lost children (29 coastal beaches) (SLSV 2001) while Royal Life Saving Victoria reported 62 lost children during the same period (25 bay beaches) (Appendix, 4). Overcrowding of beaches may be a barrier to children staying in contact with family or group members.

However, prevention of overcrowding is difficult to enforce and users needs and perceptions vary considerably between areas. Of more importance is the adequate management of the recreational water use area in order to minimise risk (World Health Organisation 1998).

7.4 BEACH TYPES AND HAZARD RATINGS

7.4.1 Beach types

The physical hazards present at a beach can be related to the beach type (Table 12). Beaches can be classified into distinct types based on their morphology and the associated waves and currents. Reflective and Intermediate Low Tide Terrace beaches have been identified as providing the safest bathing conditions (Short 1996). Reflective beaches are characterised by steep narrow beaches usually composed of coarse sand and low waves. Intermediate Low Tide Terrace beaches are characterised by a moderately steep beach face, which is joined at the low tide level to an attached bar or terrace and are the lowest energy intermediate beach type. The characteristically low waves and shallow terrace make these the safest of the intermediate beaches.

However, even these two types of beaches are not without their hazards. Reflective beaches have relatively strong swash (broken part of the wave as it runs up the beach face) and backwash (the return flow), which can knock people off their feet. The characteristic step formation around the low water mark causes a sudden drop from shallow to deeper water and the absence of a bar means deeper water close into shore. Reflective beaches are most hazardous when waves exceed one metre and shorebreak becomes stronger.

Low Tide Terrace beaches also have a number of hazards. At high tide, with deep water close to shore the beach behaves like a reflective beach. At low tide, waves may plunge heavily on the outer edge of the bar posing a risk of spinal injury for body surfers. Most hazardous at mid to high tide when waves are one metre high and are oblique to the shore. Rips and currents may cause a seaward drag.

Table 12. Beach types and their hazards (adapted from Short, 1996)

Beach type	Characteristics	Hazard rating	Hazards
Reflective	Waves tend to reflect back off the beach 0-1m breakers	2	Safe apart from deep water close inshore and from shorebreak during higher waves, steep beach and abrupt drop off to deeper water.
Intermediate <i>Low Tide Terrace</i>	Shallow bar or terrace often exposed at low tide 0.5-1m breakers	3	Safe at low tide. Deeper water and weak rips at high tide.
Intermediate <i>Transverse Bar and Rip</i>	Attached bars, rip troughs and undulating beach. 1.-1.5m breakers	5	Pronounced changes in depth and currents between bars and rips. Safest bathing is on the bars.
Intermediate <i>Rhythmic Bar and Beach</i>	Undulating bar trough and beach. 1.5m breakers	6	Pronounced changes in depth and currents between bars and rips. Hazardous during high waves and high tide. Safest bathing is on or behind bars during the lower waves.
Intermediate <i>Longshore Bar - Trough</i>	Shore parallel bar and trough. 1.5-2m breakers. Moderate rip currents.	7	Deep trough and distance to outer bar restrict most bathers to swash zone and inner trough.
Dissipative	Waves dissipate energy over wide surf zone. 2.3m breakers. Straight bars, trough and beach.	8	High waves and wide surf zone restrict most bathers to swash zone.

Changing wave height and/or wave direction can change beach topography and type and the level and nature of hazards at a beach.

7.4.2 Hazard ratings

Short (1996) has developed a system of hazard rating for beaches taking into account factors such as beach morphology, rips, currents and wave characteristics. The rating scale ranges from “1” indicating the safest beaches to “10” the least safe beaches. The beach types, their associated hazards and hazard rating are summarised in Table 12.

While Short’s hazard rating provides a useful source of information concerning some beach hazards effecting people in the water, as indicated by the preceding review, there are more hazards both in the water and on land that are not reflected in Short’s rating.

There may be some value in the development of either additional hazard ratings reflecting different aspects of beach safety, or a single broad hazard rating that would incorporate Short’s rating in addition to ratings for other hazards.

Both Royal Life Saving Victoria and Surf Life Saving Victoria keep records of incidents occurring at patrolled beaches, for example, rescue rates, incidents requiring first aid attention, visitor numbers etc and these may provide the basis for quantifying other beach hazards. Other sources of data are available, for instance, Victoria Police Incident Statistics, ABSAMP database, EPA water quality testing, and these may provide a basis for hazard ratings.

However, the appropriateness of a hazard rating as a source of information for beach users needs to be considered. While the identification and quantification of hazards could be of value to beach users, whether it would be used effectively or appropriately is not clear. Numeric ratings give rise to the possibility of misunderstanding. The user needs to remember whether the high values are “good” or “bad”. While intuitively high values would

represent “good”, in the case of hazard ratings a high value may instead indicate “bad”, as the rating is indicating a high level of hazard.

This would suggest the rating of the positive converse of hazard, that is, safety may be more appropriate. However, this raises the possibility that a user may misunderstand a high safety rating to indicate that there are no hazards present, and such a situation is not possible as there are always some hazards at beaches.

7.5 MONITORING OF HAZARDS

Beaches are not static environments, but subject to both short-term and long-term changes brought about by seasons, weather and human or animal activity. Physical hazards also vary greatly between sites and monitoring of a site for existing and new hazards needs to be undertaken on a regular basis. The WHO (World Health Organisation 1998) recommends the following hazard monitoring process for recreational areas:

1. Determine what is to be inspected and how frequently.
2. Monitor changing conditions and use patterns with regularity.
3. Establish a regular pattern of inspection.
4. Develop a series of checklists suitable for easy application throughout the system. Checklists should reflect national and local standards where they exist.
5. Establish a method for reporting faulty equipment and maintenance problems.
6. Develop a reporting and monitoring system that will allow easy access to statistics regarding ‘when, where, why and how’ questions needing answers.
7. Investigate the frequency of positive and negative results of inspections.
8. Motivate and inform employees of the inspection process through in-service training.
9. Use outside experts to critically review the scope, adequacy and methods of the inspection programme.

At Victorian beaches there are currently a number of agencies auditing and monitoring beach conditions e.g. local government monitoring of beach cleaning, EPA monitoring of litter and water quality at some beaches and Surf Life Saving Victoria’s beach safety audits. The changeable nature of beaches requires that beach monitoring be regular and ongoing. Regular monitoring is an essential part of beach accreditation of classification systems. The European Blue Flag program, for instance, requires an annual re-evaluation of beaches, and the right to fly the Blue Flag is removed if the criteria are no longer met. For these systems to be credible and reliable sources of information for beach users, identification of beach hazards and monitoring of beach conditions needs to be undertaken in an effective and regular manner.

8. Prevention Measures



Prevention measures

To maximise the level of safety at beaches it is necessary to identify the hazards and to devise intervention strategies to remove or reduce the impact of these hazards. Interventions usually fall into the following major types (Ozanne-Smith and Williams 1995):

- Legislation/regulation (accompanied by enforcement)
- Environmental/design changes
- Education/behaviour change/incentives
- Advocacy
- Community or organisation based

Selection of countermeasures ideally should:

- Follow adequate problem definition
- Involve design or organisational change as this will not require individual action
- Have cumulative protective effect over time
- Be acceptable to those to be protected
- Have measurable effects
- Have a positive benefits/cost ratio
- Have no unwanted side effects or potential misuse

8.1 Main factors and prevention measures

This study has identified a number of factors operating in the beach environment that may influence the occurrence and severity of incidents leading to negative health outcomes (Table 13). The main types of strategies that could be employed to prevent these incidents are summarised in Table 14, based on a matrix developed by Haddon (Haddon 1980).

8.2 Beach safety audits

An accurate understanding of risks present at a beach location is an essential prerequisite to the development of appropriate and effective prevention strategies. Surf Life Saving Australia is engaged in a process of conducting risk audits of beaches to provide information on which to base risk reduction strategies. The auditing program aims to reduce public risk and litigation prospects for local councils, state and federal governments and tourist developers; and to save lives, to secure the public from danger or injury at the beach and improve overall safety management (SLSA 1999).

The audits consider the presence of both fixed and variable hazards; beach characteristics; adequacy of signage; beach access; coverage by life saving, emergency services and education programs; beach user profile; beach activity profile; and amenities.

The results of this study suggest that these audits, supplemented with data on deaths, non-fatal injuries, rescues and crime etc, may provide a sound basis for addressing issues of hazard reduction at individual beaches.

8.3 Life saving patrols

Victoria has 65 beaches, which are patrolled by lifesaving clubs during the summer months. When patrols are in place the lifesavers use their knowledge and experience to identify the safest area to swim on each beach and display red and yellow flags to indicate its location to beach users. Royal Life Saving Victoria and Surf Life Saving Victoria patrol weekends and public holidays from the end of November to Easter. Surf Life Saving Victoria have professional lifeguard patrols each day between Christmas and the end of January at 26 coastal beaches.

During the 2001/2002 patrol season, professional lifeguards made 400 rescues, 492 first aid cases, found 110 lost children and conducted 27,133 preventative actions. At 25 bay beaches during the 2000/2001 season Royal Life Saving Victoria patrols performed 167 rescues, 1632 first aid actions, 62 lost children, 294 swimmer assists, 2177 SunSmart advice, 853 safety warnings, 92 boating assists and conducted 5533 preventive actions.

8.4 Public awareness and education programs

A number of the hazards present at beaches could be reduced by appropriate community awareness or education programs. This approach has been used widely and successfully to combat the drowning hazard.

The successful water safety campaign '*Play it Safe by the Water*' provides the government and the aquatic industry with an opportunity to promote and deliver important water safety information and activities to the Victorian community.

The development over the last five years of a strong public awareness media campaign focused on beach, inland waterways and pools; a week long community participation event known as *Water Safety Week*; linked directly with an extensive schools program both in the classroom and in open water environments has contributed to the lowest drownings on record.

In Victoria, primary school age children have the lowest drowning rates, with 14 drowning deaths of 6-9 year olds over the period of 1992-2002. The second lowest group is 10-19 year olds, with 43 drownings during this period (Royal Life Saving 2001; Royal Life Saving 2002). Over all ages, the drowning rate has been reduced markedly over the last decade with a total of 67 drownings in 1992/1993 being reduced to 39 drownings in 2001/2002.

A second successful prevention program is the Sun Smart campaign which has been responsible for behaviour change with regard to protection from sun burn and skin cancer.

As demonstrated in this report, there are many other hazards present at beaches, and more of these may also be amenable to reduction through community awareness programs and education strategies. Awareness of the hazards, and information as to possible preventive measures, may be able to reduce the prevalence and severity of some beach related injuries. For instance, the high number of foot injuries may be reduced by use of appropriate protective footwear while on the beach, on rocks or in the water. Accurate information as to the hazards present at beaches would also enable beach users to adopt appropriate protective behaviours.

8.5 Signage

One method of conveying important safety and amenity information to beach users is through the use of appropriately designed and placed signs.

Signage is important for three key reasons:

- it informs beach users of dangers, safety issues and other relevant information
- it offers some protection to the land manager from litigation because of duty of care owed by the land manager to warn users of dangers, prohibitions and other safety information
- it provides an economical alternative to that of employing a person to stand at every access track into the reserve and inform people of dangers.



Signs play an important role in risk and safety management of recreational areas and aquatic locations around Australia and the World. Recently more attention has been directed towards improving such signage of Victoria's parks and waterways.

The Victorian Aquatic and Recreational Signage Manual (November 2001) which has been developed through the partnership of key government and aquatic related agencies, outlines a best practice model for water safety signage at beaches (Ellis 2001). Signage audits of beaches are conducted as part of Surf Life Saving Victoria's beach safety audits.

The Water Safety Signage initiatives have developed as a collaborative effort involving a number of agencies and groups. Recently completed water safety audits and facilitation of installation of new signage has been funded through the former Department of Resources and Natural Environment's risk management program involving full aquatic safety signage audit of the outer coast beaches, including Phillip Island, Mornington Peninsula, Barwon Coast, Colac, Otway, through to Warrnambool.

8.6 Litter management and beach cleaning

Litter, both natural and man-made, can cause a number of injuries on beaches. Litter management needs to be approached on several fronts. Man-made litter comes from a number of sources: storm water drains, human activities on the water and on the beach. The first approach is to prevent the litter ending up on the beach: litter traps in the drainage system, appropriate and adequate rubbish disposal bins at beach locations and community education.

Environment Protection Authority Victoria have implemented a program to improve the quality of Victoria's water environments through better environmental management of urban storm water (EPA Victoria 2002). The Victorian Stormwater Action Program (VSAP) is part of the Victorian government's "Greener Cities" policy. A key component of VSAP is

a three-year grant program to assist local government with the development and implementation of their Stormwater Management Plans.

The second approach to preventing beach litter injuries is removal of litter from the beach. While there is general support for removal of man-made litter, the issue of whether natural litter such as shells, driftwood, seaweed, and dead creatures should be removed is more controversial. For some beach users the natural litter of a beach is part of the interest and attraction, and there are questions as to the environmental desirability of removing natural material from beaches.

The Environmental Protection Authority Victoria consider natural debris to be a normal part of the ecology of beach systems, and while arguments may be made for removal of some of excessive amounts of rotting material when beach amenity is impacted, natural debris is not considered to be litter.

The Victorian Beach Cleaning Best Practice Guidelines (Department of Infrastructure 2001) have been developed allowing for such sensitivities, while developing appropriate beach cleaning practices.

8.7 Barriers

Some hazards, such as unstable cliffs, are sufficiently dangerous as to warrant the construction of barriers to prevent exposure of people to the hazards. While for



environmental, aesthetic and practical purposes it would be inappropriate to employ this strategy widely, where an extreme hazard exists at a visited location, barrier construction may be necessary. A beach designated as a higher safety level beach would ideally have no such hazards or, if it did, would employ effective barriers to prevent or discourage access.

8.8 Beach closure

Where beach hazards are at a high level, beach closure may be warranted. For example, weather conditions creating extremely treacherous water conditions, high levels of pollution or environmental emergency such as oil spill may require closure of the beach during the time of increased hazard.

Consultation indicated that there is a need for the development of a standard beach closure sign to be included in the Aquatic and Recreational Signage Manual (Ellis 2001). In response to this, the Environmental Protection Authority of Victoria has consulted with bayside beach managers and has recommended the adoption of a modified version the advisory warning sign No. 101 (Ellis 2001) as the standard.

8.9 Crime prevention plans

The Crime Prevention Division (CPD) of the NSW Attorney General's Department provides resources supporting the development of Local Crime Prevention Plans by local government (Crime Prevention Division 1998). Some proposed strategies are relevant to beaches and include:

- Establish a mobile locker system for the beach front
- Trial mobile police station
- Establishment of police bicycle patrols around the beachfront
- Encourage Council to embrace "safety" as an essential consideration in the planning and development process
- Local town planners informed on Crime Prevention Through Environmental Design (CPTED) concepts
- Establish a 24-hour anti-social behaviour "hotline"
- Promote beach kiosks key locker facility

The CPD encourages the establishment of community partnerships to devise, implement and monitor a local crime prevention plan.

The prevalence of crimes at Victorian beaches suggests that the presence of a Crime Prevention Plan may be a valuable beach attribute, and for those beaches having relatively high crime rates, it would be expected to have high priority.

8.10 Crime prevention through environmental design (CPTED)

Crime Prevention Through Environmental Design (CPTED) is a branch of situational crime prevention which has as its basic premise that the physical environment can be changed or managed to produce behavioural effects that will reduce the incidence and fear of crime, thereby improving the quality of life, and enhancing profitability for business (Draper 2002).

The approach assumes that offenders decide whether or not to commit a crime in a location on factors such as: ease of entry; how visible, attractive or vulnerable the targets appear; the chances of being seen; if seen will the people in the area do something about it; ease of leaving the location (Taylor and Harrell 1996).

Therefore, this approach seeks to design locations in such a way as to counteract these factors by considering issues such as adequate lighting, layout of buildings and barriers, circulation patterns, territorial delineation, and control of physical deterioration.

This approach may have application to those beach locations where there is a high incidence of crime. Beaches that have poorly maintained buildings and facilities, insufficient lighting, unsuitable layout of buildings or access ways may be inadvertently encouraging criminal

activity. Auditing of high risk beach locations within the CPTED framework may identify some solutions to the problem of crimes on beaches.

8.11 New technologies

Current and new technologies may allow the development of protective devices appropriate for beach users. One such a device already exists to assist in the avoidance of skin damage due to over exposure to ultra violet light (UV). Personal UV light meters are available that measure the “skin burning intensity” of the sun light and measures the cumulative daily dose of UV the user is receiving (Optix Tech 2002).

The technology of the Global Positioning System may enable the development of warning devices for swimmers and lifeguards providing an alert indicating that a swimmer has been carried away from the shore or has moved into a hazardous region. Additionally, personal alarm devices for swimmers and beach users may be of value in summoning rescue or emergency assistance.

However, the effectiveness of personal alerting devices or other technologies relies on the compliance of beach users in their use and development of appropriate emergency response systems. The possibility that such devices may encourage greater risk taking also needs to be considered, and their impact on user behaviour would need to be evaluated.

While the cost of such items may be a barrier to their ownership by beach users, the hiring of devices through life saving clubs or kiosks may allow the use of protective equipment at beaches.

Ultimately, new technologies may allow the monitoring of greater stretches of beaches without the need for corresponding incremental increases in patrols.

Table 13. Summary of factors related to beach safety incidents

Factors	Related to the person involved	Related to the agent causing the event or physical environment	Related to the social environment
<p>Pre-event</p> <p>Factors effecting likelihood of negative event occurring</p>	<p>Alcohol or drug use</p> <p>Age</p> <p>Sex</p> <p>Lack of swimming ability</p> <p>Lack of local knowledge</p> <p>Lack of water safety skills</p> <p>Reckless behaviour</p> <p>Dehydration</p> <p>Unaccustomed behaviour</p> <p>Walking, playing or sitting :</p> <ul style="list-style-type: none"> • In water • On beach • On rocks <p>Attempting rescue</p> <p>Playing sport/game</p> <p>Swimming/diving</p> <p>Medical condition</p>	<p>Sun/ Heat/ Glare/UV</p> <p>Sand</p> <p>Rocks</p> <p>Cliffs</p> <p>Broken glass or shells</p> <p>Pollution or litter</p> <p>Watercraft</p> <p>Marine or land animals</p> <p>Offenders</p> <p>Uneven, unstable or slippery surface</p> <p>Sports equipment</p> <p>Rips and strong currents</p> <p>High waves</p> <p>Sand bars</p> <p>Deep water</p> <p>Tides</p> <p>Strong winds</p> <p>Man made structures</p>	<p>Holiday/festive mood</p> <p>Excitement</p> <p>Curiosity</p> <p>Games/sport</p> <p>Group/peer pressure</p>
<p>Event</p> <p>Factors effecting severity of outcome during the event</p>	<p>Lack of skills and/or knowledge</p> <p>Lack of fitness</p> <p>Fatigue</p> <p>Dehydration</p> <p>Impaired judgement and performance</p> <p>Inappropriate or lack of protection e.g. footwear, eye protection</p> <p>Over-exertion</p> <p>Hypoglycaemia</p>	<p>Lack of shade</p> <p>Strong waves or currents</p> <p>Litter and pollution</p> <p>Hard, sharp or rough surfaces</p> <p>Lack of rescue equipment or patrols</p>	<p>Non-observance of speed limits or zoning</p> <p>Reckless behaviour</p> <p>Uninformed behaviour</p>

Table 14. Summary of prevention strategies for beaches

Education regarding:	Enforcement:	Design/organisational:
<ul style="list-style-type: none"> • Local conditions including identification of rips • Hazards at beaches • Alcohol and drug use • Safe behaviour at beaches • Healthy behaviour at beaches • Beach oriented water safety and swimming skills • First aid 	<ul style="list-style-type: none"> • Environmental regulations • Boating and watercraft regulations • Animal control • Criminal and disruptive behaviour control • Alcohol control • Beach closure 	<ul style="list-style-type: none"> • Efficient evacuation plans e.g. helicopter landing area • Patrols providing rescue, first aid, education and sunscreen • Signage and information • Best practice beach design, management and maintenance, including safety audits and beach cleaning • Crime prevention plans • Adequate amenities including public telephone, drinking water, emergency access, shade and shelter • Barriers to prevent access to hazards • Avoid facility/carpark development at unsafe beaches • New technologies • Effective educational programs

9. Beach Information Strategies



Beach Information Strategies

There has been a number of strategies employed in Australia and overseas addressing the issues of beach safety and amenity, or aimed at improving access to information about beaches. These strategies have taken the form of competitions, beach guides, rating systems, and accreditation systems.

9.1 COMPETITIONS

The Keep Australia Beautiful (KAB) organisation has long made use of competitions as a motivation for environmental improvement. The success of the long running Tidy Towns program, has led to the development of a similar program for beaches – The Clean Beach Challenge. This program was initiated by KAB Queensland in 1998, has been adopted by New South Wales and will begin in Victoria in 2003.

The judges take into account each beach's geographic, environmental and economic circumstances, and assess how efficiently and effectively the community uses the resources available to it against a range of criteria, including tidiness and litter abatement, visitor friendliness and hospitality, fauna and flora management activities, community interaction, youth activities, resource conservation and waste management, and local government leadership within a community.

In Queensland, ten different awards are given for each of six regions and include Cleanest Beach Award and Friendly Beach Award. The awards are intended to function as a motivation to improve the beach environment. The possession of a beach award would also provide beach users with some indication of the environmental standard of the beach, which may be useful in choosing which beach to visit.

However, while beach awards add to the beach user information base, the fact that they are only awarded to a small number of beaches across the state limits their usefulness. Such competitions would provide a useful adjunct to a broader system, but are insufficient to meet the information needs of beach users.

9.2 BEACH GUIDES

Perhaps the most thorough method of providing information about beaches is through beach guides. These have taken the form of books, booklets, pamphlets and websites. They provide the opportunity to present a potentially large array of information about beaches, to be accessed and employed by users when required.

The main challenges for beach guides are the acquisition of accurate information, keeping information up to date, the difficulty of delivery to the user and ensuring the user friendliness of the guide. While it would be possible to publish an extensive guide, covering all aspects of beach characteristics, this may result in a substantial volume that is expensive and too large to use easily. Smaller guides would be cheaper and easier to use, but the information needs to be presented very concisely and distribution is still a challenge.

Presentation of the information electronically, on a website, has the potential to address a number of the challenges. Large amounts of information can be presented in interesting and easy to use formats, relatively cheaply with easy delivery to those having internet access. The limitation to this approach is that not all beach users have ready access to the internet, and even for those who do, the lack of portability limits usefulness.

9.2.1. Review of beach guides

- ***Beaches of the Victorian Coast & Port Phillip Bay***
Victoria (Short 1996)

A 298 page book, distributed by Surf Life Saving Victoria, r.r.p. \$42.95.

This publication was produced as part of the Australian Beach Safety and Management Program. The guide provides descriptions and assessments of 560 Victorian coastal and bay beaches. Each beach review contains information such as:

- Presence of patrol service
- Beach hazard rating
- Beach type
- Length of beach
- Description of beach and surrounds
- Information with regards bathing, surfing and fishing
- Brief summary of facilities and attractions

For some beaches there is also an accompanying map of the beach, showing main morphological features, facilities, access roads etc and graph of hazard rating as a function of wave height and wind hazard loading or wave height guide.

The beach hazard rating included in this publication provides an important source of information about a beach's suitability for bathing. The hazard rating is based on the morphological and environmental characteristics of the beach, which can produce hazards such as deep water, presence of rips and currents, strong waves. The ratings are subject to modification when wind hazards are present and variations in wave height.

This book is an excellent technical guide to Victorian beaches, and would be a valuable resource to the dedicated beach enthusiast. However, it would be less suitable for the average beach user. It is relatively large and expensive, may be too technical for the average beach user's needs and has only limited information about beach amenities.

- ***The Bay Beach Guide: The beaches of Port Phillip***
Victoria

This publication is available in both brochure and web-based electronic formats. The guide provides a brief text description and listing of amenities for 53 Port Phillip Bay beaches. It also includes a map of the bay indicating location of the beaches, Life Saving Clubs, water craft zones and main amenities. The web-based version of the guide includes an interactive map linked to beach descriptions.

Detailed identification of amenities takes the form of icons indicating the presence of facilities. Amenities included are toilets, disabled toilet, barbecue, boat ramp, café/kiosk, showers, Life Saving Club, pier/jetty, playground, restaurant, shelter/shade, public transport (bus, tram, train).

The guide was produced by Parks Victoria, Central Coastal Board and the Association of Bayside Municipalities.

Access to both the brochure and the web version for this guide are in need of improvement. Attempts to obtain a copy of the brochure from tourist information centres and kiosks in the Melbourne central business district were unsuccessful, and the web version appears to be available on only one website (www.bayside.vic.gov.au) and is difficult to locate within that site. These access problems severely limit the usefulness of this otherwise valuable resource.

- ***A Visitor's Guide to the Parks, Forests and Coasts of the Great Ocean Road - Beaches***
Victoria
Department of Natural Resources and Environment
www.greatoutdoors.vic.gov.au/t_beach.htm

This web-based resource provides information about the Great Ocean Road region of Victoria. The site includes a well-developed section on beaches which features a useful interactive map with links to information pages about beach locations.

The site map for each beach includes icons indicating presence of life saving patrols, facilities and activities. There are links to additional information: beach description, features of interest, opening & closing times, costs, site map, how to get there (including route map), activities (boating, fishing, diving, surfing, swimming, walking), disabled access rating, downloadable brochures.

This is a valuable resource that makes good use of the flexibility and interactivity of this format. It would provide a useful starting point for the development of a web resource covering all Victorian beaches.

- ***Parkweb***
Victoria
www.parks.vic.gov.au

This web-based resource produced by Parks Victoria, provides access to extensive information about Victoria's national and state parks including beaches. It is an easy to use resource providing information about: things to do, facilities, heritage, fauna, vegetation, nearby parks, how to get there, precautions, guided activities and park notes, maps and guides

- ***Surf Life Saving Victoria Patrolled beaches***
Victoria
www.slsv.asn.au/home_slsv.html

This web-based resource aims to provide a guide to patrolled surf beaches across Victoria, and includes some useful information about location of beaches, brief description of beach conditions and contact information. However, many of the entries on this site are incomplete in terms of the critical information concerning patrol availability.

- ***Environmental Protection Authority Beach Report***
Victoria
www.epa.vic.gov.au/beachreport/brmap.asp

The Beach Report is a web-based resource that provides information to beach users about the predicted water quality at 36 Port Phillip Bay beaches. The Beach Report is available only during the summer period. Water sampling for the report is conducted weekly, from 1 December to 31 March, and twice weekly from Christmas to the end of January. The

predicted beach water quality is based on weather conditions, beach history and the latest water sample results.

- ***Environmental Protection Authority Beachwatch Bulletin***

New South Wales

www.epa.nsw.gov.au/beach/beachupd.asp

The Beachwatch Bulletin is a web-based resource that provides information about water conditions for Sydney's ocean and harbour beaches. The Bulletin operates year round, is updated daily, and includes an indicator of the likelihood of pollution at each beach and any other hazard information supplied by local councils eg. notice of beach closure due to dangerous surf conditions.

The site uses the simple, but effective, smiley face icon to indicate the absence of pollution at a beach, and a crossed circle icon to indicate the presence of pollution.

- ***Good Beach Guide 2001***

United Kingdom

www.goodbeachguide.co.uk

This book and web-based resource produced by The Marine Conservation Society (United Kingdom) provides a guide to beaches in the United Kingdom. The book sells for £3.50.

Two forms of beach information are available. Firstly, beaches are graded on the basis of their compliance with water quality criteria. The gradings are:

- Recommended (Sandcastle icon) – minimum sewage contamination risk
- Marine Conservation Society guideline pass (mcsG) – affected by sewage pollution under certain tide conditions or heavy rain
- European Commission guideline pass (G) – fail EC mandatory test 5% of time
- European Commission mandatory pass (P) – pass EC mandatory test but substantial pollution risk
- European Commission mandatory fail (F) - contaminated

In addition to the water quality rating, a range of other information is also included: beach description; bathing safety; litter management and cleaning; beach facilities; seaside activities; wildlife and walks; getting there; parking; public transport; tourist information contact details. The web-based version includes an interactive map linking to beach information pages and Ordinance Survey maps for the area surrounding the beach.

Information about the beaches is collected by beach managers' completion of the "Beach Information Form" which is available for download from the website.

The water quality status is the overriding focus of the guide. The Marine Conservation Society will only recommend beaches that achieve the Marine Conservation Society Guideline Pass with respect to water quality (100% pass the European Commission Mandatory Standard, 80% pass the European Commission Guideline Standard), and are not affected by any sewage outfalls which discharge raw, preliminary or primary treated sewage.

The guide is, at this stage, incomplete with a number of recommended beaches having no information beyond the water quality assessment, but for those beaches where information

is available it provides a potentially useful resource.

- ***Ajuntament de Sant Josep: Beaches***

Spain

www.sanjose-ibiza.net/plagesing.htm

This is a web-based guide to beaches on the Spanish Island Sant Josep (Sant Josep 2002). The guide has a tourist focus and for each beach provides textual information such as access, transportation, description, length, width, terrain, depth, orientation and predominant winds and scenery. Beaches are classified by service level and activities separately, and the following categories are employed:

Service Levels:

- I Beaches with numerous services
- II Beaches with basic services
- III Natural beaches, with very little landscape transformations and minimum services
- IV Other places of interest away from the shoreline

Activities:

- I For young excursionists who love serenity and scuba diving
- II For people searching for tranquillity without a variety of amenities
- III For young people or families looking for sports facilities and amenities
- IV For people looking for comfort and a wide range of services

9.2.2 Need for Victorian beach guide

Consultation with stakeholders indicated considerable support for the development of a Victorian Beach Guide based on *The Bay Beach Guide: The Beaches of Port Phillip Bay*. It was considered that extension of the guide to include outer coastal beaches would be of value.

However, the content of the guide would need to be enhanced to provide indications of safety rating at the beaches. Inclusion of the ABSAMP hazard rating (see Section 8.3.1), or a broader hazard or safety rating encompassing a range of factors such as bathing and beach safety, water quality and personal security would assist readers in determining the suitability of beaches for their needs.

9.3 RATING SCHEMES

Rating schemes have been used for a number of products as a shorthand way of conveying information to consumers. Rating levels indicate to consumers the absolute and relative level of some specified characteristic of a product. For example, in Victoria, rating schemes have been used to inform consumers of the energy efficiency of house design and domestic appliances. These schemes make use of a star designation, with the greater the number of stars the greater the energy efficiency of the product.

Employment of a rating system to convey safety information concerning beaches would need to be based on well considered principles, as failure to use or interpret the rating correctly could have serious consequences. Such a system would need to be based on accurate and up to date information. It would also need to incorporate a process for revision, as beach conditions are subject to change, both short-term and long-term and the rating would need to be unambiguous and easy to interpret.

9.3.1 AUSTRALIAN BEACH RATING SYSTEM

- **ABSAMP beach hazard rating**

A rating scheme has been developed in Australia, as part of the Australian Beach Safety and Management Program (ABSAMP), specifically addressing the issue of beach safety (Short 1996). The rating is, in effect, a bathing hazard rating, and provides a numerical value indicating the degree of hazard at a beach. The rating is related to the beach type together with any local hazards such as rocks, reefs, inlets and presence of strong winds. The scale ranges from 1 (safest) to 10 (least safe). The rating refers to average wave conditions and therefore any change in wave height, length or direction will change the hazards. Consequently, the system includes a procedure for calculating hazard rating taking into account wave height and beach type.

This rating provides an important source of safety information for Victorian beach users and should be included in some form in any proposed beach user information system.

9.3.2 INTERNATIONAL BEACH RATING SYSTEMS

Several rating systems have been developed for beaches in the USA and UK incorporating criteria related to safety, amenity and aesthetics.

- **Leatherman beach rating scheme**

In the USA, a beach rating scheme was designed and implemented based on 50 criteria covering physical characteristics of beach, climate, biological factors, and factors relating to human use and impact (Leatherman 1997).

The system was designed to reflect the primary importance of swimming water in general beach use. For each of the 50 factors there was a 1 to 5 ranking, with 5 reflecting the most positive attributes and 1 the most negative. For example, for the factor “smell” the categories ranges from 1 (bad odours) to 5 (fresh salty air). These values are used to construct a beach rating profile, and it assumes that the more complete the profile, the more desirable the beach. The rating system has been used to provide a ranking of beaches which has appeared in the popular media and includes identification of categories such as: best scenic; best amenities; best wilderness; best sports; best resort destination.

The safety related criteria addressed in this system are:

- Wind speeds
- Size of breaking waves
- Number of waves/width of breaker zone
- Beach slope (underwater)
- Longshore current
- Rip currents present
- Turbidity
- Floating/suspended human material (sewage, scum)
- Red tide
- Pests (biting flies, ticks, mosquitoes)
- Presence of sewerage/runoff outfall lines on/across the beach
- Glass and rubble
- Well kept grounds/promenades or natural environment
- Lifeguards
- Safety record (deaths)
- Intensity of beach use

- Floatables in water (garbage, toilet paper)
- Public safety (e.g. pickpockets, crime)
- Competition for free use of beach (e.g. fishermen, boaters, waterskiers)

- **Morgan user-based rating system**

One weakness of the Leatherman rating system is that it makes assumptions about the desirability of attributes without determining whether these assumptions accord with the actual preferences of beach users. Morgan (Morgan 1999) stresses the need for a rating system to take into account user preferences, to recognise that not all aspects of beaches are of equal importance and have regards to differing requirements at different types of beaches. Morgan used findings from a survey of beach user preferences to determine weighting of items on a detailed checklist which was used in a pilot study to assess 70 Welsh beaches. The system used 49 beach factors consisting of physical, biological and human use factors. The study identified the need for a requirement that beaches should meet minimum standards for a range of important beach aspects in order to achieve an overall rating. It also highlighted the need to distinguish between those wishing to visit developed beaches and those wanting a pristine uncommercialised beach environment.

The outputs of the Morgan system are a series of percentage rating scores including a total score plus separate scores for physical, biological and human-use factors. The system includes as one of its criteria the Short hazard rating the value of which is subtracted from the total checklist score. Other safety related criteria are:

- Size of breaking waves
- Submerged obstacles: trenches, pits, groynes, rocks etc.
- Presence of dangerous cliffs, precipices etc (above at least part of beach)
- Wind speed
- Insects or similar pests
- Dangerous animals offshore (jellyfish, sharks etc) average occurrences per season
- Sewage debris on beach (mean no. of items per 10 m of strandline, from examination of 100m)
- Water quality
- Litter on beach
- Lifeguards
- Are animals permitted on the beach?
- Are watersports (water-skiing, jet-skiing, sailboarding) permitted offshore?

9.4 ACCREDITATION AND AWARD SCHEMES

Reputable accreditation programs are useful means of providing consumers with the assurance that certain standards have been reached by a service or product. To receive accreditation a set of criteria must be complied with and, if properly managed, accreditation can be beneficial to both service/product consumers and providers.

In Australia, accreditation has been used for a diverse range of products: for example, foods (the Heart Tick Program of the Heart Foundation); ecotourism (Nature and Tourism Accreditation Program of the Ecotourism Association of Australia); camp sites (Camping Association of Victoria).

Internationally, accreditation programs have also been used for beaches. The main such program is the European Blue Flag Award, which is employed across Europe and in South Africa. In the United Kingdom there are several additional beach accreditation programs: Encams Seaside Award and Green Coast Award.

9.4.1 Review of award schemes

- **Blue Flag Campaign**

The Blue Flag Campaign is a program of eco-label awards given to beaches and marinas in 23 countries across Europe and South Africa (Foundation for Environmental Education 2002). It is owned and run by the non-profit organisation Foundation for Environmental Education. The criteria for award of The Blue Flag accreditation relate to water quality, environmental education and information, environmental management, safety and services. The Blue Flag is awarded annually and satisfactory compliance with the criteria allows a beach to fly the official blue flag bearing the campaign's logo.

There is some scope for variation of the criteria to meet the needs of the conditions of individual countries. The South African Blue Flag program employs a modified set of criteria, and adaptation of the European program is being explored in a number of other countries. In the Caribbean, the program is being considered in response to the increasing threat of poor water quality (QTC 2000) (Green Globe 21 2000). Seven countries in the Caribbean are conducting one year pilots before full implementation of the program (Thomsen 2002). Studies on the feasibility of introducing the program to Asia are being conducted in Malaysia, Philippines and Thailand (Canadian Universities Consortium 2000). Negotiations were conducted with Canada and the USA with intended implementation in autumn 2002, and Uruguay and Oman have expressed interest in the program (Thomsen 2002).

Blue Flag Awards are seen as prestigious (BBC News 2001). The Blue Flag is sought by local authorities for the status it confers upon them and the attraction it has for beach tourists (QTC 2000). In South Africa, the awards are seen as providing job creation through improved tourism and recreational opportunities; improved environmental quality of South Africa's coastline; and increased public awareness and education of the need for environmental management (Coastcare). Blue Flag Awards have also been used as negotiation tools. In an environmental campaign to oppose the granting of salmon-farming licences in Ireland, the proximity to a Blue Flag beach was cited as an objection (Save the Swilly 2001).

One criticism of the Blue Flag program has been that it is not appropriate for rural beaches. Beaches which meet the program's criteria are likely to be major resorts (Comhairle nan Eilean Siar) (Encams 2002). However, in the United Kingdom, Encams is running a pilot Rural Blue Flag Program (Encams 2002). The pilot is being conducted at 12 beaches during 2002 and it may be extended to other beaches in 2002/2003 after review of the scheme.

- **Encams Seaside Awards**

In the United Kingdom, the Blue Flag Awards are administered by Encams which also runs another beach award program specific to the UK: Seaside Awards program. Unlike the Blue Flag program, the Seaside Awards program recognises both resort beaches and rural beaches with separate criteria for each type of beach.

Beaches meeting the criteria are eligible to fly the official yellow and blue Seaside Award flag.

- **Green Coast Award**

The Green Coast Award has been piloted in Wales to recognise more rural beaches which have high water quality but may lack the infrastructure needed to be eligible for the Blue Flag Award (Batte 2002).

9.4.2 Limitations of awards

A number of concerns have been identified with beach award programs. While there are advantages to being able to represent the quality of a beach by a single simple symbol, such as a flag, there are also problems with this. For such a symbol to function properly it is necessary that those acting in response to it have an accurate understanding of its meaning, and there is some doubt concerning this. Further, there are suggestions that such programs have impacts far beyond the purpose for which they were intended: economical, environmental and political. Such impacts are not always positive. It has also been suggested that the standards set by the awards made not be of a sufficiently high standard.

Lack of clarity as to the meaning of beach awards has been identified as a problem. Where there is more than one type of award system people are confused as to whether they mean the same thing, whether they mean that the water is clean (Dorset Coast Forum 2002).

One study found that while most beach users asserted that award status was an important basis for beach selection, the findings suggested there was poor levels of knowledge of the awards criteria and the award status at particular beaches (Nelson, Morgan et al. 2000). In a survey of 700 beach users in the UK relatively low levels of awareness and understanding of beach awards were found. Only 49% of respondents claimed to be aware of the beach award flags used in the UK, and there appeared to be a wide lack of understanding of the meaning of the different types of beach flags. Only 19% associated a flag with a beach award scheme, 6% thought that the flag meant the beach was clean and safe, 17% thought the flag indicated danger, and 30% had no understanding of beach awards at all.

Beach awards have been criticised as being likely to mislead the public unless beach users are aware of what the flags actually mean (Surfers Against Sewage 2002). It was suggested that beach users need to think carefully about what they want from a trip to the beach and look for the appropriate type of flag.

Concern has been raised about the impact of the loss of Blue Flag status. "European destinations can lose coveted blue flag status for their beaches due to the pollution activities of others. Local mayors have lost their posts because of the loss of blue flag status, and the economic result can be closed hotels, empty restaurants, and unemployed vendors." (Manning 1998)

The impact of the high level of beach cleaning on wildlife has also been questioned. It has been suggested that the high standards required to win a Blue Flag award may be causing beaches to be overcleaned, as mechanical beach cleaning removes ecologically important seaweed as well as rubbish. (BBC News 2001).

The adequacy of the standards required by the awards has also been questioned (Kirby A 2000). The E coli poisoning death of an eight year old girl in 1999, after bathing at a Blue Flag beach brings the adequacy of the programs water quality criteria into doubt. The Marine Conservation Society's Good Beach Guide had not recommended the beach in question as it was affected by a raw sewage outfall.

It has also been argued that awards that meet only minimal water quality requirements would interfere with the drive for water quality to be improved at these locations (Surfers Against Sewage 2002).

Further, there are a number of disincentives for local authorities to become involved with beach award programs (Comhairle nan Eilean Siar): likelihood of failure; bad publicity of failure; associated funding commitments if successful.

9.4.3 Blue Flag in Australia

Consultation with the Blue Flag management agency, Foundation for Environmental Education (FEE) in May 2002 indicated there had been a number of informal discussions with individuals concerning the implementation of the Blue Flag program in Australia, but the process had not proceeded beyond this initial point.

The process required to bring the program to Australia is:

- Involvement of appropriate auspicing organisation. FEE suggested that the Australian Association for Environmental Education may be appropriate.
- Form a Blue Flag committee in cooperation with authorities and private sector
- Carry out a feasibility study.
- The campaign should be national, but implementation could begin in a single state.

More recently, a representative of the Department of Primary Industry, Water and the Environment, Tasmania has met with Blue Flag administrators and is currently exploring the possibility of Australian involvement. Informal discussions, exploring the introduction of the Blue Flag Program in Australia, were held at the Coast to Coast Conference in November 2002, and a meeting of interested parties is to be held in Melbourne in March 2003 to address this issue further.

However, some stakeholder groups have noted that the Blue Flag program has had deficiencies in other jurisdictions and more information about its implementation in the Victorian context is required before support would be forthcoming.

10. Beach Attributes



Beach Attributes

Any system of beach classification needs to identify which attributes are required at beaches for them to function effectively as suitable recreational destinations. However, as discussed earlier, the purpose of beaches is not uniform. Not all beaches should have all possible amenities or attributes, as the needs and preferences of beach users are varied and the environmental sensitivities of beaches may preclude development.

The LOS approach outlined in Chapter 4 requires identification of attributes appropriate for each level of service (class of beach). Full development of a LOS model for beaches, and identification of attributes for each level is beyond the scope of the current study. However, the highest level of beach class is of particular relevance for the identification of beaches suitable for people requiring low hazard beach conditions and well-developed facilities, such as families with young children. Consequently, this study has endeavoured to identify a set of attributes appropriate to this class of beach. This process has been informed through consultation with beach safety experts and review of injury data, literature and electronic resources.

10.1 CONTEXT OF BEACH USE

A submission from Royal Life Saving Victoria (Farmer 2002) also stressed the need to consider the context in which the beach is being used and by whom. People visit the beach for many reasons, and those reasons will determine the relative importance of the attributes. For example, a person visiting a beach alone may have solitude or safety as a primary attribute whereas others visiting with friends or family may have other attributes as their primary focus. What a person wants from a beach may depend on factors such as gender, age, whether alone or with others, socioeconomic background, cultural background, time of the year, location of the beach and the familiarity of the visitor with the beach.

10.2 WHICH ATTRIBUTES?

Surf Life Saving Victoria (SLSV) submitted proposed infrastructure and service requirements for a “family friendly” beach for consideration by the study. The full listing of these suggested requirements is shown in Appendix 9, and a summary is shown in Table 15.

A comparison of the SLSV attributes and those of beach award programs is shown in Table 15. There are 3 award programs that aim to identify more highly developed and safer beaches: European Blue Flag Award; Encams Seaside Award: Resort Beach; Queensland Tourism Friendly Beach Award. While there is considerable agreement as to desirable attributes, only SLSV recommends the inclusion of an appropriate beach hazard rating as one of the criteria.

The hazard rating recommended by SLSV is the ABSAMP hazard rating developed by Short (see Section 8.3.1) and ranges from “1” safest to “10” most hazardous. SLSV propose that a “family friendly beach” have a rating of 6 or less and recommend the presence of lifeguard patrol to be an essential requirement.

In the presence of a patrol this level of hazard would be acceptable. However, patrols only operate at certain times, and in the absence of a patrol, such a beach would present unacceptable hazards. This raises the question of whether a “family friendly beach” classification would only apply to a beach when patrols are present. It would be necessary to develop a mechanism of clearly indicating that in the absence of patrols, the beach is no longer “friendly”.

Recommendations will need to take the absence of lifeguard patrols into consideration. For instance, while a rating of 6 or less may be acceptable for a beach that is patrolled, in the absence of patrols, family beaches would need to have a hazard rating of 3 or less.

The inclusion of a hazard rating is an important addition to the set of criteria for safer beaches. The awards schemes, while giving an indication to the beach user of the safety of a beach in terms of pollution and litter hazards, give no indication of the hazards associated with beach morphology and conditions.

Table 15. Comparison of specified beach attributes

Beach Attribute	Surf Life Saving Ellis (2002) Victoria	Blue Flag Europe	Encams Seaside Award: Resort United Kingdom	Friendly Beach Award Queensland
Appropriate beach (water) hazard rating	√			
Water quality	√	√	√	√
Lifeguards/first aid	√	√	√	√
Signage	√	√	√	√
Public warning procedures		√		
Pollution and litter control	√	√	√	√
Education & information nodes	√	√	√	√
Safe access	√	√	√	√
Road safety	√			
Toilets	√	√	√	√
Changing rooms	√			
Management of conflicting needs of users		√	√	
Public phone	√	√	√	
BBQ & picnic facilities	√			√
Drinking water	√	√	√	
Playground	√			√
Public transport	√	√		
Policing	√			
Recreational activities	√			
Refreshments & food facilities	√			√
Environmentally friendly	√	√	√	
Flora & fauna				
Beach regulation/policing	√	√	√	
Dog and other domestic animals restrictions		√	√	
Disabled facilities	√	√		√
Risk management	√			
Equipment & buildings maintained		√		√
Artificial lighting	√			
Shelter/shade	√			√

10.3 DEVELOPING CRITERIA FOR “HIGHER LEVEL OF SAFETY” BEACH

Consultation with stakeholders indicated that considerable expertise and information exists within agencies, and that it would be inappropriate to prescribe specific attributes without substantial involvement of those individuals and agencies. Development of the specific details of desirable beach attributes would be best achieved by the agencies working together, drawing on their skills and knowledge, the results of the current study, and supported by further research. It is suggested that there needs to be further opportunity for beach managers and agencies to work collaboratively beyond the present study.

On the basis of information available to this study, the following broad criteria are suggested as being required for a beach with the highest level of safety and amenity:

- Low hazard rating e.g.:
 - ABSAMP hazard rating (Short 1996)
 - 3 or less if beach is not patrolled by lifeguard service
 - 6 or less if beach is patrolled by lifeguards
 - Low ratings for other hazards: e.g. injury, crime

- Auditing, risk management practices and review processes in place for:
 - Signage
 - Bathing hazards
 - Pollution and litter control
 - Safety – including access; activity zoning
 - Security – personal and property
 - Ecological and cultural
 - Shelter and shade
 - Information nodes – safety, local knowledge, environmental, historical, cultural

- Public amenities:
 - Toilets
 - Changing rooms
 - Public telephone
 - Drinking water
 - Showers
 - BBQ & picnic facilities
 - Playground
 - Recreational activities
 - Kiosk and/or café
 - Car parking
 - Public transport

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APPENDIX 1

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APPENDIX 2

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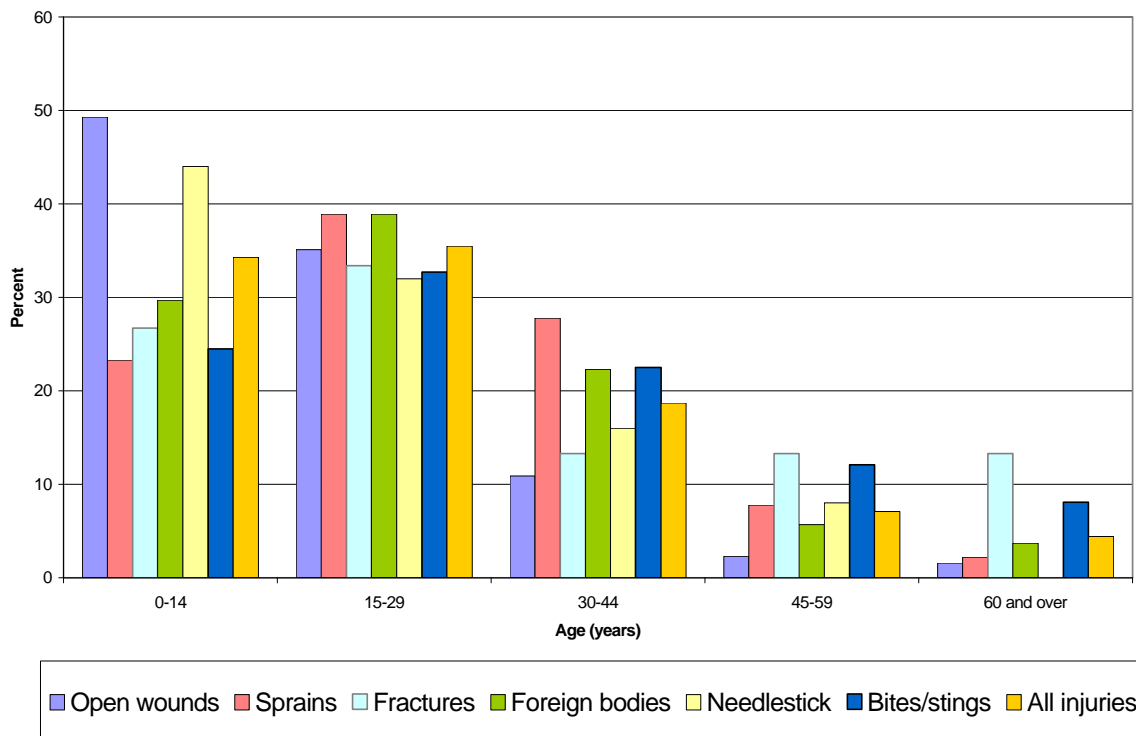
APPENDIX 3

HOSPITAL EMERGENCY DEPARTMENT PRESENTATIONS

The Victorian Emergency Minimum Dataset (VEMD) is a database which captures approximately 80% of Victorian public hospital emergency department presentations. Identification of beach related injury on the VEMD is reliant on a text search of the 100-character “description of injury event” variable for the text term “beach”. All records containing “beach” were retrieved for the period of October 1995 to December 2001. These data were analysed to determine what types of injury events are occurring at beaches, and who is most at risk of these injuries. As the records do not give a direct indication of the severity of the injury, admission to hospital was used as an indirect measure, assuming that it is only the more severe injury cases that admitted to hospital, rather than being discharged to home.

The results show that during this period there were 508 people identified as being treated at Victorian hospital emergency departments for injuries incurred at beaches. There was a predominance of males (61%), and most cases were under the age of 30 years. The age distribution of beach injury cases is shown in Figure 1. A summary of the types and frequencies of the injuries is shown in Figure 2.

Figure 1. Age distribution of beach related injuries (N=508)



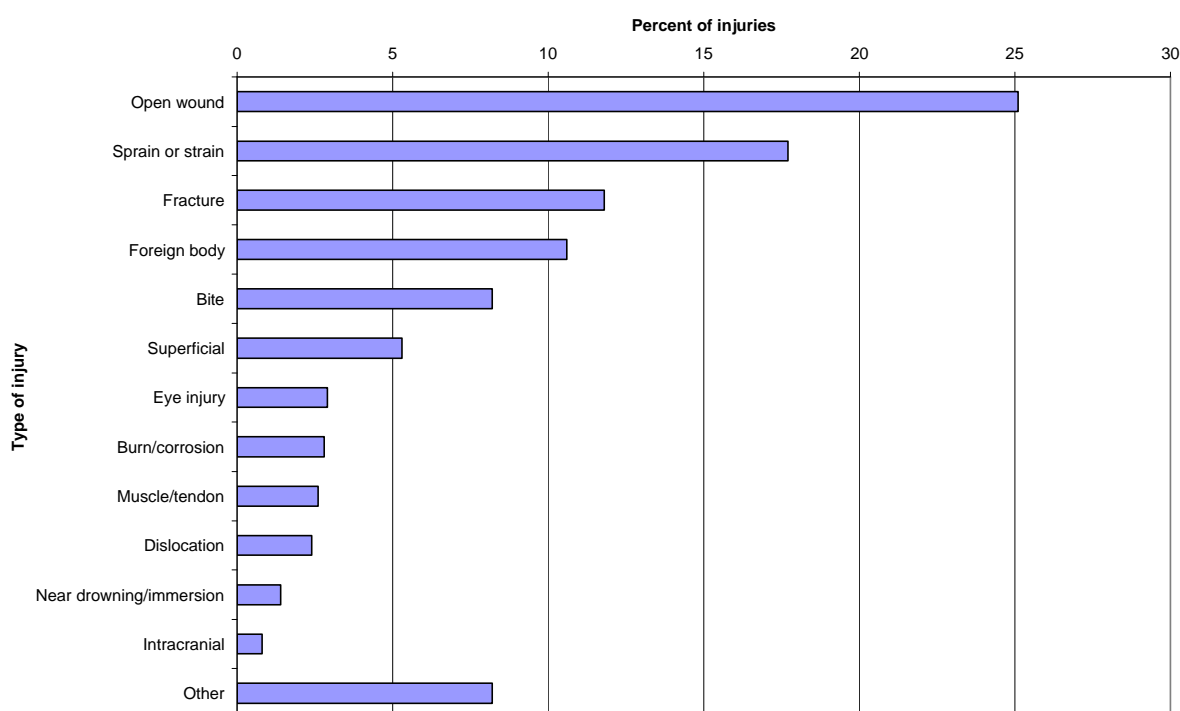
Admission to hospital (N=45)

Injuries were sufficiently severe to require admission to hospital for further treatment in 8.8% of the cases. The most common type of injury requiring admission was fractures, including 3 cases of neck fracture. Two of these neck fractures were caused by diving and one by being dumped by waves. Two admissions were due to severe sunburn, and there were 3 cases of injury resulting from assault. Injuries associated with falling onto rocks led to 5 admissions: 4 fractures and 1 injury to internal organs. Two admissions resulted from near drowning or immersion.

Types of injuries

A summary of the types of injuries occurring at beaches and their prevalence is shown in Figure 2 and summary of the main findings for each type of injury follows.

Figure 2. Types of injuries occurring at beaches (N=508)



Region of body injured

The most commonly injured body region was the lower limbs: knee, lower leg, ankle, foot and toes (51.5% of all injuries) with foot and toes being the site of injury 53% of these lower limb cases. Upper limbs (shoulder, upper arm, elbow, forearm, hands and fingers) were the sites of 17.6% of injuries. Neck, head and face were the sites of 19.5% of injuries, with 53.8% of these being injuries to the eye.

Near drowning or immersion (N=6)

Although relatively few in number, near drowning and immersion injuries are potentially the most severe. This is reflected in a 33.3% admission rate for these injuries. Near drowning and immersion injuries mostly involved children under the age of 10 years (83.3%) and the majority of the cases were males (66.7%).

Open wounds (N=128)

The most common type of injury was “open wounds” and the majority of these occurred on the feet or lower leg. Rocks or glass were the most common causes of these injuries. Other causes were shells, metal objects, surfboards, steps and other beach structures. Sixty four percent of open wound cases were male. These injuries tended to be relatively minor with only 4.7% of cases being admitted to hospital. Children under the age of 15 years are particularly at risk.

Sprains and strains (N=90)

Sprains and strains were the second most common injury experienced at beaches. Fifty eight percent of these cases were male. These injuries were most common in the 15–29 years age group. Most of these injuries involved the ankle (36.7%) or foot (15.6%). These injuries tended to have low severity with only 2.2% cases admitted to hospital.

Fractures (N=60)

Fracture injury cases were more likely to be female (55%). While fractures were more frequent among people under 30 years of age, there was a relatively high frequency of these injuries among the 45 years and older compared to other injury types. Fracture injuries also tended to be relatively more severe with thirty percent of these cases being admitted to hospital.

The most frequent sites of fractures were foot/toe, ankle, hand/finger and shoulder.

Foreign body injuries (N=54)

Foreign body injuries were more frequent among males (68.5%) and mostly in the younger age groups. Most of these injuries involved foreign bodies in the eye (63%). None of these cases were admitted to hospital.

Bites and stings (N=48)

Bites and stings injuries were more likely among males (65.3%) and people in the 15-29 years age group (32.7%). Although the cause of the bite was often not known, the most frequent identified or suspected causes were: insect (6 cases), jelly fish (5 cases), stingray (5 cases), spider or snake (5 cases), dog (2 cases). Two of these injury cases were admitted to hospital.

Needlestick injuries (N=25)

Children under the age of 14 were found to be most at risk of needlestick injuries. Needlestick injury cases were also more likely to be male (68%).

APPENDIX 4

ROYAL LIFE SAVING VICTORIA – Patrol reports

During the beach patrol season, November to March, Royal Life Saving patrol officers record an array of information including details of first aid administered and number of rescues conducted. The data is drawn from 25 patrolled locations around Port Phillip Bay. Records were accessed for the period of November 2000 to March 2001 a total of 995 patrol days.

While the hospital emergency data reflect only those cases thought to be severe enough to warrant medical treatment, data from the records of the Royal Life Saving patrols captures a broader range of incidents as it includes the many more minor incidents.

Rescues

During this period there were 167 recorded rescues. Of these rescues 37.9% were adult males, 18.9% were adult females, 22.9% were child males and 20.3% child females.

Activity

For those rescues where the activity engaged in at time of rescue was identified (N=127) swimming was the most common activity (62.2%), followed by boating/sailing (14.2%), playing (11%), wind surfing (9.4%) and jetski (3.1%).

First aid

There were 1632 cases of first aid assistance during this period. A summary of the types of injuries is shown in Table 1.

Table 1. Type and number of injuries attended by Royal Life Saving patrols

Injury type	Number
stings	643
cuts/abrasions	379
sprains/strains	40
fractures	5
burn	4
spinal	1
resuscitation	1
exposure	12
Other	20
TOTAL	1105

Number of visitors in water

Of the total estimated attendance (n=786,109) only 23% were estimated as entering the water (n=180,821). This tended to be relatively stable across the patrol season with only slightly higher proportions of visitors entering the water in the month of January, with 27% of visitors in the water.

Lost children

Patrols reported 62 lost children during this period.

APPENDIX 5

VICTORIAN ADMITTED EPISODES DATASET

The Victorian Admitted Episodes Dataset (VAED) records morbidity data on all admitted patients from Victorian public and private acute hospitals including rehabilitation centres, extended care facilities and day procedure centres. Data is coded using the International Classification of Diseases (ICD) coding system. The ICD 9 codes 831.5, 834.5, 835.5 and 838.5 were used to identify cases of injury to a swimmer involving watercraft for the period of July 1987 to June 1998. It was not possible to identify such cases more recently than this date as the current version of the ICD system does not support such analysis.

A total of 17 cases of injury to swimmers involving watercraft were identified. There was a tendency for such injury incident to involve younger people with 10 of these patients being 19 years of age or younger. Most of these patients were male (82%).

A summary of the types of injury incurred is shown in Table 1, with fractures being the most prevalent injury outcome.

Table 1 Types of injuries incurred by swimmers in watercraft incidents

Type of injury	Number of cases
Fractures	9
Dislocations	1
Intracranial injury (not skull fracture)	1
Open wound	3
Bruises/haematomas	1
Traumatic complications	1
Other/unspecified	1
Total	17

Most patients remained in hospital for a period of 2 days or longer. The length of stay is shown in Table 2.

Table 2 Length of stay

Length of stay	Number of cases
Less than 2 days	7
2-7 days	8
8-30 days	2
Total	17

APPENDIX 6

SURF LIFE SAVING VICTORIA – First aid incident narrative descriptions

Surf Life Saving patrols provide first aid assistance to beach users. Narrative descriptions of a sample of such incidents are shown in Table 1. These incidents were recorded by Professional Lifeguards during Summer 2001/2002.

Table 1. Sample of First Aid & Resuscitation Incident Reports:

Resuscitation

Serious resuscitation case -1 hour resuscitating, flown to Melbourne - recovered.

Bone and joint injuries

Broken Leg - Twisted in Surf.
Possible broken nose & concussion - hit with surfboard
Dislocated collar bone - hit on sand bank - pops out often.
Dislocated Knee - dumped in shore break
Dislocated right kneecap - shore break
Dislocated shoulder - dumped in surf
Neck Injury - Hit head on sand bank
Dumped by wave - nose bleed, bruised face, sore neck
Sprained ankle
Sprained Knee - hurt in surf
Stubbed Toe - walking on rocks
Damaged toenail - walking on rocks

Soft tissue damage

Cut Head - hit by surfboard
Cut hand - broken glass in sand
Cut foot - broken glass in sand
Cut foot on rock
Seriously cut foot - suspected Stingray injury.
Cut feet and hands from jumping off pier
Cut and sprained hand from falling on rocks
Cut head - hit by surfboard -- referred to Doctor
Cut head - fell over backwards taking photo
Cut webbing between toes - sand boarding
Cut face - body surfed into another person
Cut hands - fell down hill and used hands as brakes
Cut hands - same person, same result as above but 3 days later
Badly cut foot in sand dunes
Cut Foot - jumping off wall and landing on metal
Cut finger - fell over in change rooms
Cut knee - surf board riding
Cut foot - stood on broken beer bottle while walking on rocks
Cut foot - slipped on rocks
Cut above eye - surf board
Small cuts and abrasions

Grazed toes - tripped on rocks
Grazed Toes - skate board accident
Glass in foot - walking on beach
Scratched knee - kneeling in sand
Stone lodged in foot - walking on rocks
Bruised knee - fell on rocks
Broken blisters - playing soccer
Compression injury to finger - beach cricket

Stings and bites

Jelly fish stings.
Wasp sting
Bee Sting
Sting - sea lice
Bite to knee - marine creature while swimming

Eye problems

Eye irritation - person put sunscreen in eye
Sand in eye

Breathing problems

Asthma - minor attack
Asthma - Ventolin
Hyperventilating - dumped in surf

APPENDIX 7

VICTORIA POLICE INCIDENT STATISTICS

The Victoria Police Law Enforcement Assistance Program (LEAP) records information relating to all crimes occurring in Victoria for which a crime report has been completed. Analysis, from the LEAP database, of records of offences recorded at beaches or foreshores was obtained from Victorian Police Statistical Services. Information for 116 locations was available for the period of July 2000 to June 2002. It should be noted that the data reflects only those offences which were made the subject of a completed crime report.

A total of 1584 offences occurred at Victorian beaches or foreshores over the 2 year period. The types and numbers of these offences are shown in Table 1. While the predominance of crimes were committed against property, of particular concern is the substantial numbers of crimes against a person many of which appear to be serious in nature. This level of personal risk suggests that crime prevention at beaches may need to be a major focus for any program seeking to improve the safety of beaches.

Table 1. Type and number of offences occurring at Victorian beaches or foreshores

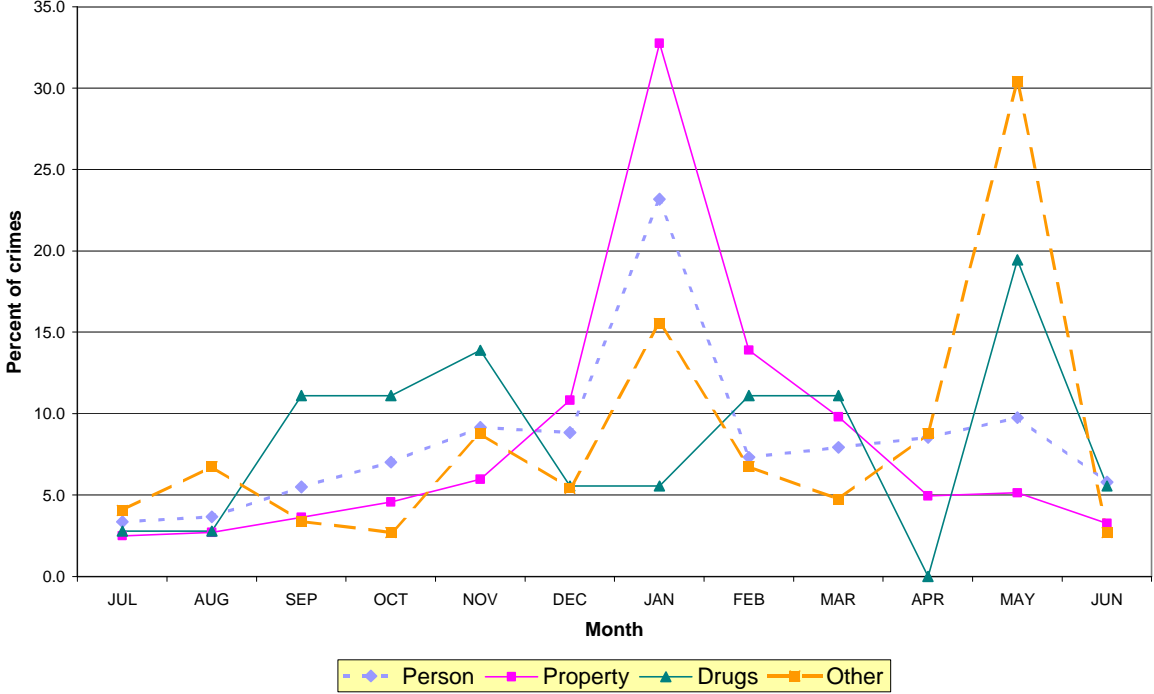
TYPE OF OFFENCE	Number of offences
Crime against person	
Rape	35
Sex (non-rape)	147
Robbery	25
Assault	114
Abduction/kidnap	7
TOTAL	328
Crime against property	
Arson	38
Property damage	131
Burglary (other)	64
Handle stolen goods	6
Theft from motor car	51
Theft of motor car	3
Theft (bicycle)	22
Theft (other)	757
TOTAL	1072
Drug offences	
Drugs (cult/man/traf)	2
Drugs (poss/use)	34
TOTAL	36
Other crime	
Going equipped to steal	1
Justice procedures	20
Regulated public order	22
Weapons/explosives	16
Harassment	3
Behaviour in public	37
Other	49
TOTAL	148
TOTAL: All crimes	1584

Distribution of crimes across the year

The rate of crime appears to be dependent on both the time of year and the type of crime.

While crimes against person and property both peak markedly during January, drug related crime is relatively low during this month and is most likely to occur in the months of May and November. Other crimes also show the highest incident in May and with elevated levels in January.

Figure 1. Types of crimes at beach or foreshore locations by month of year



However, while the rate of crime is higher during these periods it cannot necessarily be inferred that the risk of being a victim of crime is higher. To determine the risk of crime it would be necessary to have some measure of beach visitation rates. While there are many more crimes during January, there are also many more people at beaches during January. While the number of crimes against people is relatively low in May, there are probably few people at beaches in May, so it might be that the risk of being a victim crime during this month may be higher.

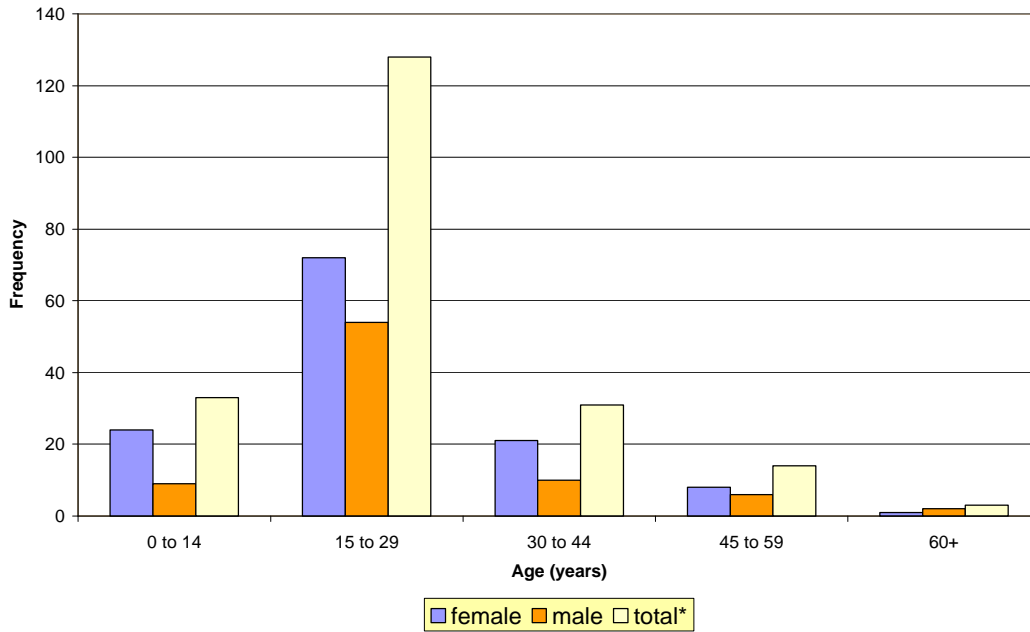
These results suggest that a beach crime prevention program, aimed at increasing the personal safety of beach users and their property would need to focus its attention around the month of January. However, in the absence of an estimation of risk, as a function of time of year, the presence of criminal activity throughout the year suggests that strategies having year long effect are also necessary.

Age and sex of victims

The crime against the person at beaches appears to be primarily a problem for adolescents and young adults as the majority of these crimes affected the 15 - 29 year age group. Females under the age of 45 also appear to be more at risk than males.

The offences against children in the 0-14 year age group were primarily rape (4 females) and non-rape sex (7 males; 14 females), while for 15-29 year olds rape (15 females), non-rape sex (1 male; 30 females) and assault (36 males; 22 females) predominated.

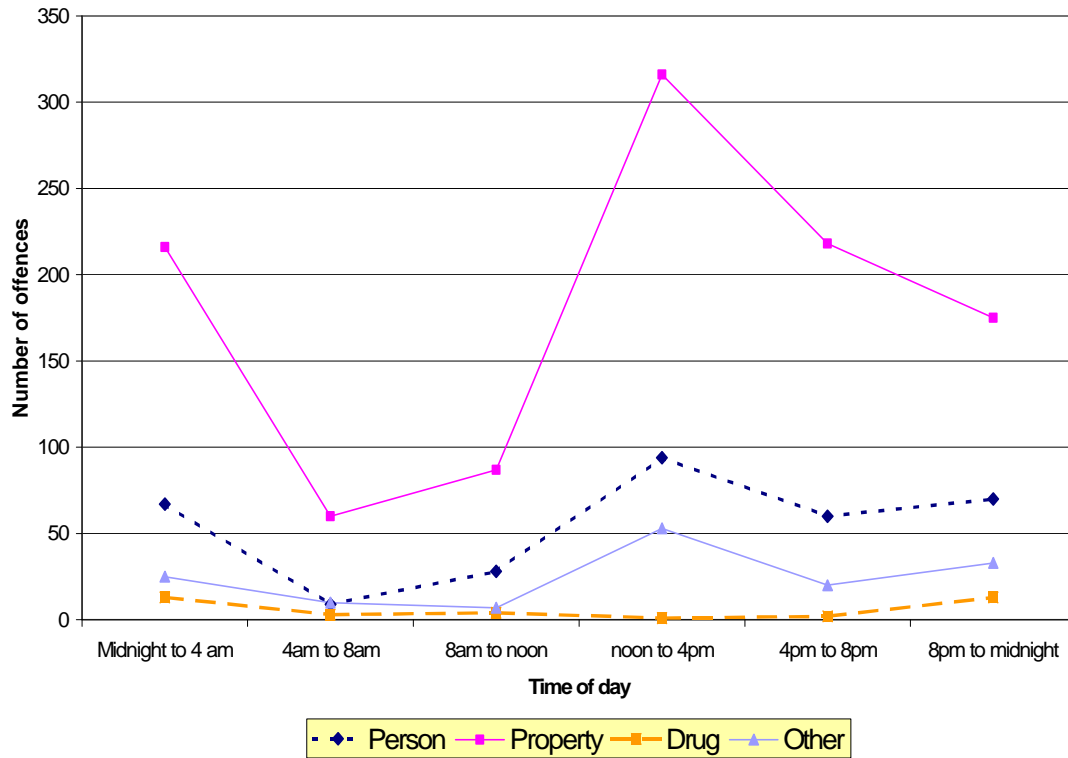
Figure 2. Age and sex of victims of crimes against the person at beach/foreshore locations * total includes recorded victims where sex is unspecified



Time of day

All types of crime except drug crimes, showed highest levels in the afternoon (noon to 4pm) and relatively low levels in early morning (4am to 8am).

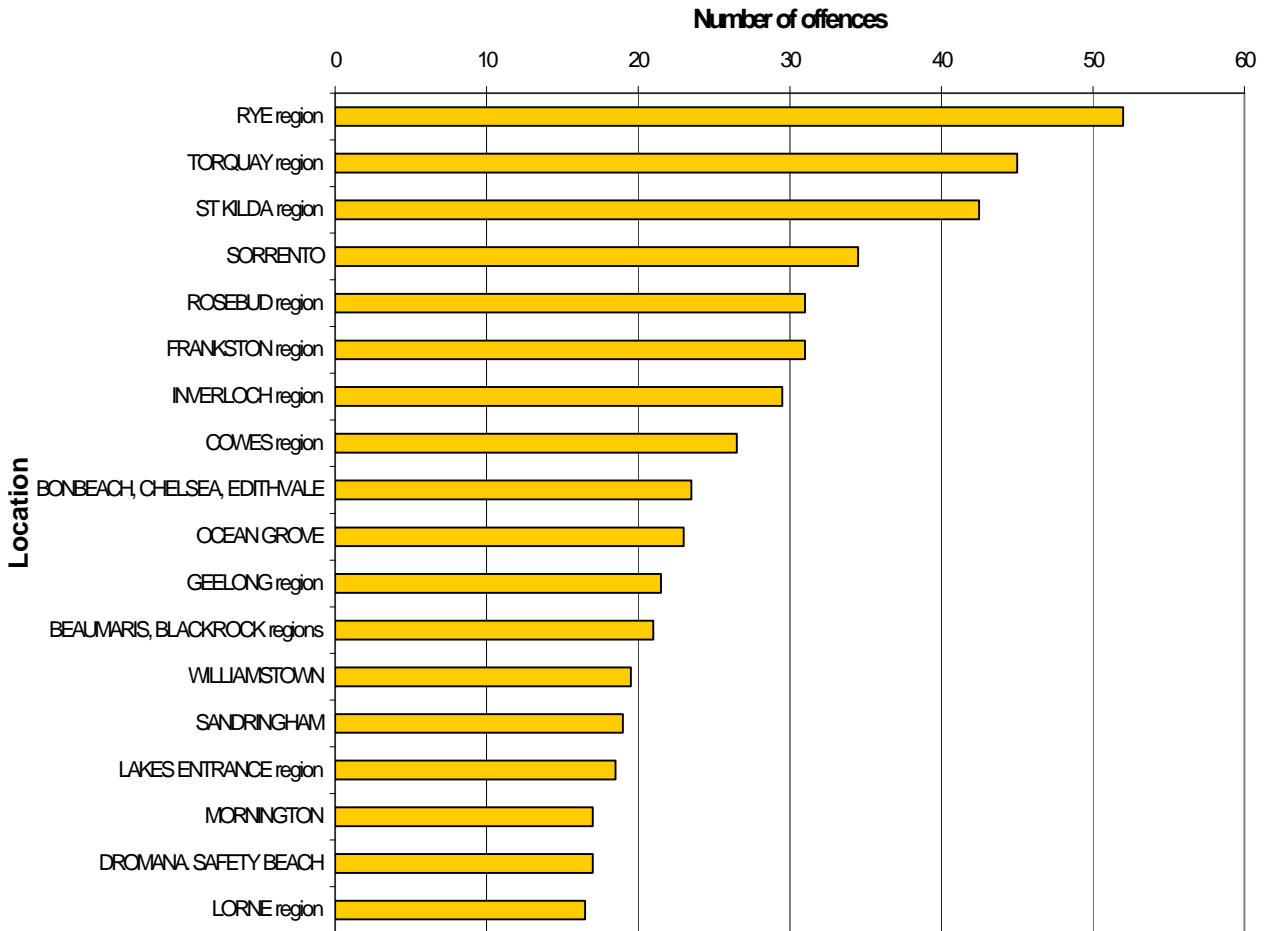
Figure 3. Offences at beach or foreshore: time of day of offence



Location of crime

The data was gathered from 115 locations across Victoria with an average of 6.9 offences per location annually. However, the actual number of offences varied greatly depending on the location with some beaches having found to have substantially higher crime rates than others. The greatest number of offences occurred at beaches in the Rye region, with an annual average of 52 offences. Eighteen locations (15%) had annual averages of 15 offences or more, and these locations accounted for 62% of the total number of offences. These higher offence locations are shown in Figure 4.

Figure 4. Locations having annual average of 15 or more offences



APPENDIX 8

DEATH OCCURRING AT BEACH LOCATIONS IN VICTORIA

Preliminary report

(Morgan 2002)

This report summarises death occurring in beach locations in Victoria from 1 July 2000 to 1 November 2002. Cases were retrieved from the National Coroners Information System (NCIS) on 1 November 2002, and therefore, case listing for 2002 is likely to be incomplete. Cases were identified in the NCIS search system (query design) through location code 1 – ‘other specified place’ and location code 2 – ‘other body of water - beach ocean etc’ for Victorian cases only. All other identifiers were set to default. Data was drawn from the spreadsheet supplied through the query design and case documentation was not referred to for this report.

The NCIS produced 51 cases. Of these, 39 (77%) were male, 9 (18%) female and 3 (6%) of unknown sex. Age ranged from 19 to 87 years with the average age was 46.5 years (and standard deviation 16.7 years). Age was unknown for three cases.

As listed in *case type completion*, 12 (24%) deaths were due to natural causes, 34 (67%) were due to external causes, and 5 (10%) were of unlikely to be known cause.

For the 12 deaths due to natural causes, 11 (92%) were male, 1 (8%) female. Age ranged from 39 to 87 years with the average age was 54.5 years (and standard deviation 14.7 years). Table 1 lists further details of this grouping.

Table 1 Death due to natural causes occurring in beach locations in Victoria listed on the National Coroners Information System (from inception to 1 November 2002)

Primary medical cause:	Cases (n=12)	Activity at time of death	Cases (n=12)
Cardiac related	11 (92%)	Recreation on shore	7 (58%)
Other	1 (8%)	Swimming / surfing	2 (17%)
		Boating	2 (17%)
		Other	1 (8%)

Table 1 indicates that heart related medical causes were the primary natural cause of death regardless of activity.

For the 34 deaths due to external causes, 27 (79%) were male, 7 (21%) female. Age ranged from 19 to 86 years with the average age was 43.1 years (and standard deviation 16.8 years). For *intent completion*, 21 (62%) deaths were listed as unintentional, 10 (29%) as intentional self-harm, and 3 (9%) as unlikely to be known. *Threats to breathing* and *drowning and immersion* were the primary and secondary mechanisms listed respectively for all 21 unintentional deaths. Table 2 lists further details of this grouping.

In Table 2, the primary external cause of death was drowning related. The activity indicates that for approximately half of the deaths, the victims were intentionally in the water (e.g., swimming and scuba) and just under half were not intentionally in the water (e.g., fishing and boating).

Table 2 Death due to external causes occurring in beach locations in Victoria listed on the

National Coroners Information System (from inception to 1 November 2002)

Primary medical cause:	Cases (n=34)	Activity at time of death (unintentional cases only)	Cases (n=21)
Drowning related	29 (85%)	Swimming, surfing, surf rescue, jumping in water	9 (43%)
Fall from height	2 (6%)	Boating	6 (29%)
Other	3 (9%)	Scuba Fishing Unknown	2 (10%) 2 (10%) 2 (10%)

The five deaths due to *unlikely to be known cause* included one male, one female and three of unknown sex. Drowning was stated as a likely medical cause for two cases.

Report limitations

The report has been compiled from the NCIS database. The reported data is limited to both the information contained in this database and the accuracy and validity of data categorisation. The data reported here will be checked against case documentation available through this system at a later date.

APPENDIX 9

INFRASTRUCTURE AND SERVICES REQUIREMENTS FOR A BEACH TO BE CLASSED FAMILY FRIENDLY.

Family Friendly Beaches – Discussion Paper

Brett Ellis
Manager Lifesaving Operation
Surf Life Saving Victoria

A Family Friendly Beach will have the following:

- | | |
|---|---|
| <input type="checkbox"/> Appropriate car parking | <input type="checkbox"/> Recreational activities |
| <input type="checkbox"/> Best practice lifesaving services | <input type="checkbox"/> BBQ and picnic facilities |
| <input type="checkbox"/> Appropriate access | <input type="checkbox"/> Pollution control |
| <input type="checkbox"/> Risk and safety signage | <input type="checkbox"/> Best practice cleaning systems |
| <input type="checkbox"/> Public phones | <input type="checkbox"/> Information nodes |
| <input type="checkbox"/> Adequate shade | <input type="checkbox"/> Disabled facilities |
| <input type="checkbox"/> Drinking water | <input type="checkbox"/> Appropriate road safety systems |
| <input type="checkbox"/> Public amenities | <input type="checkbox"/> Artificial lighting |
| <input type="checkbox"/> Safety education dissemination systems | <input type="checkbox"/> Appropriate ABSAMP Program safety rating |
| <input type="checkbox"/> Public transport access | <input type="checkbox"/> Environment friendly |
| <input type="checkbox"/> Kiosk / Cafe | <input type="checkbox"/> Risk Management Practices |
| <input type="checkbox"/> Appropriate Policing | |

Appropriate parking

- Car parking will be appropriate for visitations
- Car parking will be sealed
- Car parking will meet town planning standards
- Car parking will have appropriate drainage
- Bus parking will be available where needed
- Bicycle racks will be available
- Disabled parking will be available
- Emergency service vehicle parking will be available

Best practice lifesaving services

- Lifesavers will have appropriate training.
- Lifesaving management practices will be developed and implemented. (Beyond the flags roving and outpost patrols.)
- Lifesavers will have appropriate equipment to implement best practice services.
- The beach will have appropriate lifesaving facilities, viewing/communications towers & first-aid facilities.
- Lifesaving services will be intergraded via communications systems and computer systems to central operation centres.
- Lifesaving service times and dates will be appropriate to service needs.
- Out of hour emergency infrastructure is in place

- ❑ Safety surveillance camera systems will be used in appropriate locations for out of hour monitoring and aquatic danger spots.
- ❑ Safety Plans will be developed and reviewed
- ❑ Lifesaving services will be integrated with other emergency services and emergency infrastructure.

Appropriate access

- ❑ The beach will have wheelchair and pram access
- ❑ The beach will have emergency services vehicle access
- ❑ Accesses will lead into safe areas
- ❑ Accesses will be free of hazards
- ❑ Emergency access to first-aid facilities will be available

Risk and safety signage

- ❑ The beach, roads and accesses will have signage in line with Aquatic and Recreational Risk and Safety Signage Manual
- ❑ Risk and safety signage will be monitored and maintained.
- ❑ Neighbouring beaches will be signed to encourage beach use at the patrolled locations.

Public phones

- ❑ Public phone services will be available.

Vic Health Requirements

- ❑ Shade will be available in line with Vic Health recommendations
- ❑ SunSmart practices will be promoted.

Drinking water

- ❑ Water fountains will be available

Public amenities

- ❑ Public toilets and changing rooms will be well maintained
- ❑ Will cater for disabled persons and infant needs

Public transport access

- ❑ Will be available and suitable for the needs of the area
- ❑ Drop off points will be adequate and safe
- ❑ Routes will be promoted
- ❑ Time between linking transport services will be short

Safety education dissemination systems

- Safety promotion will be displayed at information points (App. D)
- Safety promotion will be displayed on public transport routes
- Safety promotion will be displayed on major road routes
- Safety education will be taught to land managers, kiosk operators, information centre staff and other personnel working in the area
- Lifesavers will maintain a safety information board detailing daily safety information.
- Safety Information and lifesaving services information will be available at Information centres.

Kiosk and or café

- A kiosk and or cafe will be located in the area.
- Seating and shade will be available.
- Access will be safe. Example no crossing roads.
- The kiosk will sell items with environmental sensitive packaging. Example; no glass, limited wrapping.
- Kiosk will meet health requirements and will be inspected

Appropriate policing

- The beach will be included in daily police routes.
- Police will integrate with lifesaving services.
- Seasonal and new policing staff will be inducted on lifesaving services and other emergency protocols and expectations relating to the beach.

Recreational activities

- Volleyball and other such recreational activities will be available
- Aquatic equipment hire services will be available
- Walking tracks will be promoted and safe
- Activities available will be promoted at information points, (rocks pools, snorkelling, walking)

BBQ and picnic facilities

- BBQ and picnic facilities are available and maintained
- Open grassed areas are available
- Trees and other hazards are inspected and risk management strategies implemented.
- Adequate shade and shelters are available.
- Playground equipment is inspected and maintained and meets risk management standards.

Pollution control

- Pollution monitoring and reduction systems are in place
- Storm water outlets are monitored and problems rectified
- Best practice cleaning systems are in place
- Rubbish bins are located in appropriate areas

Information nodes

- ❑ Will be pleasing to the eye
- ❑ Contain safety information
- ❑ Map of location
- ❑ Depict recreational activities and places of importance (walking tracks, rock pools etc)
- ❑ May provide other information of interest

Disabled facilities

- ❑ Infrastructure and access for disabled persons will be in place
- ❑ Beach wheelchairs will be available.

Appropriate road safety systems

- ❑ Road safety systems will be in place within the area. (speed humps, appropriate signage etc.)

Artificial lighting

- ❑ Will be appropriate for infrastructure

Appropriate Australian Beach Safety and Management Program safety rating

- ❑ Beaches with a hazard rating of 6 or under will only be considered as family friendly.

General Safety

- ❑ Coastal Risk and Safety Auditing will be undertaken and recommendations implemented.
- ❑ Risk management systems will be implemented

Environment

- ❑ Beaches will be managed to reduce impact on and encourage natural environment maintenance and growth where necessary.

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