RESEARCH REVIEW
OF ROCK FISHING SAFETY
IN NEW SOUTH WALES

Report by Surf Life Saving Australia to the
NSW Department of Primary Industries

March 2012

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Acknowledgements

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We would also like to thank and acknowledge the work of Dr. Rebecca Mitchell, Dr. Mike Bambach and Ms. Lauren Ware who authored the report Research Review of Rock Fishing in NSW: A TARS Report for Surf Life Saving Australia, herein provided as Appendix 1. The dedication and professionalism provided by this report has allows us to explore identified issues with unprecedented insights into rock fishing safety.

Finally, the authors express their sincere appreciation to all the stakeholders who found the time to complete stakeholder surveys and participate in interviews throughout this process, as well as the countless individuals who have worked to prevent, rescue or record rock fishing related death and injury. Their generosity has contributed greatly to the improvement of rock fishing safety.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABSAMP</td>
<td>Australian Beach Safety and Management Project</td>
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<tr>
<td>ANSA</td>
<td>Australian National Sportfishing Association</td>
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<tr>
<td>AS</td>
<td>Australian Standard</td>
</tr>
<tr>
<td>BoM</td>
<td>Bureau of Meteorology</td>
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<tr>
<td>CALD</td>
<td>Culturally and Linguistically Diverse</td>
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<tr>
<td>CPR</td>
<td>Cardio-Pulmonary Resuscitation</td>
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<tr>
<td>EFD</td>
<td>Emergency Flotation Device (eg Throw Stick)</td>
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<td>EPIRB</td>
<td>Emergency Position Indicating Radio Beacon</td>
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<td>RFA</td>
<td>Recreational Fishing Alliance</td>
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<tr>
<td>ISO</td>
<td>International Standard</td>
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<td>LGA</td>
<td>Local Government Area</td>
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<td>MAC</td>
<td>New South Wales Police Force Marine Area Command</td>
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<td>NHMRC</td>
<td>National Health and Medical Research Centre</td>
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<td>NPWS</td>
<td>National Parks and Wildlife Service</td>
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<td>NSW</td>
<td>New South Wales</td>
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<td>NSWPOL</td>
<td>New South Wales Police Force</td>
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<tr>
<td>PFD</td>
<td>Personal Flotation Device (eg Lifejacket)</td>
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<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
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<tr>
<td>PRE</td>
<td>Public Rescue Equipment</td>
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<tr>
<td>RLSS</td>
<td>Royal Life Saving Society</td>
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<td>SLSA</td>
<td>Surf Life Saving Australia</td>
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<tr>
<td>SLSNSW</td>
<td>Surf Life Saving New South Wales</td>
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<tr>
<td>TARS</td>
<td>Transport and Road Safety Research</td>
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<tr>
<td>UAV</td>
<td>Unmanned Aerial Vehicle</td>
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<tr>
<td>UNSW</td>
<td>University of New South Wales</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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Executive Summary

Rock fishing has been regularly described as the most dangerous sport in Australia. While it can be done quite safely, it has resulted in an average of 8 drowning deaths per annum in New South Wales (NSW) alone. This trend has not significantly deviated over the past 20 years. Over this period of time, interested stakeholders have delivered a variety of initiatives primarily to increase the use of personal flotation devices (PFDs) while fishing, as well as promoting other safe fishing behaviours and precautions. The results of these initiatives, both quantitative and qualitative have been mixed, and they have had minimal effect on the average number of annual drownings.

Surf Life Saving Australia (SLSA) was contracted by the NSW Department of Primary Industries to conduct a research review of rock fishing safety in NSW. This followed recommendations made by the Coroner to the Department.

SLSA employed the services of the University of New South Wales, Transport and Road Safety Research Unit (TARS) to conduct preliminary research and analysis. This study provided an independent report to SLSA for further investigation. In summary, the aims of the research conducted by TARS were to:

i) Review rock fishing fatalities in NSW between 2000-2010
ii) Describe rock fishing related hospitalised morbidity in NSW between 2003-2011
iii) Determine self reported exposure to rock fishing using the NSW Population Health Survey Program (2005)
iv) Review and categorise the literature on rock fishing safety methods and programs in terms of education, engineering, enforcement and other methods aimed at improving rock fishing safety.
v) Survey relevant organisations and manufacturers regarding the effectiveness of a range of initiatives aimed at improving rock fishing safety including identification of strengths and weaknesses of each initiative.

The TARS report provided a series of recommendations identified through an epidemiological review, literature review including grey matter, and online stakeholder survey. These recommendations were made to SLSA and further consulted through an interview process with 26 identified key stakeholders. A series of three recommendations have been made in this final report, accompanied by evidence both supporting and detracting from the recommendation. Judgements have been made on the available evidence as instructed by the project scope.

The TARS report in its entirety is provided in Appendix 1. It provides a thorough epidemiological review, literature review and online stakeholder survey analysis. Key findings of the epidemiological analysis included:

- Aside from yearly fluctuations, there has been no significant change in the number of fatalities per year.
- Nearly all decedents were male, with an average age in the mid-forties.
- Decedents were predominantly able to swim.
- The majority were not wearing PPE, including PFDs or non-slip footwear.
- Decedents were predominantly fishing alone or with one other person.
- There were more persons recorded as wearing PPE between 2000-2010 as compared to 1992-2000.
- There is an average of 38 rock fishing related hospitalisations each year.
- There is an average of 74 unspecified fishing related hospitalisations each year.
- 75% of hospitalisations were following a fall and exposure to inanimate mechanical forces.
Injuries to the knee and lower leg (29.9%) and head (12.9%) were the most common injuries sustained.

The report provides three recommendations to reduce these incidences of injury and fatality. Recommendations have been prioritised, and accompanied by a series of action items which have been provided for the consideration of those implementing the recommendations. The action items have not been prioritised.

**Recommendation 1:** Develop a state-wide strategic plan for rock fishing safety under any proposed comprehensive water safety strategy in New South Wales, including the delegation of responsibilities to key agencies, stakeholders and non-government organisations, and the development of clear objectives and key performance indicators.

It has been widely identified that there are a variety of interventions designed to support and improve rock fishing safety already underway in NSW. These activities fall under the financial contribution of several government agencies, and are delivered by a broad range of stakeholders including fishing associations and clubs, government departments, emergency services and volunteer rescue organisations. The development of a collaborative, coordinated strategy, under the leadership of one agency, was considered essential by stakeholders.

Stakeholders and the authors have prioritised the following interventions from most to least successful for inclusion in strategy development:

<table>
<thead>
<tr>
<th>Priority</th>
<th>Intervention</th>
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<tbody>
<tr>
<td>1</td>
<td>Development of the coordinated state wide strategy.</td>
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<tr>
<td>2</td>
<td>Wearing PFDs and non-slip footwear (voluntary or mandated)</td>
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<td>3</td>
<td>Education campaigns using safety ambassadors and targeting vulnerable groups.</td>
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<td>4</td>
<td>Targeted technique and safety workshops and other media.</td>
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<td>5</td>
<td>Coastal safety risk assessments</td>
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<tr>
<td>6</td>
<td>Public rescue equipment</td>
</tr>
<tr>
<td>7</td>
<td>Review, assessment and continuous improvement procedure for all interventions</td>
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<tr>
<td>8</td>
<td>Signage</td>
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<tr>
<td>9</td>
<td>DVD’s</td>
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<td>10</td>
<td>Anchor Points</td>
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<tr>
<td>11</td>
<td>Hydrodynamic modelling</td>
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<tr>
<td>12</td>
<td>Closure or restricted access to high risk locations</td>
</tr>
<tr>
<td>13</td>
<td>Written Material – pamphlets, brochures, booklets</td>
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</table>
Recommendation 2: Develop, implement and assess a public education and communication campaign, incorporated into the state-wide strategy to promote safe rock fishing practices and support the introduction of legislation.

Although education and communication initiatives were noted for inclusion in the strategy, the evidence provided and stakeholder opinion of the perceived potential success of education initiatives warranted their identification through a specific recommendation.

Although written materials (pamphlets, brochures and booklets) are widely used in the promotion of rock fishing safety, there is little evidence available reviewing its effectiveness, and stakeholders have not perceived it as a priority compared to ambassador related public relations activity and workshops.

Recommendation 3: Legislate the mandatory wearing of Personal Floatation Devices (PFDs) while rock fishing at coastal locations in New South Wales.

The key message of current education and communication initiatives related to rock fishing safety is inevitably the use of PFDs. Although other aspects of rock fishing safety are vitally important, and in risk management terms, more important to prevent the angler from entering the water, there have been persistent calls for the introduction of legislation to mandate the use of PFDs while rock fishing.

In support of this proposition, there is 20 years worth of drowning data, indicating that no victim has drowned while properly wearing a PFD. There are international studies indicating that the comparative rate of survival following accidental immersion for someone wearing a PFD is twice that of someone who is not. The proposition of exploring mandatory PFD legislation has been cited in several reports including the TARS report, and there is significant support for the notion of legislation within the stratified stakeholder group incorporated into the online survey and interview process for this research. It was noted, that within this group, there was an element of resistance from anglers, and sentiments expressed that anglers would be in opposition to any such legislation for a number of reasons.

The arguments provided against legislation include cultural perception of PFD use, lack of identification with being at risk themselves, and identifying others as being of higher risk particularly the inexperienced and anglers of Asian background. The data revealed that of the 24 fatality cases between 2000 and 2010 that specified information about fishing experience, 96% were considered experienced. The majority of victims were also identified as competent swimmers. While Asian background was a common characteristic of drowning victims, it was by no means comprehensive, and all rock fishers are faced with significant hazards while angling. The lack of identification with individual risk is a significant barrier which will need to be addressed through education and communication initiatives.

Enforcement was also identified as a key barrier to legislation. There were two consistencies to this testimony;

1) That mandatory lifejacket legislation would be impossible to enforce, and
2) Legislation should not be introduced unless there is an ability to enforce the mandate.
Opinion regarding the ability to enforce legislation is mixed; ranging both heavily for and against a belief that it could be appropriately enforced. There is also an element which believes legislation would improve voluntary compliance with or without active enforcement. Previous research has indicated further investigation into enforcement. There are a number of government agencies involved in compliance of water based activities with potential capacity to enforce mandatory lifejacket legislation. The ability to enforce does not appear to be a significant barrier to legislative efforts.

Despite the available evidence supporting the introduction of legislation, it is highly likely that mandatory PFD legislation will be met with some resistance from the fishing community. It has been proposed that introducing mandatory PFD legislation to certain high risk locations could be received better by the fishing community. There is evidence available against the introduction of legislation for periods or locations of heightened risk, which can result in lower rates of compliance or the transfer of risky behaviours to alternate locations. Stakeholders also indicated this would complicate education and enforcement aspects of legislative introduction. A grace period of no penalties being enforced is preferred.

While objections to legislation by anglers is potentially a significant challenge, the inability of prolonged education, communication, engineering and other initiatives to prevent rock fishing related drowning has resulted in drastic decisions needing to be made to curb the drowning toll.
Summary of Action Items
The following action items are provided for the consideration of those implementing or considering the implementation of recommendations. Evidence attributable to these action items are available elsewhere in this report.

Recommendation 1: Develop a state-wide strategic plan for rock fishing safety under any proposed comprehensive water safety strategy in New South Wales, including the delegation of responsibilities to key agencies, stakeholders and non government organisations, and the development of clear objectives and key performance indicators.

Action Item 1.1: The NSW Rock Fishing Safety Strategy should adopt the goal of a 50% reduction in rock fishing related drowning by 2020 from a 3 year baseline from 2004-2007.

Action Item 1.2: The New South Wales Rock Fishing Safety Strategy should be developed by the Safer Coastal Waters Sub-Committee under the leadership of the Chair agency (currently NSW Police) or their delegate.

Action Item 1.3: Rock fishing related fatality data should be collected and analysed annually for comparison to milestone targets for 50% reduction in drowning by 2020. Rock fishing related morbidity data will be collected and analysed at least every 4 years to inform intervention strategies.

Action Item 1.4: Develop and implement the methodology and mechanisms to collect rock fishing exposure data as part of routine coastal patrols.

Action Item 1.5: A coastal safety risk assessment of rocky coastlines in identified rock fishing black spots will be undertaken to identify localised strategies and interventions.

Action Item 1.6: The use of non-slip footwear, appropriate to the local platforms, is promoted through education and communication initiatives.

Action Item 1.7: Conduct further research and consultation into determining the most effective setting of dangerous surf warning thresholds.

Action Item 1.8: The development and delivery of regular fishing reports incorporating rock fishing conditions in a variety of radio and print mediums across mainstream and multicultural communities.

Action Item 1.9: Liaise with Australian Standards regarding comprehension of aquatic safety signage in non-English speaking communities, and deliver education initiatives to increase comprehension.

Action Item 1.10: The installation of improved access should be considered on a case by case basis following recommendations from a safety risk assessment process.

Action Item 1.11: Coastal safety risk assessments can be used to justify exclusion for identified high risk areas in consultation with the land manager on a case by case basis.

Action Item 1.12: The wearing of appropriate clothing should be promoted through education and communication initiatives.

Action Item 1.13: The use of anchor points in New South Wales cannot be recommended until further evidence of their effectiveness is available.
Action Item 1.14: The installation of emergency beacons should be considered on a case by case basis following coastal safety risk assessment of the location, and carrying of a mobile phone or EPIRBS is encouraged in education and communication initiatives.

Action Item 1.15: The establishment of a coordinated Emergency Marker system for coastal locations should be further explored in consultation with the New South Wales Police Force.

Action Item 1.16: Develop, including necessary field testing, and implement a guideline for the use of public rescue equipment to ensure adequate methodology for the citing, installation, and maintenance of public rescue equipment.

Action Item 1.17: Based on the available evidence, rescue tubes are not recommended for use as PRE.

Action Item 1.18: Based on the available evidence the use of throw bags may be installed as PRE for rocky coasts on a case by case basis.

Action Item 1.19: Based on the limited evidence available, the use of silent sentries (or similar devices) may be appropriate for rock platforms with a gently sloping gradient (<1:1) on a case by case basis.

Action Item 1.20: Based on the limited evidence available, and the establishment of the program, the use of angel rings (life buoys) is considered appropriate on rock platforms with a steep gradient (>1:1) on a case by case basis with formal installation, citing, auditing and maintenance procedures in place.

Action Item 1.21: The following actions should be considered by the NSW Government to reduce the time taken for land managers to approve and facilitate the installation of safety signage and/or public rescue equipment related to rock fishing safety:

   a) Review section 5L of the Civil Liabilities Act (2002) NSW to absolve land managers of liability for attempts to mitigate risks associated with dangerous recreational activities by installing safety signage or emergency rescue equipment.
   b) Formalise efficient installation, citing, auditing, and maintenance procedures for PRE in partnership between all key stakeholders.

Action Item 1.22: Inflatable throw sticks may be used by emergency services regularly deployed to aquatic rescue incidents in conjunction with angel rings.

Recommendation 2: Develop, implement and assess a public education and communication campaign, incorporated into the rock fishing safety strategy to promote safe fishing practices and support the introduction of legislation.

Action Item 2.1: The rock fishing safety strategy will allocate appropriate resources to the implementation and management of rock fishing safety education and communication activities.
Action Item 2.2: A joint resource should be explored and established to manage rock fishing education and communication initiatives between key stakeholders including the multicultural community.

Action Item 2.3: The Safer Coastal Waters Sub Committee will establish a prioritised set of key messages for rock fishing safety for consistent promotion by all agencies in public education and communication initiatives.

Action Item 2.4: The Safer Coastal Waters Sub Committee should establish and implement a Rock Fishers Code of Conduct in consultation with key stakeholders and the community based on key messages determined as outcomes of action item 2.3.

Action Item 2.5: That a range of recognisable ambassadors should be appointed as spokespeople for safe rock fishing, to use in advertising materials, resources, and educational programs and other initiatives.

Action Item 2.6: SLSNSW in partnership with NSW DPI, ANSA, the RFA and other key stakeholders will develop a syllabus, lesson plan, implementation plan and evaluation process to support the coordinated delivery of rock fishing safety seminars and workshops.

Recommendation 3: Legislate the mandatory wearing of Personal Floatation Devices (PFDs) while rock fishing at coastal locations in New South Wales.

Action Item 3.1: A working group should be established including PFD manufacturers and anglers to identify and/or develop practical rock fishing PFDs to improve voluntary compliance.

Action Item 3.2: Any legislation efforts should not be restricted to either periods of heightened risk or high risk geographic locations.

Action Item 3.3: Following the implementation of any legislation a grace period may be given where no penalties are enforced. During the grace period, concentrated education and awareness, or reward initiatives should be implemented to increase voluntary PFD wearing rates.

Action Item 3.4: Legislation must specify that PFDs must comply with Australian Standard AS4758 - Personal Flotation Devices.

Further Research

Action Item 4.1: Develop and implement a robust independent evaluation program of rock fishing safety initiatives based on; unprompted recall, reported behavioural change, actual behavioural change, and epidemiological outcomes.
Background
Fishing is one of the most popular sports enjoyed in NSW. It is estimated that one million people across the state go recreational fishing at least once a year. Rock fishers make up a small, but passionate, sector of the fishing community and while it is an enjoyable pastime for many, unfortunately it is also a sport that poses many dangers. Some fishing can be done very safely from the rocks, especially in sheltered bays, inlets and protected headlands. However, some rock platforms, especially on more high energy exposed coastline where large waves can break unpredictably, can be more dangerous to rock fishers.

Rock fishing represented 45% (n=119) of all fishing related drowning fatalities (including boating and all shore based fishing) in NSW between 2000 and 2007. People of Asian background accounted for 59% of the 54 rock fishing fatalities during this period.

A series of rock fishing safety programs have been undertaken over the years by various organisations to educate and assist rock fishers in NSW to help keep them safe. These organisations include the NSW Branch of the Australian National Sportfishing Association (ANSA), Recreational Fishing Alliance of NSW (RFA), Surf Life Saving Australia (SLSA), Surf Life Saving New South Wales (SLSNSW), Royal Life Saving Society (RLSS), NSW Department of Sport and Recreation, and NSW Department of Primary Industries (NSWDPI). Some of these programs are now being extended and adopted in other states. A brief summary of recent NSW programs is provided below:

- The Angel Ring Project is implemented by ANSA and involved the installation of more than 110 life buoys at popular rock fishing spots along the NSW coast. The program began in 1994 and is now being expanded in other states. The program is ongoing and the installation of more rings is planned. The program also includes fisher safety signage and a trial of angel ring GPS trackers.
- The NSW Rock Fishing Safety Awareness Program commenced in 2004 and was coordinated by the NSW Department of Sport and Recreation in collaboration with ANSA, RFA, NSWDPI, and SLSA. This included development and distribution of a rock fishing safety resource folder and production of a safety DVD. The folders and DVDs were translated into Korean, Chinese and Vietnamese, and distributed free of charge to anglers.
- The NSW ‘Don’t put your life on the line’ education campaign involved refining the above resource kit into a more user friendly format for anglers by the RFA. Several phases of this program have been run over the past few years. Over 50,000 kits have been distributed to anglers since 2006 through various media, including online, fishing clubs, formal safety events, NSWDPI Fishcare Volunteers and Fisheries Officers.
- A research program undertaken by the University of New South Wales was undertaken in 2008 and 2009 titled ‘predicting hazardous conditions for rock fishers’ which modelled the processes that lead to waves overtopping and sweeping people off rock platforms for potential use in future warning forecasting.
- The Asian Awareness Project was undertaken in 2009 by ANSA and the RFA in collaboration with SLSA and involved a series of rock fishing safety advertisements in a range of Asian Newspapers.
- A series of workshops in 2010 and 2011 were run by the RFA in collaboration with ANSA, SLSA, NSWDPI and other organisations to educate rock fishers, especially of CALD
background, of simple safety messages. So far 5 workshops have been held and more are planned.

- The Multilingual Safety Information Program was implemented by NSWDPI in 2010 and involves distributing a tri-fold rock fishing safety brochure (based on the ‘don’t put your life on the line’ education campaign) to recreational fishing license holders (around 250,000 per year) with their license renewal notice. This is an ongoing program.

- Angel ring enhancement program – additional funding from the NSW Government is being provided to ANSA to enhance the angel ring program, including the installation of more rings, fisher safety signage and a trial of angel ring GPS trackers. The trackers enable ANSA to monitor the use of the rings in emergency situations and identify missing rings.

- The Royal Life Saving Society has recently completed a study to review existing literature on recreational fishing related drowning fatalities, investigate these recreational fishing related drowning fatalities and undertake a survey of recreational fishers’ exposure, attitude and risks taken. This follows on from a previous study completed by the NSW Water Safety Taskforce in 2003 titled: Investigation into the coronial files of rock fishing fatalities that have occurred in NSW between 1992 and 2000.
Scope

The primary objective of this project is the delivery of a detailed research report identifying the demographic groups most at risk of drowning while rock fishing and an assessment of the effectiveness of available rock fishing safety programs.

The specific objectives of the project as defined by NSWDPI are:

1) Undertake a desktop review of key demographic reports on NSW coastal rock fishing fatalities and prepare a summary report of existing statistics on the demographic groups most at risk of drowning whilst rock fishing in NSW. (Appendix 1 pp7)

2) Undertake a comprehensive desktop review of literature reports on rock fishing safety methods/programs used or proposed to be used to prevent rock fishing fatalities in Australia and around the world. (Appendix 1 pp18)

3) Undertake consultation, as required, with relevant organisations/manufacturers implementing rock fishing safety methods/programs and/or have the authority to implement these programs (Appendix 1pp40 / Interview comments in final report)

4) Undertake a detailed assessment and analysis of the current or potential effectiveness of each of these safety methods/programs in regard to their capacity to improve rock fishing safety in NSW. (Final report)

The development of a state wide rock fishing safety program is not in the scope of the project.
**Methodology**

Surf Life Saving Australia (SLSA) have partnered with the University of New South Wales in the development of this Research Review of Rock Fishing in New South Wales. The aims of this research are to:

i. Review rock fishing fatalities in NSW using information from existing reports and provide an update of rock fishing-related fatalities in NSW from 2000 to 2010;

ii. Describe rock fishing-related hospitalised morbidity in NSW from 2003-04 to 2010-11;

iii. Determine self-reported exposure to rock fishing in NSW using data from the NSW Population Health Survey program, 2005;

iv. Review the literature on rock fishing safety methods and programs in terms of education, engineering, enforcement and other methods and programs aimed at improving rock fishing safety;

v. Conduct an online survey of relevant organisations and manufacturers regarding the effectiveness of methods and programs aimed at improving rock fishing safety, including identification of the strengths and limitations of each initiative;

vi. Conduct stakeholder interviews regarding the effectiveness of proposed improvements proposed through the epidemiological review, literature review, or online survey; and

vii. Provide recommendations for the improvement of rock fishing safety in NSW in a report to the Department of Primary Industries.

This study has been conducted in two parts. Sections i – v were conducted by the University of New South Wales Transport and Road Safety (TARS) Research centre in the School of Aviation by Dr. Rebecca Mitchell, Lauren Ware, and Dr. Mike Bambach (Appendix 1). To ensure scientific rigor and objectivity, this assessment was carried out independently of SLSA. SLSA did however provide logistical assistance between 10th November 2011 and Friday 17th February 2012 (draft TARS report delivered).

The TARS report provided recommendations, which were the basis for a round of in depth stakeholder interviews to further explore those key topics identified based on the literature. SLSA conducted these stakeholder interviews between Friday 24th February 2012 and Monday 12th March.

A total of 30 stakeholders were identified for this round of consultation across a range of professions and interest groups. These 30 stakeholders were contacted by e-mail with a request for participation. A total of 26 participants took place in the interview process. This represents an 83.3% participation rate.

Participants were advised that any information provided including audio recordings would be de-identified. This was considered necessary considering the controversial nature of some topics. The de-identified quotations provided are expressed in this report.

The final report endeavours to make a series of prioritised recommendations into the effectiveness of various interventions for rock fishing safety based on the available evidence provided through the TARS report and stakeholder engagement.

This final report also provides a series of Action Items relating to the implementation of the recommendations.
Limitations
The limitations of the TARS contributing research are found elsewhere (Appendix 1 pp67).

The scope of this research review did not allow the widespread consultation of the rock fishing community. The researchers have attempted to consult with leaders within the rock fishing community. These leaders were asked to provide opinions which were reflective of their communities (informal rock fishing groups, fishing clubs, or associations).

The researcher also conducted site visits over 10th-11th March, to discuss rock fishing safety with anglers on the rocks. This attempted to ‘road test’ some of the recommendations with larger groups of anglers to determine whether the opinions expressed through stakeholder surveys and interviews was consistent with the general opinion. These interviews were informal, and quotations have not been included in this report.

The scope of this research also provided provision of desktop review and information gathering only. There are several theories related to public rescue equipment and personal inflatable devices which currently have no quantitative evidence, in situ or laboratory test results available to contribute to the assessment. Where this is the case, Action Items have been made by analysis of the available expert opinion.
Discussion and Recommendations

This report makes three recommendations for the improvement of rock fishing safety to the New South Wales Government. Additionally, it provides Action Items for the development or implementation of these recommendations by either the Government or their delegates.

Recommendation 1: Develop a state-wide strategic plan for rock fishing safety under any proposed comprehensive water safety strategy in New South Wales, including the delegation of responsibilities to key agencies, stakeholders and non-government organisations, and the development of clear objectives and key performance indicators.

The evidence and opinions provided below are for the information of the committee or agency tasked with the development of the aforementioned strategic plan. It provides information across:

- Relationship to Existing Strategies
- Leadership and Coordination of the Plan
- Epidemiological Background
- The Identification of Black Spots
- Coastal Safety Risk Assessment
- Primary Interventions Strategies
- Secondary Intervention Strategies
- Tertiary Intervention Strategies
- Prioritisation of Intervention Strategies

Although this information is provided for the information of the authors of the strategy, where significant evidence is available, key Action Items have been provided which are strongly recommended for consideration in the development of the strategic plan. These action items have not been prioritised numerically. The stakeholders’ perceived prioritisation of initiatives is provided at the conclusion of the chapter.
Relationship to Existing Strategies

The development of a state-wide, long term plan to address rock fishing safety is considered a priority in order to streamline the efforts by multiple agencies, allocate responsibilities and determine key performance indicators to measure success.

There are currently many programs, strategies and projects underway by numerous organisations relating to rock fishing safety\(^1\). The development of a strategy aims to encompass all of these efforts, and unite their contributions for the systematic pursuit of a set of goals. This process has been undertaken previously by the NSW Water Safety Taskforce in 2003, which suggested four broad strategies to address drowning rock fishing related drowning deaths:

- Improving knowledge about the risks of rock fishing,
- Reducing risk taking behaviour through education and taking personal responsibility,
- Promoting safe rock fishing,
- Increasing the ability of rock fishers to stay afloat\(^2\)

The Australian Water Safety Council Strategy 2008-2011 identified the aspirational goal of water safety agencies including recreational fishing organisations to reduce drowning by 50% by 2020\(^3\)

**Action Item 1.1: The NSW Rock Fishing Safety Strategy should adopt the goal of a 50% reduction in rock fishing related drowning by 2020 from a 3 year baseline from 2004-2007.**

When developing this strategy, it is important to consider not only interventions which are currently underway, but those which may require further development. The TARS Report to Surf Life Saving Australia suggests that the strategy should consider education, engineering, guideline and enforcement, risk assessment and monitoring strategies in terms of primary, secondary and tertiary prevention efforts as described in Haddon’s matrix elsewhere in this report \(^4\).

There is universal support for the development of a coordinated strategic plan indicated by key stakeholders interviewed through the review process.

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Leadership of the Strategic Plan Development

The Safer Coastal Waters Sub-Committee (SCWSC) has been endorsed by the NSW Government under the Safer Waters Council, with the NSW Police Marine Area Command sitting at Chair and reporting to the New South Wales Minister for Police and Emergency Services. This sub-committee has identified rock fishing as a key priority area.

There are currently a number of agencies and organisations involved in rock fishing safety identified through this review which may be identified for leadership of the strategic plan development including:

- NSW Department of Primary Industries
- NSW Police - Marine Area Command
- Recreational Fishing Alliance NSW
- Australian National Sportfishing Alliance NSW Branch
- Surf Life Saving New South Wales
- Surf Life Saving Australia
- The Royal Life Saving Society of New South Wales
- NSW Roads and Maritime

It was noted that the development of the plan should be collaborative, with several stakeholder identifying this.

“It needs to be lead by an agency with experienced on the coast, Surf Life Saving would be great, but getting the experienced anglers involved would be great. We all sit back together and create a plan.”

“Lack of consultation or involvement would be a significant barrier.”

“Say one group is the lead agency, we need to ensure other groups are involved.”

Based on this, the NSW Safer Coastal Water’s Sub-Committee which involves key water safety agencies and recreational fishing groups would be an appropriate forum to develop the strategy, under the leadership of the chair agency or their delegate.

**Action Item 1.2: The New South Wales Rock Fishing Safety Strategy should be developed by the Safer Coastal Waters Sub-Committee under the leadership of the Chair agency (currently NSW Police) or their delegate.**
Epidemiological Assessment

The strategic plan should provide an update to stakeholders regarding the rock fishing related morbidity and mortality rate in NSW. This information provides the basis for this, and future strategies. It should also establish the baseline outline the projected fall in rock fishing related morbidity and mortality to allow stakeholders to track their progress against the forecast reduction of 50% by 2020.

To date, there have been three key epidemiological reports investigating rock fishing fatalities in Australia. These include Jones, Monash, and TARS. Key findings of the three reports are summarised in Table 1.

Figure 1: A comparison of key epidemiological study results for fatal rock fishing incidents

<table>
<thead>
<tr>
<th>Report</th>
<th>Jones</th>
<th>Monash</th>
<th>TARS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datasets investigated</td>
<td>NSW Coroner</td>
<td>NCIS</td>
<td>NCIS</td>
</tr>
<tr>
<td>Location</td>
<td>NSW Only</td>
<td>All of Australia</td>
<td>NSW only</td>
</tr>
<tr>
<td>Average number of rock fishing fatalities per year</td>
<td>8.22</td>
<td>8.2</td>
<td>7.89</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>46 (range 15-82)</td>
<td>46 (range 15-74)</td>
<td>44.5 (range 9-82)</td>
</tr>
<tr>
<td>Proportion male</td>
<td>96%</td>
<td>98%</td>
<td>95.5%</td>
</tr>
<tr>
<td>Proportion Australian born</td>
<td>17%</td>
<td>29%</td>
<td>23.5%</td>
</tr>
</tbody>
</table>

*Results for 2000-2007 from Piliskic et al 9 and updated 2010 from TARS NCIS analysis.

Non-fatal rock fishing hospitalisation has been investigated in two key reports, namely Monash and TARS. The key findings for these two reports are summarised in Table 2.

Figure 2: A comparison of key epidemiological study results for non-fatal rock fishing incidents

<table>
<thead>
<tr>
<th>Report</th>
<th>Monash</th>
<th>TARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time period investigated</td>
<td>2002-2009</td>
<td>2003-2010</td>
</tr>
<tr>
<td>Datasets investigated</td>
<td>NISU</td>
<td>NSW Admitted Patients Data Collection</td>
</tr>
</tbody>
</table>

A thorough review of rock fishing morbidity, mortality and exposure data as determined through the National Coroners Information System (NCIS), the NSW Admitted Patients Data Collection (APDC), NSW Health Population Health Survey Scheme is provided by Mitchell et al in TARS Report (Appendix A pp 6-17). This report also provides comparisons to the previous epidemiological review by Matthew Jones, 1992-2000.

The Monash University report A National Review of Rock Fishing Deaths and Hospital-Treated Injury showed that there were 104 rock fishing related deaths in Australia between July 1, 2000 and June 30, 2010. Of these cases, only 82 were ‘closed’ NCIS files at the cut of date for case selection (April 30, 2011), and thus included in the analysis. Of these, 65% of cases (n=53 rock fishing related fatalities) occurred in New South Wales.

From a National perspective, Cassell and Clapperton provide some key findings which will influence the development of intervention strategies, including:

- Of the 24 cases with information on rock fishing experience (29% of all cases), 96% of decedents were considered experienced rock fishers;
- Decedents ranged in age from 15-74 years (both average and median ages were 46 years); and,
- 92% of decedents were Australian residents, 6% were overseas residents and the country of residence was unknown for the remaining 2%.

The TARS report differed from the Monash report in that it only reported rock fishing deaths in NSW. The time period differed as well in that TARS report covered from 1992 to 2010. Key findings of the TARS report included:

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• For the period 1992-2010 there have been on average 7.89 drowning deaths per annum related to rock fishing;
• By comparison between the 1992-2000 and 2000-2010 time periods, aside from yearly fluctuations there has been no significant change in the number of fatalities per year;
• Nearly all were male with an average age in the mid-forties\(^{13}\).
• Common country of origin was Asia-Pacific region.
• Predominantly were able to swim.
• Predominantly were swept off the rocks.
• The majority were not wearing PPE; including lifejackets, cleats, wetsuits or vests with flotation devices.
• The majority were rock fishing either alone or with one other person.
• The majority of fatalities occurred between Friday and Sunday.
• Three quarters of all rock fishing specified hospitalisations were following a fall.
• For rock fishers, injuries to the knee and lower leg (29.9%) and head injuries (12.9%) were the most common type of injury sustained.
• Overall, 2.8% (95% CI: 2.0-3.6) of adults surveyed in the NSW Population Health Survey Program indicated that they had been rock fishing in the last 4 weeks\(^{14}\).

Sound epidemiological data provides the foundation for the development of the strategic plan and its prioritised initiatives. Ongoing data collection and comparison to baseline data, which is provided in this report, will determine the ultimate success of the range of intervention measures employed.

**Action Item 1.3:** Rock fishing related fatality data will be collected and analysed annually for comparison to milestone targets for 50% reduction in drowning by 2020. Rock fishing related morbidity data will be collected and analysed at least every 4 years to inform intervention strategies.

To improve the data currently available, there are some key areas which require improvement to give a true perspective on rock fishing safety:

• Participation Data
• Exposure Data

While there is excellent data available for the analysis of rock fishing related morbidity and mortality, there is a lack of participation and exposure data to determine rates. The rate of injury is a superior measurement of morbidity and mortality than crude drowning figures, which may mask key trends in behavioural change and the effectiveness of intervention strategies.

The development of mechanisms to collect ‘snap shot’ exposure data was a key recommendation of the TARS report\(^{15}\). The following mechanisms were suggested through stakeholder engagement\(^{16}\):

\(^{13}\) Comparison between the Mitchell et al, TARS Report (Appendix A) and Jones, M., Investigation into the coronial files of rock fishing fatalities that have occurred in NSW between 1992 and 2000 (2003) NSW Water Safety Taskforce, Sydney.

Research Review of Rock Fishing in New South Wales

- Fly over data collection (helicopter, fixed wing or UAV)
- Water borne data collection (Surf Life Saving, Maritime and Police vessels)
- Fishing Clubs
- Dedicated data collectors

There was also some resistance to the continued focus on new data collection in an ongoing strategy, owing to a belief that the issue was well identified in existing data and more action was required\textsuperscript{17}.

\textit{Action Item 1.4: Develop and implement the methodology and mechanisms to collect rock fishing exposure data as part of routine coastal patrols.}

\textsuperscript{15} Mitchell, R., Ware, L., Bambach, M., \textit{Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia.} University of New South Wales, Transport and Road Safety Research, School of Aviation, Sydney.

\textsuperscript{16} \textit{Research review of rock fishing in NSW}, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{17} Ibid
The Identification of Black Spots

The literature contains regular description of black spot locations for rock fishing. These are known as locations of increased risk, increased mortality or increased morbidity. There are several challenges to the current use of the phrase which have been identified.

Firstly, the current definition of black spot refers to an increased incidence rate of rock fishing fatalities. There has been concern that this may be due to an increased visitation rate or frequency of rock fishing activities, and not take into account that increased visitation may be due to the location having safer access and generally safer fishing conditions\(^{18}\).

“A good example is Catherine Hill Bay; we’d had no drownings there, at that spot. Then we lost five in one go, so then all of a sudden it’s a black spot?”\(^{19}\)

The lack of exposure data and rates of morbidity and mortality for individual locations is at this point a limitation on the development of a rigorous definition and methodology for the identification of black spot locations.

Aware of this limitation, a working definition is proposed for adoption.

Rock fishing black spots shall be identified as local government areas with multiple incidents and/or increased rate of rock fishing related fatality within the previous 10 year period, or an increased rate of incidents and a high probability/risk of occurrence.

Based on this definition, the 10 year fatality data analysis by location provided by Cassel and Clapperton\(^{20}\) provides a list of NSW Rock Fishing Black spots:

**Figure 3: List of Rock Fishing Black Spot Local Government Areas and Localities**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Deaths</th>
<th>Proportion of Deaths in NSW (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randwick LGA</td>
<td>15</td>
<td>28.3</td>
</tr>
<tr>
<td>Cape Banks, La Perouse</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Boora Point, Malabar</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Magic Point, Malabar</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Mahon’s Pool, Maroubra</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lurline Bay</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Botany Bay, La Perouse, not further defined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sutherland LGA</td>
<td>7</td>
<td>13.2</td>
</tr>
<tr>
<td>Yena Gap, Kurnell</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Inscription Point, Kurnell</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Potters Point</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Cape Solander, Kurnell, exact unknown</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kurnell, not further defined</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Warringah LGA</td>
<td>4</td>
<td>7.5</td>
</tr>
<tr>
<td>At or near Dee Why, exact unknown</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Harbord Headland, Freshwater Beach</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>North Curl Curl Headland</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

---

\(^{18}\) Ibid

\(^{19}\) Ibid.

<table>
<thead>
<tr>
<th>Location</th>
<th>Cases</th>
<th>Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wollongong LGA</td>
<td>4</td>
<td>4.9</td>
</tr>
<tr>
<td>At or near Port Kembla, exact unknown</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Red Point, Port Kembla</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>At or near Coalcliff, exact unknown</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Gosford LGA</td>
<td>3</td>
<td>5.7</td>
</tr>
<tr>
<td>At or near Avoca Beach, exact unknown</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Southern rock platform, MacMaster Beach</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pittwater LGA</td>
<td>3</td>
<td>5.7</td>
</tr>
<tr>
<td>Whale Beach</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bengally Headland, Avalon</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Shoalhaven LGA*</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>Crampton Island</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Brooks Lookout, Jervis Bay</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Eurobodalla LGA</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>At or near Lilli Pilli, exact unknown</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mullimburra Point, Bingi</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lake Macquarie LGA</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>At or near Blacksmiths, exact unknown</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Manly LGA</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>Blue Fish Point, Manly</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Waverley LGA</td>
<td>2</td>
<td>3.8</td>
</tr>
<tr>
<td>Cliff Platform, Golf Club, North Bondi</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

*Amended to remove Wattamolla, in the Royal National Park from Shoalhaven LGA.

Notes:

This list includes only drownings of NCIS cases which were closed for the period at 30 April 2011. Without knowledge of specific cases included in the sample, the author could not determine cases which have closed since, and can be added to this list. It is presumed that additional drowning events to be included are Catherine Hill Bay (5 Drownings) and Obelisk Beach, Mosman (2 Drownings).

The description of LGA in this table refers to all coastline contained between the coastal extremities of the LGA. Including land which may be owned or managed by the Commonwealth or State (Crown Land), National Parks and Wildlife Service (NPWS), or private land owners.
Coastal Safety Risk Assessment

A series of systematic coastal safety risk assessment of rock platforms in black spot areas provides the basis for all localised interventions. The coastal safety risk assessing process involves:

1. Determine the minimum acceptable levels of risks and potential injuries through completion of a risk assessment in accordance with recognised guidelines, standards and best practice;
2. Provide economically sustainable risk mitigation options;
3. Provide recommended staging plans considering the environmental conditions, forecast settlement areas, coastal access and usage;
4. Review the status of aquatic safety and signage management;
5. Evaluate the level of compliance or non-compliance with relevant regulations and standards;
6. The assessment will include reference to:
   a. The Australian Beach Safety and Management Program (ABSAMP)
   b. The Australian Coastal Public Safety Guidelines
   c. Beaches of Australian Coast – A guide to their nature, characteristics, surf and safety
   d. The National Aquatic Recreational Signage Style Guide
7. Consult with relevant community stakeholders including volunteer surf life saving services, beach safety liaison committees and other organisations involved in or impacted by beach safety21.

While several interventions may be state-wide, the detailed approach to strategic development within identified black spot local government areas is a distinct advantage to ensure adequate implementation.

*Action Item 1.5: A coastal safety risk assessment of rocky coastlines in identified rock fishing black spots will be undertaken to identify localised strategies and interventions.*

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Haddon’s Matrix Applied to Rock Fishing

William Haddon Jr developed the conceptual model, The Haddon Matrix, over 40 years ago applying basic principles of public health to the problem of traffic safety. The framework can be applied to any source of injury, and the table below provides an overview of countermeasures for rock fishing hazards, as applied to Haddon’s Matrix.

Table 4: Haddon’s Matrix Applied to Rock Fishing

<table>
<thead>
<tr>
<th>Primary: Pre-event (preventing the angler from entering the water/falling)</th>
<th>Agent/Vehicle (Water, Waves, Cliffs)</th>
<th>Host (Angler)</th>
<th>Physical Environment (Rock Platform)</th>
<th>Social Environment (Community norms, Policies, Rules)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education to choose appropriate locations and conditions</td>
<td>Anchor points</td>
<td>Education to choose appropriate locations and conditions</td>
<td>Restricting access</td>
<td>Prohibit fishing at times if heightened risk</td>
</tr>
<tr>
<td>Signage</td>
<td>Non-slip footwear</td>
<td>Anchor points</td>
<td>Install safer access</td>
<td>Prohibit fishing at locations of heightened risk</td>
</tr>
<tr>
<td>Weather warning systems</td>
<td></td>
<td></td>
<td></td>
<td>Cultural resistance to lifejacket use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary: Event (Once the angler has entered the water/fallen)</th>
<th>Host (Angler)</th>
<th>Agent/Vehicle (Water, Waves, Cliffs)</th>
<th>Physical Environment (Rock Platform)</th>
<th>Social Environment (Community norms, Policies, Rules)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education to swim away from the rock platform to await rescue or to a sheltered exit point</td>
<td>PFD use</td>
<td>Install emergency beacons to alert emergency services as soon as possible</td>
<td>Install safer access for emergency services</td>
<td></td>
</tr>
<tr>
<td>Swimming skill development</td>
<td>Appropriate clothing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tertiary: Post-Event (Once the angler has been injured and requires assistance)</th>
<th>Host (Angler)</th>
<th>Agent/Vehicle (Water, Waves, Cliffs)</th>
<th>Physical Environment (Rock Platform)</th>
<th>Social Environment (Community norms, Policies, Rules)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education to teach others how to assist or advise the patient</td>
<td>PDS use</td>
<td>Emergency markers</td>
<td>Improve response of emergency services to rock fishing locations</td>
<td></td>
</tr>
<tr>
<td>CPR and first aid</td>
<td>Angel ring (lifebuoy)</td>
<td>Install safer access for emergency services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic rescue techniques</td>
<td>Silent Sentry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EFD use</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A discussion about the evidence and opinion surrounding the countermeasures described above is provided in the following chapters.

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Primary Prevention Strategies

Primary prevention strategies, or pre-event efforts, aim to prevent an incident occurring in the first place\(^\text{23}\). The International Life Saving Federation have provided a framework for primary drowning prevention strategies in the context of the drowning cycle; this can include all factors including education, awareness, and engagement initiatives, warnings, signage, supervision and exclusion barriers\(^\text{24}\).

Figure 5: The Drowning Cycle, International Life Saving Federation. Brussels. 2006.

The following provides key findings and Action Items for identified primary prevention strategies of the drowning cycle applicable for rock fishing safety.

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**Appropriate Footwear**

Previous evidenced based recommendations advise the wearing of non-slip footwear or cleats, along with lightweight clothing and jackets that open at the front so that they can be easily removed to reduce mass in the water\textsuperscript{25}.

Of 21 cases where information about clothing and PPE is available;

- 3 were wearing safety items recommended for rock fishing
  - 2 wore rock fishing shoes (cleats)
  - 1 wore a fishing jacket with flotation
- 5 were wearing gear specifically not advised for rock fishing
  - 3 wore heavy boots
  - 2 wore waders\textsuperscript{26}

Of the cases studied with information available about other specific PPE (n=21), two were wearing rock fishing shoes\textsuperscript{27}. This indicates that while appropriate footwear may be an appropriate means of preventing entry, if the angler is still swept into the water by an overtopping wave, or falls rather than slips into the water, the consequences can still be dire and a PFD would be required to add buoyancy.

The benefits of wearing fishing cleats are well noted as a means of preventing accidental entry into the water\textsuperscript{28}. The rationale for this is dependent on basic laws of physics; the friction applied from the force (mass) of the angler being exerted on the cleats against the rock platform, is required to be greater than the opposing force of an overtopping wave against the feet and legs. As the force of the opposing wave is increased (moving higher up the legs), the angler can stand on one foot to both increase the friction applied to one foot, and reduce resistance and drag against the force of wave by removing one leg. Once the wave gets higher, there are thresholds that are met, and the Archimedes principle (Any floating object displaces its own weight of fluid) must be considered. Although, once a person is swept off their feet, the person will have very little capacity to regain friction with the rocks\textsuperscript{29}. This is consistent with the attitude of anglers while fishing on the rocks, the depth of overtopping waves provides a comparative indicator of safety, with higher levels being considered much more dangerous, requiring a change in location:

> “I go back to what my father taught me, if there’s water around your feet think about where you are, if it’s around your thighs, why are you there?”\textsuperscript{30}

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\textsuperscript{26} Clapperton, A., Cassell, A. (2011) *A National Review of Rock Fishing Deaths and Hospital Treated Injury.* Injury Research Institute, Monash University.

\textsuperscript{27} Clapperton, A., Cassell, A. (2011) *A National Review of Rock Fishing Deaths and Hospital Treated Injury.* Injury Research Institute, Monash University.

\textsuperscript{28} Mitchell, R., Ware, L., Bambach, M., *Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia.* University of New South Wales, Transport and Road Safety Research, Sydney.

\textsuperscript{29} *Research review of rock fishing in NSW*, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{30} Ibid.
The use of non slip footwear was thought to be the most effective engineering initiative by the stakeholder survey with 100% of stakeholders believing they are either very effective or somewhat effective.

"The other important feature was the presence of black algae, which becomes very slippery when wet. It was thought that algae dramatically increased the risk of being washed into the sea"

Stakeholder interviews also provided some discussion about the variety of non-slip footwear which is appropriate for use under different rock types along the NSW coastline further research, including laboratory testing into these principles and effectiveness has previously been proposed by stakeholders.

**Action Item 1.6:** The use of non-slip footwear, appropriate to the local platforms, should be promoted through education and communication initiatives.

**Weather Warning and Risk Rating System**

There is currently a trial by the Bureau of Meteorology in New South Wales of Dangerous Surf Warnings. The system is partnered and promoted by Surf Life Saving New South Wales and the Recreational Fishing Alliance of New South Wales. An example of the dangerous surf warning as distributed by Surf Life Saving NSW is attached in Appendix B. There is general support for these warnings indicated through stakeholder survey, with 72.7% indicating the system is very effective or somewhat effective.

It has been proposed that a high wave period, or the distance/time between significant wave heights, can lead to increased probability of overtopping waves on rock platforms. While increased wave period does introduce an extra element of risk for rock fishers, for general beach goers, the effects are not as great. This provides a challenge in the development of warning products, in that general beachgoers will not see the benefits. It has been noted that the majority of rock fishing related drownings currently occur below the current dangerous surf warning threshold, and this threshold is currently under review.

It is widely advised for rock fishers to watch the water prior to fishing for at least 30 minutes, to gauge the conditions. This however, does not always provide protection from changing conditions. In the case of one decedent, an angler spent one hour watching the water before fishing. These

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32 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

33 Ibid.


37 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

38 Ibid.


conditions are consistent with those described for a very long period swell, which can result in larger ‘set’ waves over 30 minutes to 1 hour\(^{41}\). This supports the requirement for the distribution of warnings when the actual risk can be much more difficult to recognise than the perceived conditions over an extended period of time.

**Action Item 1.7: Conduct further research and consultation into determining the most effective setting of dangerous surf warning thresholds.**

While these warnings can and are being distributed through mainstream media with good support\(^{42}\), there was concern by some stakeholders that the message may not be reaching all target markets, particularly multicultural communities:

> “Getting it out through multicultural media is critical”\(^{43}\)

The Bureau of Meteorology (BoM) and Surf Life Saving have recently aimed to address the barrier to non-English speakers sourcing, accessing and interpreting information through a multilingual guide on the BoM website\(^{44}\).

The warnings are currently applicable under one threshold (Dangerous Surf Conditions), and are not staged in a risk rating system such as the colour coded scheme used to describe bushfire risk. While the benefits of a risk rating system were discussed, the variability of different rock platforms under similar conditions makes it difficult to ensure accurate rating based on existing models\(^{45}\). It was also suggested that this scheme would only be effective if sites ranked as very dangerous were physically closed and/or monitored, which would be very expensive and potentially unsustainable\(^{46}\).

**Development of an evidenced based automated system would require five key advances**\(^{47}\):

1. The development of risk rating classifications for rocky coasts;
2. The accurate mapping of geospatial characteristics of rocky coasts;
3. The development of accurate modelling to display the interaction of the ocean and the rock platforms under different conditions; and
4. Improved near shore modelling of marine swell (<6Nm).

These advances summarise the recommended steps to produce a sound, evidenced based system of dangerous surf warnings for specific locations. There is however an alternative model currently under use by surfers and delivered via the Daily Surf Report.

While this system is based on individual interpretation, it is highly effective in communicating the typical surf conditions, and translating the conditions into advice for finding ‘better surfing locations’.

While the official warning system may be improved on, it has been proposed that the success of

\(^{41}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012


\(^{43}\) Ibid


\(^{45}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012


\(^{47}\) Ibid.
angler based interventions comes from identification with the personality providing not only safety information, but tips to better enjoy the experience.\textsuperscript{48}

A similar approach could be taken for rock fishing in daily fishing reports, where an angler can rely on publicised fishing advice to make an informed decision about the ‘best fishing locations’ on a number of factors including, but not necessarily exclusively focused on, safety.

This approach also has the advantage of using identifiable, genuine fishing personalities with experience to relate information regarding safety in a colloquial manner reducing the synthesis required for raw swell, tide, wind and location data.

“I’m sure we could do something similar to coastalwatch, or the surf reports you hear on the radio. Simple stuff you know. Swell today is from the south around 2 metre, with light winds from the north east. The best spots will be Kamay in the south, and Flat Rock in the north. Bream have been schooling, and undersize Kingy’s... Yeah I think that would work.”\textsuperscript{49}

**Action Item 1.8: The development and delivery of regular fishing reports incorporating rock fishing conditions in a variety of radio and print mediums across mainstream and multicultural communities.**

**Signage**

There is no consensus on the use and effectiveness of signage among rock fishing stakeholders\textsuperscript{50}. One aspect of signage which is largely accepted is the availability of appropriate processes and methodology for the installation of signage, through either coastal safety risk assessment or similar processes. These processes are designed to ensure individuals are exposed to appropriate Australian Standard signage before their reach a hazard, largely through access points.\textsuperscript{51}

A survey of stakeholders found that 73.3% indicated they found standard pictorial signage ‘somewhat effective’ (62.2%) or ‘very effective’ (11.1%)\textsuperscript{52}. Conversely, in the same survey of participants (n=25) only 2 considered it to be one of the most successful initiatives. Furthermore, 3 participants indicated that it was one of the least successful initiatives (n=20). Further insights were provided through the interview process:

“It can be effective for people who haven’t gone somewhere before, maybe not for people who have been there and suffered no negative consequences.”\textsuperscript{53}

This belief could be an explanation for the variances in perceived effectiveness. It is also consistent with the statistics, of 24 drowning cases which referred to rock fishing experience, 91% had previously fished the exact location where the incident occurred.\textsuperscript{54}

\textsuperscript{48} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{49} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{50} Ibid.

\textsuperscript{51} Ibid.

\textsuperscript{52} Mitchell, R., Ware, L., Bambach, M., Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia. University of New South Wales, Transport and Road Safety Research, School of Aviation, Sydney.

\textsuperscript{53} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{54}
There is significant debate about the inclusion of translated messages on safety signage related to rock fishing, partly due to the high proportion of drowning deaths for fishers from non-English speaking backgrounds.

The system of iconography based signage has been established under international ISO standards, and Australian Standards\textsuperscript{55}. The principles on which these standards are developed are that the imagery included is designed and tested to be understood across linguistic barriers to approximately 80\% comprehension\textsuperscript{56}.

It is noted that among a sample of 95 Chinese speakers, 34\% of respondents recognised the signage for \textit{swimming prohibited}, but only 16.1\% understood the signage for \textit{fishing prohibited}\textsuperscript{57}.

\textsuperscript{54} Clapperton, A., Cassell, A. (2011) \textit{A National Review of Rock Fishing Deaths and Hospital Treated Injury}. Injury Research Institute, Monash University.
\textsuperscript{55} Australian Standard AS2416:2011 \textit{Aquatic Safety Signage and Flags}. SAI Global, Sydney.
\textsuperscript{56} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Figure 7: An example of Australian Standard Signage (dogs prohibited) and signage developed by ANSA incorporating the Australian Standard Symbols and translations. Dee Why, Warringah.

This issue presents several possible solutions, though two consistently were identified by stakeholders. Firstly, educate people further regarding the meaning of standard signage. Secondly, insert multilingual translations of safety messages. It is proposed that the use of multilingual signage is however unnecessary given the Australian Standard assessments and testing, and the installation of some languages could increase liability for the landowner:

“If we use the Australian Standard signage, we know we’re OK, because there’s a whole system behind that. But if you add a few languages, and someone who speaks something else, like Arabic for example drowns, then people will ask why wasn’t that language included. That could be a case”

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58 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
59 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
It has been noted that there is resistance to the installation of both safety signage and public rescue equipment in some localities, a detailed discussion of this subject is provided elsewhere in this report.

**Action Item 1.9:** Liaise with Australian Standards regarding comprehension of aquatic safety signage in non-English speaking communities, and deliver education initiatives to increase comprehension.
Safer Access
Improving access to rock fishing locations has been undertaken at several locations in New South Wales on land controlled by the National Parks and Wildlife Service, including Kamay Peninsula (Botany Bay) and The Tubes (Jervis Bay). They currently involve the installation of galvanised steel gangways, stairs and platforms to allow safer access down cliffs to the rock platform area. Stakeholders identified that these initiatives were not only practical, but also send a positive message about rock fishing and a commitment to the future of the sport.

There is specific data relating to falls resulting in fatalities, in 12% (n=69) of cases the patient was walking on rocks either in a first attempt to reach a fishing location, when they first arrive at a location, or when moving between locations or leaving. The data also shows that 75% of rocks fishing related hospitalisations were resulting from a fall, with 20.4% falling from one level to another specifically. It has been hypothesised that this figure could be attributable to the difficult accessibility of many rock fishing locations.

“We’ve had lots of incidents of anglers dying or getting injured accessing fishing spots”

In some locations anglers have installed makeshift infrastructure to improve accessibility and mitigate some of these risks. Some examples of this include:

- Chains
- Foot Holes
- Ladders
- Anchor Points

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60 Recreational Fishing Alliance, Newsletter. February 2012 Edition.
64 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
There was some support from stakeholders to improve accessibility to rock fishing sites, citing varied benefits:

“The gangways can go over culturally significant land, middens, and it prevents erosion”

“If one easy access point was installed it would make signage easier, and you could funnel people through the one spot, conduct more education activities there”

“The fishos will get there anyway, by hook or by crook, if there isn’t a ladder, then we’ll bring a rope and use it to get down, but a ladder would be a lot safer. I’m sure there would be some liability issue or something though. It’s never that easy!”

“Kamay is inside Botany Bay, and Beecroft is inside Jervis Bay. If we ever came to sending people to safer spots, or recommended spots to learn how to fish, we’d be sending them there. The access just makes it more attractive”66

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66 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
It was considered by some that access may have been a significant challenge for rescue and emergency services to reach an incident location, however this was largely dismissed:

“Most of the time we would be attending with water and airborne resources, and people might oversee the operation from a safer location. If someone has gone in, then the people on the ground are trained to make calls based on their risk assessment to see whether they need to get down to the location, but it’s more unlikely”\textsuperscript{67}

Finally, cost and prioritisation were also discussed by some stakeholders:

“They’re not cheap, the set of stairs at Jervis was a couple of hundred thousand dollars. So pretty expensive, but the life of those stairs could be 20 years, and they’re always putting in this sort of thing for sightseers or walkers”

“On a scale of one(high) to five(low) priority wise, I’d give it a five”\textsuperscript{68}

\textbf{Action Item 1.10: The installation of improved access should be considered on a case by case basis following recommendations from a safety risk assessment process.}

\textsuperscript{67} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
\textsuperscript{68} Ibid.
Restricting Access
Restricting access to rock fishing platforms has been proposed as a possibility in Western Australia, following an audit of coastline and identification of ‘very high risk’ locations\(^69\). A similar process of exclusion from dangerous locations has also been proposed by Piliskic et al.\(^70\). A systematic audit of coastal rock platforms would be required prior to the restriction of access on certain grounds based on geomorphologic aspects rather than simple epidemiology to avoid unintended consequences such as those described below:

“They opinion is that if you block the tracks, remove the PRE, then people will stop drowning in there, but it doesn’t take into account what’s happening around there. Are people just drowning at another spot now? It’s all just political shuffling, and all that crap”\(^71\)

It is noted that angler stakeholders indicated there would be significant resistance to any efforts to restrict access to rock fishing locations based on historical and epidemiological factors.

“If you block somewhere off, it might be a place that someone learn to fish at 50 years ago. He might only fish there when it’s dead flat, and there’s hardly any risk. But if a handful of people fish there when it’s huge and get killed, then the place is off limits? Nah, we won’t stand for that”\(^72\)

Examples of ‘blocking’ access have included the barricading or replanting of tracks leading to locations, removing makeshift infrastructure, fencing or signposting as area as restricted access.

**Action Item 1.1:** Coastal safety risk assessments can be used to justify exclusion from identified high risk areas in consultation with the land manager on a case by case basis.

Education and Communication Initiatives
Education and communication initiatives are pivotal to the improvement of rock fishing safety, and an essential element of the state-wide strategy. These initiatives include:

- Consistent Messages
- Code of Conduct
- Public Relations
- Advertising
- Ambassadors
- Workshops and Seminars
- Ongoing assessment

These initiatives are detailed under recommendation 3 of this report for incorporation into a state-wide strategic plan to both increase safe fishing behaviour and introduce any legislative efforts for mandatory PFD wear while rock fishing.


\(^71\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

\(^72\) Ibid.
Secondary Prevention Strategies
Secondary prevention strategies aim to prevent or limit the severity of an injury during an adverse incident\(^\text{73}\). In the context of rock fishing incidents, this includes improving the buoyancy of the angler in the water through the use of personal flotation devices or the wearing of appropriate clothing.

Personal Flotation Devices (PFDs)
This report recommends the mandatory use of PFDs while rock fishing, this topic is discussed in detail under recommendation 3.

Appropriate Clothing
An important factor in the minimisation of harm to the angler is the use of appropriate clothing. Of 21 rock fishing fatality cases where PPE use was described, 1 wore heavy winter clothing\(^\text{74}\).

Education programs currently include instruction on the negative consequences of accidental immersion in heavy clothing\(^\text{75}\), and it is also covered in written and online material\(^\text{76}\). While these efforts should continue, the year round nature of rock fishing participation\(^\text{77}\) indicates that during colder months, anglers will wear warmer clothing. It has been suggested that this can be mitigated by the use of appropriate PFDs, or specifically designed warm jackets with inbuilt inflatable PRE\(^\text{78}\).

**Action Item 1.12: The wearing of appropriate clothing should be promoted through education and communication initiatives.**

Anchor Points
Anchor points are eye bolts which have been secured into the rock shelf, that allow the angler to tether themselves in using their own rope and harness. They do not aim to necessarily remove exposure to the risks (overtopping waves, cliffs, algae), but will minimise the damage if the angler is exposed by preventing either accidental immersion or impact from a fall.

A trial of anchor points has taken place in the Leewin – Naturaliste National Park, Western Australia from 2003\(^\text{79}\). No results of this trial have been sourced. The selection of locations was determined between local fishermen and Department of Environment and Conservation (DEC) staff using the following factors\(^\text{80}\):

- History of drowning and wash off incidents
- Which were the popular spots people fished from on the rocks
- Develop an understanding of why these sites were used

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\(^{75}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012


\(^{78}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012


\(^{80}\) Ibid.
The fishers behaviour and use of the site

Wave action at these spots and its potential impact on the fisher

The important physical features of the site e.g. slope, black algae

Type of visitors fishing at such sites e.g. noted inexperienced fisher not far from us

Accessibility of the rock; e.g. road access, tracks to rock etc.

Importantly, the report describes the specific geomorphology of the rock platforms under Action Item for anchor point installation:

The most important physical features of the site include the slope of the rock on which the fisher stands, as the more flat rocks, found at some sites, would not require anchors as the risk was low. This would need to be considered on a case by case basis.\(^\text{81}\)

This is consistent with the information offered by stakeholders when asked about their effectiveness in NSW which generally has rock platforms with a steep rampart rather than sloping rocks into the ocean. It also provided some opinions for their possible effective use in NSW:

“I can see some benefits for anchor points over in the west, where they have sloping, granite, platforms and very high cliffs, they’re pretty high spots so in those cases fair enough. I’d probably tie myself off too.”\(^\text{82}\)

The use of anchor points for both mid-cliff fishing is also non-specifically referred to by the Western Australian DEC in the Recommended Action Proposed Edel Land National Park:

“Mid-cliff fishing at various sites – people engaged in scaling the cliff faces to fish from mid-cliff face or swell line ledges can fall from the cliff face because they lose balance or grip of the rock face and are not tied off with a safety line.

Risk Score: Substantial

Recommended Action: 2) Consider developing a code of practice in consultation with participants, which may include safety lines and tying off to an anchor point”\(^\text{83}\)

The use of anchor rings in cliff situations is also supported through epidemiological data which shows that 16.8% of 304 anglers hospitalised from rock fishing related injuries fell from a cliff. A further 20.4% fell from one level to another, and 32.2% had unspecified falls. Overall, falls represented 75.4% of all hospitalisations.

The use of anchor points for fishing from rock platforms in New South Wales, which are closer to the water line and with a steep or immediate drop off into the ocean, has been discounted by many stakeholders, particularly anglers:


\(^{82}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

\(^{83}\) Table 3 – Recommended Actions Proposed Edel Land National Park, Department of Environment and Conservation, 2009.
“It could prevent your movement around the rock ledge, and it relies on your ability to tie a good knot. I’d be worried about it giving you a false sense of security and fishing when you shouldn’t. If you needed to tie yourself to the rocks, then you shouldn’t be fishing”

“I’ve seen many inventions over the years. Who is going to install it, test, and accredit the eye bolts? They’re all good ideas, you will be at the end of the tether, so they will find you, but what condition will you be in?”

Besides occasional ranger observations, there is currently no strong evidence showing that anchor points are being used on a regular basis. The anchor rings also rely on the angler bringing the necessary equipment (harness and rope), and being knowledgeable of the effective techniques to properly use the anchor point. It is noted that the anchor points currently promote signage to educate visitors of their use.

The use of anchor points in flat rock platforms is also not supported by fishing organisations:

“We won’t support them no. (...) we don’t think they’re appropriate especially when you can wear cleats and a lifejacket, and if it’s too dangerous then go home, you shouldn’t be fishing in the first place”

Despite these strong opinions displayed through stakeholder interviews, the perceived effectiveness of anchor points indicated through the stakeholder survey (n=30) showed that opinion was split with 60% indicating they believed anchor points were very effective or somewhat effective, 16.7% considered them neither effective or ineffective, and 23.4% indicated either somewhat ineffective or ineffective. This may be accounted for by the varied uses of the device.

The use of anchor rings is currently limited to installation in granite rocks, further investigation into their effectiveness to bear 600lb of force in varied rock types is required. A coastal risk assessment conducted has also recommended further research into the nature, siting and operation of anchor points.

**Action Item 1.13: The use of anchor points in New South Wales cannot be recommended until further evidence of their effectiveness is available.**

**Emergency Communication Beacons and EPIRBS**

Contacting emergency services following a rock fishing incident is considered challenging for several reasons, including:

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84 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
86 Ibid.
87 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
89 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
• Ensuring the angler keeps a mobile phone or EPIRB their person (often not the case around water);
• Ensuring the location has mobile phone coverage;
• Ensuring the location is away from tall cliffs which can shadow phone coverage; and
• Ensuring the person can accurately identify their correct location to the operator.

A range of solutions and devices can minimise these issues.

Firstly, anglers have been encouraged to carry their mobile phone in a water proof case while rock fishing as part of safety campaign91.

Where locations do not have mobile phone coverage, are in shadow or anglers would have to travel considerable distance to receive coverage, emergency communication beacons which route directly to emergency services could be a viable option following recommendation from a risk assessment.

There are several types of emergency beacons which communicate on different mediums including GSM (mobile coverage), hard wired, UHF or VHF radio frequencies or satellite communications92. Each type has its own advantages and disadvantages, though location is the biggest determinant to choosing which type of emergency beacon would be appropriate.

Stakeholders generally thought that the beacons were either very or somewhat effective (73.3%), although some (23.3%) also believed that the beacons were neither effective nor ineffective93. Several interviews revealed genuine concerns for malicious damage, misuse, and hoax calling94. These concerns are consistent with notations in the RNLI Guide for Coastal PRE relating to location of the devices “not being located where there is a likelihood of misuse resulting in hoax calls to the emergency services”95.

It has been proven in Australia that inappropriate use of publicly accessible EPIRBS can result in false activations, and the unnecessary tasking of emergency resources. With the cost of major search operations costing between $60,000 and $100,000 the financial risks of unnecessary expense and diversion of assets are considered serious96. The Silent Sentries installed in Western Australia which were originally installed with EPIRB’s installed, and automatically activated when the device was used, has the EPIRB’s deactivated and removed following vandalism97.

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92 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
94 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
97 Mercer, D. Beacons taken away because of vandalism. The West Australian. 4th April 2011.
Surf Life Saving New South Wales also operate an emergency beacon in Little Bay in Randwick, NSW. There have also been concerns raised about the malicious use of this device, the location of the device and the necessity of an emergency beach in the location which has presumably excellent mobile phone coverage.98

Action Item 1.14: The installation of emergency beacons should be considered on a case by case basis following coastal safety risk assessment of the location, and carrying of a mobile phone or EPIRBS is encouraged in education and communication initiatives.

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98 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Emergency Markers
One advantage of emergency communication beacons is that it can immediately indicate the specific location of the angler to emergency services. There have been cases noted where fishermen contacted emergency services, and could not accurately communicate their location on the coastline:

“We’ve seen several examples of rescuers being sent to the wrong spot, the drowning in the Royal National Park for example, where the helicopters were around Bundeena but they were near Wattamolla. It could have been a language barrier, but there’s more examples where different places have the same name. Even then the names are usually fishing names, might not be official. Like I don’t know how many Snapper Points there are along the coast”

It is noted that a limitation of this assessment is that data was not be analysed regarding the frequency of occasions emergency services were tasked to the wrong location.

While emergency markers can assist in addressing this issue, the Victorian Coroner has previously made recommendations regarding the use of an emergency marker system which also provides a solution.

The Emergency Services Telecommunication Authority (ESTA) in Victoria is currently establishing a system of emergency markers which provide a system of unique location codes used across the state which can be provided to emergency service when in need. Stakeholder interviews revealed that a similar coordinated system was currently under investigation by Surf Life Saving New South Wales for coastal locations by retrofitting existing signage. The use of an emergency marker system in areas with mobile phone coverage rather than emergency communication beacons provides a much more cost effective solution to the issue.

Action Item 1.15: The establishment of a coordinated emergency marker system for coastal locations may be further explored in consultation with the New South Wales Police Force.

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99 Ibid.
102 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Tertiary Prevention Strategies

Tertiary prevention strategies aim to limit the consequences and improve survivability of an injury that has already occurred. In the case of rock fishing, it also includes the ability to alert appropriate emergency services to be dispatched in a timely manner in order to minimise the severity of the immersion of fall.

Overview of Public Rescue Equipment

Figure 12: The table below provides an overview of PRE currently in or suggested for use in Australia.

<table>
<thead>
<tr>
<th>PRE Type</th>
<th>Morphology of Current Installations</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Extensive Training Required</th>
<th>Recommended uses in NSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rescue Tube</td>
<td>Sandy Beaches and Rock Pools</td>
<td>Can be thrown short distances.</td>
<td>Requires the patient to enter the water themselves with swim fins</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>Throw Bag</td>
<td>Not in use.</td>
<td>Distance of deployment.</td>
<td>Risk of theft, risk of using the line to return the patient towards the rocks, resilience insitu for coastal locations and maintenance.</td>
<td>No</td>
<td>May be used on a case by case basis. Further effectiveness investigation required.</td>
</tr>
<tr>
<td>Angel Ring (lifering)</td>
<td>Steep (&gt;1:1) rampart rock platforms</td>
<td>Ease of use. Rugged design. &gt;120 angel rings installed in NSW. Awareness campaign established.</td>
<td>Single use device. Distance of deployment. Requires rescuer to approach the platform edge.</td>
<td>No</td>
<td>Steep (&gt;1:1) rampart rock platforms.</td>
</tr>
<tr>
<td>Silent Sentry</td>
<td>Sloping (&lt;1:1) platforms</td>
<td>EPIRB unit immediately alerts emergency services. Multiple balls can be rolled down slopes to the patient keeping rescuer at a safer distance.</td>
<td>EPIRB units were vulnerable to vandalism and disabled.</td>
<td>No</td>
<td>Sloping (&lt;1:1) rampart rock platforms. Recommended redesign to remove EPIRB housing.</td>
</tr>
</tbody>
</table>

It was noted through stakeholder interviews that Australia currently lacks a rigorous methodology or guideline for the installation of public rescue equipment. It is noted that the use of each type of equipment has developed organically through either land manager based audit and recommendation, or through the advocacy of interest groups including The Australian National Sportfishing Association (Angel Rings), the Nathan Drew Memorial Trust (Silent Sentries) and local fishing advocates (anchor points).

Action Item 1.16: Develop, including necessary field testing, and implement a guideline for the use of public rescue equipment to ensure adequate methodology for the citing, installation, and maintenance of public rescue equipment.

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104 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Rescue Tubes
Rescue tubes are presently used in a small number of coastal council areas in NSW, generally around sandy beaches and rock pools\textsuperscript{105}. Their use is currently limited to sandy beaches and rock pools.

Figure 13: Rescue tube in situ as PRE at Dee Why, Warringah, adjacent to the rock pools.

The use of a rescue tube as public rescue equipment is considered inappropriate for four reasons:

1) The use of the equipment could not be adequately taught to the rescuer in under 10 seconds preferably in pictures\textsuperscript{106};
2) There is significant aquatic ability and skill required to use a rescue tube effectively\textsuperscript{107}; and
3) The effective use of the equipment requires the rescuer to enter the water, assuming a degree of aquatic skill and exposing the rescuer to further risk
4) The use of swimming fins is highly recommended with a rescue tube\textsuperscript{108}.

An argument for the use of rescue tubes is related to human nature, and that loved ones will enter the water to conduct a rescue, and any flotation that can be provided is beneficial\textsuperscript{109}. This topic, for the case of the child drowning victim, is discussed in a paper by Pearn and Franklin, who term the process of the rescuer drowning following a rescue as aquatic victim-instead-of-rescuer (AVIR) syndrome\textsuperscript{110}. The results of this study advocate both an increase in basic rescue skills (aquatic skill development) and use of non contact rescues\textsuperscript{111}.

The Royal National Lifeboat Association (RNLI) also uses rescue tubes for trained lifeguards, but the equipment is not recommended for use on beaches, rocky coasts, tidal inlets, estuaries, or man-made coasts\textsuperscript{112}. The descriptions of the geomorphology included in the RNLI guide are consistent

\textsuperscript{105} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
\textsuperscript{107} Surf Life Saving Australia (2010) Public Safety and Aquatic Rescue. 33\textsuperscript{rd} Ed. Surf Life Saving Australia, Sydney.
\textsuperscript{108} Ibid.
\textsuperscript{109} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
with the descriptions included in the SLSA Public Safety and Aquatic Rescue Manual\textsuperscript{113} learners guide, therefore the guideline has been considered transferrable to the Australian environment.

Training provided to lifesavers and lifeguards in the use of rescue tubes strongly recommends the use of swim fins (flippers) to aid the effectiveness and speed with of aided and unaided rescues\textsuperscript{114}. This has also been displayed through scientific research\textsuperscript{115}. It has been noted by stakeholders that storage of swim fins in situ as a piece of public rescue equipment would be impossible due to theft, and inability to provide a variety of sizes to suit different rescuer sizes\textsuperscript{116}.

The RNLI guide also states that “PRE is not generally suitable for shallow shelving beaches (...) PRE has proven to be ineffective in areas where an adult is able to stand at any point within 25m of the shoreline and the gradient of the seabed or the beach is low and gentle”. In the case where PRE is going to be installed, RNLI recommend small-medium life rings are used.\textsuperscript{117}

\textit{Action Item 1.17: Based on the available evidence, rescue tubes are not recommended for use as PRE.}

\textbf{Throw Bags}

Throw bags consist of a self contained casing, with a buoyant ball (>40N), weight, line and handle which can be launched to the patient with the other end of the rope held by the rescuer. No evidence could be found for the use of throw bags as PRE on rocky coasts in Australia. The use of throw bags as PRE for rocky coast is recommended as an option in the United Kingdom\textsuperscript{118}.

Stakeholder expressed concern that the use of throw bags as PRE could result in increased theft of the devices, as well as possibly encouraging rescuers to draw the patient back with the line and attempt a recovery on the rocks which is not recommended\textsuperscript{119}.

\textit{Action Item 1.17: Based on the available evidence the use of throw bags may be installed as PRE for rocky coasts on a case by case basis.}

\textsuperscript{113} Public Safety and Aquatic Rescue. 33\textsuperscript{rd} Ed. (2010) Surf Life Saving Australia, Sydney.
\textsuperscript{114} Ibid.
\textsuperscript{116} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
\textsuperscript{118} Ibid.
\textsuperscript{119} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Silent Sentries
Silent Sentries were developed by The Nathan Drew Memorial Trust based in Western Australia. The unit consists of a stainless steel case containing three 300mm diameter floats with a rope meshing and handle at each end. The floats are removed by sliding a horizontal retaining bar across. Sliding the handle activates a GME MT400 EPIRB located at the top of a pole.\(^{120}\)

![Silent Sentry in situ at Salmon Holes, Albany, WA. Adam Weir, SLSA.](image)

*Figure 14: A silent sentry in situ at Salmon Holes, Albany, WA. Adam Weir, SLSA. The instructions for use of the silent sentry are located on the device.\(^{121}\):*

In Case of Emergency:
1. Do not panic or put yourself at risk
2. Push the arm around and remove the float

\(^{121}\) Ibid.
3. **Walk, do not run on rocks**
4. **Go to a safe location above person in water**
5. **Roll float down rocks to person in water**
6. **Reassure person in water – do not panic.**
7. **Guide person in water to a safe location**
   *Ring 000 For Help*

The design of the device has been developed specifically for the geomorphology of the WA coastline, particularly rock shelves with a low, sloping rampart into the water. The geomorphology described by several independent stakeholders of the locations where silent sentries are located was consistently “long, sloping rocks”\(^{122}\). Since the morphology of the Western Australian coastline is different to that of New South Wales, it is unsurprising that the survey results indicated the majority of respondents indicated the device would be somewhat effective (55.2%) though few considered it very effective (6.9%). Some of the benefits in appropriate locations were also expressed through interviews:

“The idea of a silent sentry device is that you could roll it (the flotation buoy) down the rocks, like a long sloping rock that stays pretty slippery a long way down to the water”\(^{123}\)

The figure below provides visual evidence of the gradient of rock platforms where silent sentries are installed:

*Figure 14: A silent sentry in situ and the adjacent sloping platform. Adam Weir, SLSA.*

\(^{122}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

\(^{123}\) Ibid.
Silent sentries have been involved in at least two successful deployments and rescues since June 2007, and there are currently 5 installed in WA with plans to expand the program.\textsuperscript{124}

\textbf{Figure 15: Silent Sentries following the removal of the EPIRB units. Adam Weir, SLSA.}

Due to malicious activations and vandalism, the EPIRB component of the silent sentry has been deactivated and removed.\textsuperscript{125} This may result in significant redesign of the unit to remove redundant components.

\textbf{Action Item 1.19: Based on the limited evidence available, the use of silent sentries (or similar devices) may be appropriate for rock platforms with a gently sloping rampart (<1:1) on a case by case basis.}

\textsuperscript{125} Mercer, D. Beacons taken away because of vandalism. The West Australian. 4\textsuperscript{th} April 2011.
Angel Rings
The Angel Ring Project was developed and is managed by the Australian National Sportfishing Association\textsuperscript{126}. It involves the installation and maintenance of 32” Life Rings at 120 rock fishing locations along the coastline as well as 150 Angel Rings installed in New South Wales Police vehicles\textsuperscript{127}.

![Angel ring in situ at Suicide Rocks, Dee Why, Warringah. Anthony Bradstreet, SLSA.](image)

\textit{Figure 16: Angel ring in situ at Suicide Rocks, Dee Why, Warringah. Anthony Bradstreet, SLSA.}

The Angel Ring Project is currently implemented by ANSA with financial or in-kind support by several agencies and sources including:

- NSW Department of Primary Industries;
- NSW Recreational Fishing Trusts;
- NSW Sport and Recreation;
- NSW National Parks and Wildlife Service;
- NSW Police; and
- Federal Government; Department of Agriculture, Fisheries and Forestry.\textsuperscript{128}

\textsuperscript{126} Australian National Sportfishing Association (2011) \textit{Angel Rings Website}. Available: www.angelrings.com.au [Cited 2/03/2012]
The Angel Ring Project has been credited with the successful rescue of 47 individuals\textsuperscript{129}. It has also been hypothesised that of past rock fishing fatalities, 74% could have been prevented if an Angel Ring was available and used\textsuperscript{130}. This belief is however disputed, with stakeholders referring to the Buscombe joint-inquest into 12 rock fishing related fatalities as an example. The inquest indicated that 7 of the 12 deaths occurred at locations with an Angel Ring present\textsuperscript{131}.

Despite overwhelming support in stakeholder surveys and being ranked as the fourth most successful initiative to improve rock fishing safety\textsuperscript{132}, there are legitimate limitations to the reliance on Angel Rings.

The effective range of an Angel Ring has been criticised by stakeholders owing to its weight of approximately 5kg; with the average user able to propel the device between 5-10 metres\textsuperscript{133}. One alternative device suggested was a throw bag\textsuperscript{134}. Another was a Stormy Grenade or the Pacific Highlander Mustang, though both were discounted by stakeholders as being non-reusable, lacking the resilience to be left exposed to the elements, and being highly targeted for theft and vandalism\textsuperscript{135}.

The use of 32” life rings is recommended for rocky coasts in the RNLI guide for the use of PRE, with descriptions of coastlines consistent with Australian rocky coast geomorphology\textsuperscript{136}.

The RNLI guide refers to the use of a rope of at least 25m plus any expected maximum drop in combination with the life buoy. This provides the opportunity to retrieve the ring if it misses the patient\textsuperscript{137}. Angel rings currently do not have lines attached\textsuperscript{138}. The suggestion has some merit as stakeholder interviews revealed successful rescues which have been conducted with unofficially attached ropes to angel rings\textsuperscript{139}. However, possible attempts to return the patient onto the rocks and vandalism were identified and significant challenges to the attachment of ropes:

“There have been rings that have missed the mark, people haven’t been able to throw them correctly. The ring relies on the swash of the waves to push it out towards the patient. But yeah, a second throw might work, but my biggest worry is theft”

“We shied away from attaching a rope once again for theft, it was a decision made by rock fishermen based on theft, but it’s something that we could go back and look at again”\textsuperscript{140}

\textsuperscript{129} ANSA, NSW Angel Ring Update: 20\textsuperscript{th} March, 2011. Australian National Sportfishing Association.


\textsuperscript{131} Buscombe, M. NSW State Coronial Investigation. 2001, NSW State Coroner: Newcastle.

\textsuperscript{132} Mitchell, R., Ware, L., Bambach, M., Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia. University of New South Wales, Transport and Road Safety Research, Sydney.

\textsuperscript{133} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012


\textsuperscript{135} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012


\textsuperscript{137} Ibid.

\textsuperscript{138} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{139} Ibid.

\textsuperscript{140} Ibid.
It was also raised that a limitation of angel rings is the fact that another person is needed to assist in the rescue, although only 25% of drownings between 2000-2010 indicated the person was fishing alone\textsuperscript{141}. Furthermore, that when the device is used, it requires the person to approach the extreme edge of the rock platform, exposing themselves to further risk which may be further increased to the patient and rescuer if attempts are made to haul in the patient using an attached rope\textsuperscript{142}. This response is not advised in education efforts which have established the use of angel rings without rope, and that the patient should move away from the rocks and await rescue to avoid further injury\textsuperscript{143}. The RNLI guide for PRE provides no references to evidence for the inclusion of a line in rocky coast environments\textsuperscript{144}. Further investigations are required to determine the effectiveness of rope attached to angel rings which considers current educational practices.

Maintenance and vandalism were recurring issues identified with the Angel Ring Project. It was hypothesised during stakeholder interviews that challenges in maintaining the infrastructure are a significant issue for local land managers authorising their installation\textsuperscript{145}. Although ANSA volunteers undertake to conduct an audit of the rings every three months, concerns are still raised between these periods\textsuperscript{146}. Recently, a number of Angel Rings have had asset tracking GPS devices installed, which alert designated individuals when an angel ring moves beyond a predetermined geographic polygon, and allow the individual to determine whether the device is being genuinely used or has been stolen or vandalised\textsuperscript{147}. This addresses some of the key issues around maintenance, though stakeholders also indicated that this process needed to be formalised between various agencies concerned\textsuperscript{148}. This is discussed further, and a Action Item made in the section regarding resistance to installation below.

**Action Item 1.20:** Based on the limited evidence available, and the establishment of the program, the use of angel rings (life buoys) is considered appropriate on rock platforms with a steep rampart (>1:1) on a case by case basis with formal installation citing, auditing and maintenance procedures.

**Resistance to Installation of Signage and Angel Rings**

There have been delays or resistance to the installation of signage and Angel Rings by land manager noted by Coronial inquests\textsuperscript{149}. Further investigation and interviews with stakeholders reveals several pertinent issues, primarily involving the perceived liability on land managers which could result from the installation of angel rings on land under their control\textsuperscript{150}.

The Civil Liability Act 2002 (NSW) was implemented to provide some protection for councils from litigation for matters which would be ordinarily considered outside of their duty of care.

\textsuperscript{141} Clapperton, A., Cassell, A. (2011) *A National Review of Rock Fishing Deaths and Hospital Treated Injury*. Injury Research Institute, Monash University.

\textsuperscript{142} *Research review of rock fishing in NSW*, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{143} Safefishing.com.au


\textsuperscript{145} Ibid.

\textsuperscript{146} Ibid.


\textsuperscript{148} *Research review of rock fishing in NSW*, Stakeholder interview process. Subject de-identified. SLSA, 2012

\textsuperscript{149} Buscombe, M. *NSW State Coronial Investigation*. 2001, NSW State Coroner: Newcastle.

\textsuperscript{150} *Research review of rock fishing in NSW*, Stakeholder interview process. Subject de-identified. SLSA, 2012
Interpretation of this legislation can result in a variety of strategies to both mitigate risk related to rock fishing, as well as defining the limitations of duty of care for a land manager. A summary of key passages is provided below:

Section 5B discusses concepts that would be considered in determining the existence of a duty for a land manager:

A person does not breach a duty to take precautions against a risk of harm unless:

a. The risk was foreseeable (that is, it is a risk of which the person knew or ought reasonably to have known); and
b. The risk was not insignificant; and
c. In the circumstances, a reasonable person in the position of the person would have taken the precautions.

An interpretation of this passage can interpret that the risks involved in rock fishing, including waves and cliffs are foreseeable risks, and the angler should reasonably be aware of the hazards. Therefore installation of signage is not a priority.

Similarly, section 5H states that there is no proactive duty to warn of an obvious risk. Obvious risks are defined as those that would be obvious to a reasonable person in the position of the injured party, and include those that are patent or matters of common knowledge. The test of a reasonable person however, has its limitations.

Section 5L provides that there is no liability as a result of the materialisation of an obvious risk of a dangerous recreational activity, whether or not the injured person was aware of the risk. ‘Dangerous recreational activity’ is defined as an activity engaged in for enjoyment, relaxation or leisure that involves a significant degree of risk of physical harm to a person.

An interpretation of sections 5H and 5L provides the option for land managers to remove/not install any signage or public rescue equipment related to rock fishing safety within their rights under the Civil Liability Act (2002) NSW.

Section 42 is of further assistance to land managers. It provides that:

The following principles apply to a proceeding in deciding whether a public or other authority has a duty or has breached a duty:

a. The functions required to be exercised by the authority are limited by the financial and other resources that are reasonably available to the authority for the purpose of exercising the functions;
b. The general allocation of financial or other resources by the authority is not open to challenge;

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151 Civil Liability Act 2002 (NSW)
152 Section 5H of the Civil Liability Act 2002 (NSW)
154 Section 5L of the Civil Liability Act 2002 (NSW)
155 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
156 Section 42 of the Civil Liability Act 2002 (NSW)
Research Review of Rock Fishing in New South Wales

c. **The functions required to be exercised by the authority are to be decided by reference to the broad range of its activities (and not merely by reference to the matter to which the proceeding relates); and**

d. **The authority may rely on evidence of its compliance with its general procedures and any applicable standards for the exercise of its functions as evidence of the proper exercising of its functions in the matter to which the proceeding relates.**

In summary, with relation to the installation and maintenance of both aquatic safety signage and public rescue equipment, under the legislation described above, there is no impetus for the land manager to install either device to prevent injury or death. There are three significant interpretations of the Civil Liability Act which can be employed to resist moves to install signage and PRE:

1. No proactive duty of care exists because the risk was foreseeable or obvious such as waves, cliffs, and moss (Sections 5B and 5H)

2. No liability exists as a result of the materialisation of an obvious risk of a dangerous recreational activity, interpreting rock fishing as a dangerous activity (Section 5L)

3. The functions required to be exercised by the land manager are limited by financial and other resources (section 42)

4. The establishment of local general procedures, standards and policies 'little laws' (Section 42)

From the perspective of the land manager, two of the biggest limiting factors cited were budgetary constraints and public expectations. Financial limitations may be a genuine factor for some land managers regarding the erection and maintenance of signage, though the Angel Ring project is fully funded by state and federal government grants. It was also considered that aesthetics, and ‘visual pollution’ was a significant barrier to the installation of signage in some localities.

Further Action Items and interpretations of the Civil Liability Act were discussed in stakeholder meetings. It was proposed that once signage or public rescue equipment was put in place, the land manager may be held liable for aspects including:

1. Methodology and process for placement of the sign or PRE;

2. Maintenance of the sign or PRE; and

3. The presence of signage or PRE encouraging recreational use of a locality or “invite use”.

Multiple stakeholders have presented the notion that some land managers may be taking action within their rights under the Civil Liability Act 2002 (NSW) to exclude the use of safety signage and public rescue equipment within their locality by:

- Establishing local policies or “little laws” while rule out the installation of signage or PRE

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159 *Research review of rock fishing in NSW*, Stakeholder interview process. Subject de-identified. SLSA, 2012

160 Ibid.

161 Ibid.
• Accept the advice of risk advisors that signage installation may be a liability
• Prioritise installation and maintenance of signage and PRE as low; or
• Rule that resources are not available for the installation and maintenance of signage or PRE.

The increased liability experienced by land managers who take action to install signage or PRE is a significant barrier, and that an amendment to the civil liability act to legislate out liability for those who install emergency rescue equipment has been proposed by multiple stakeholders as a solution. It was however noted, that any such legislative amendment to the Civil Liability Act must also be accompanies by improved resourcing, maintenance and audit procedures162.

**Action Item 1.21:** The following actions should be considered by the NSW Government to reduce the time taken for land managers to approve and facilitate the installation of safety signage and/or public rescue equipment related to rock fishing safety:

1. Review section 5L of the Civil Liabilities Act (2002) NSW to absolve land managers of liability for attempts to mitigate risks associated with dangerous recreational activities by installing safety signage or emergency rescue equipment.
2. Formalise efficient installation, citing, auditing, and maintenance procedures for PRE in partnership between all key stakeholders.

**Appropriate Resources for Emergency Services**

New South Wales Police Marine Area Command has authority for all marine search and rescue and recovery operations163. However, a variety of emergency services may respond including Surf Life Saving, Ambulance or State Emergency Services depending on location and incident type164.

The angel ring project currently provides over 150 angel rings to be stored in NSW Police vehicles for use in response to rocky coast related incidents165. Testimony was provided to Coroner Buscombe by a NSW Police Force officer who believes that the use of angel rings in police vehicles was outdated, and new products such as stormy grenades (throw sticks) would be more effective166.

Throw sticks are available in different types from multiple manufacturers including Mustang and Stormy Australia. Both consist of a handle, and a float with a hydrostatic head which inflates on immersion in the water167.

Investigation into throw sticks with stakeholders uncovered several benefits over angel rings including size of the unit for storage, distance of deployment, ability to carry multiple sticks for multiple throw attempts168.

162 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
163 Ibid.
164 Ibid.
168 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Stakeholders provided the following opinions on the replacement of angel rings with throw sticks for use by emergency services:

“I wouldn’t like to be the person to remove angel rings from cars; maybe they could be used together?”

“They (throw sticks) can be thrown a long distance. I can throw one about 50 metres, but I think I’d only be able to throw a life ring, maybe 10 or 15”\(^\text{169}\)

The distance the device can be thrown has also returned conflicting opinion, while 50m has been described above, trials have indicated a distances between 10-25m, though individual skill plays a significant part\(^\text{170}\).

As identified as a challenge with the use of angel rings, accuracy of the throw by the rescuer can be a limitation on their success. This may be addressed by ensuring responders carry at least two devices as indicated below:

“We’ve done some testing with our guys, and found that you had to carry a few of them. The first throw was always way off target, usually by around 15 meters, but the second one was a lot better.”\(^\text{171}\)

There is however a cost element involved in the use of throw sticks both as replacement following use, and maintenance over time for unused equipment\(^\text{172}\).

**Action Item 1.2:** Inflatable throw sticks may be used by emergency services regularly deployed to aquatic rescue incidents in conjunction with angel rings.

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\(^{169}\) Ibid.


\(^{171}\) Ibid.

\(^{172}\) Ibid.
Prioritisation of Interventions in the State-Wide Strategy

Stakeholders were asked to identify the most successful and least successful initiatives to improve rock fishing safety as part of a survey. The results provided the perceived effectiveness, and combined with a literature review and further stakeholder analysis, the authors provide the following prioritisation table based on these results:

Figure 17: Prioritised interventions for inclusion in state-wide rock fishing safety strategy (H-L)

<table>
<thead>
<tr>
<th>Priority</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development of the coordinated state wide strategy.</td>
</tr>
<tr>
<td>2</td>
<td>Wearing PFDs and non-slip footwear (voluntary or mandated)</td>
</tr>
<tr>
<td>3</td>
<td>Education campaigns using safety ambassadors and targeting vulnerable groups.</td>
</tr>
<tr>
<td>4</td>
<td>Targeted technique and safety workshops and other media.</td>
</tr>
<tr>
<td>5</td>
<td>Coastal safety risk assessments</td>
</tr>
<tr>
<td>6</td>
<td>Public rescue equipment</td>
</tr>
<tr>
<td>7</td>
<td>Review, assessment and continuous improvement procedure for all interventions</td>
</tr>
<tr>
<td>8</td>
<td>Signage</td>
</tr>
<tr>
<td>9</td>
<td>DVD’s</td>
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<tr>
<td>10</td>
<td>Anchor Points</td>
</tr>
<tr>
<td>11</td>
<td>Hydrodynamic modelling</td>
</tr>
<tr>
<td>12</td>
<td>Closure or restricted access to high risk locations</td>
</tr>
<tr>
<td>13</td>
<td>Written Material – pamphlets, brochures, booklets</td>
</tr>
</tbody>
</table>

It is interesting to note that stakeholders considered signage to be equally effective and ineffective.

Recommendation 2: Develop, implement and assess a public education and communication campaign, incorporated into the rock fishing safety strategy to promote safe rock fishing practices and support the introduction of legislation.

Existing public education campaigns have achieved varied degrees of success, and provided little assessment into their effectiveness. They have also been undertaken in a variety of organisations, both government and non-government. Education campaigns were also considered by 52% (n=25) of respondents to be the most successful initiative for rock fishing safety.\(^{174}\)

The development of a campaign incorporated into the state-wide strategy, and providing a clear delegation of responsibilities and reporting requirements will provide a sound basis for the improvement of voluntary safe rock fishing practices.

Resourcing

Appropriate resourcing an education and communication initiatives is essential to their success. Previous campaigns have cited a lack of both financial and head count resources as barriers to the improvement, expansion or review of the programs:

“Last year we ran workshops with Surf Life Saving and Multicultural Marketing, but the funding, it’s not there this year. We would very much like this to return”

“Everything that we (anglers) do has been run by volunteers, and it’s just been too much. We don’t see it as our job; we’re paying our recreational licenses. It shouldn’t be our job”\(^{175}\)

If legislation is to be introduced, then resources would need to be allocated appropriately to not only implement an education and communication campaign, but also to manage it.

**Action Item 2.1: The rock fishing safety strategy will allocate appropriate resources to the implementation and management of rock fishing safety education and communication activities.**

Collaborative Approach

A key feature of rock fishing education initiatives undertaken previously has been the highly collaborative nature of multiple organisations contributing both expertise and resources to each other’s programs. It is particularly important to recognise and employ the expertise provided by key representative bodies and peak bodies for rock fishing; primarily the Australian National Sportfishing Association and the Recreational Fishing Alliance.

The collaborative approach between water safety agencies and organisations is underscored in key strategies, such as the Australian Water Safety Strategy,\(^{176}\) and should continue to be a vital component in the development of any education and communication campaign.


\(^{175}\) NSW Department of Primary Industries interview process. Research review of rock fishing in NSW, Stakeholder interview process.. Subject de-identified.. SLSA, 2012
Another concern is appropriate engagement with the community, which can be achieved by promoting individual empowerment as described by the WHO Safe Communities Model\(^{177}\). This model provides localised forums with key stakeholder groups and the general community represented; developing initiatives, and building a sense of responsibility for each individual's role to prevent rock fishing related drownings\(^{178}\). This process seems to have been occurring through existing rock fishing safety workshops incorporating anglers, wives and children, as well as a variety of stakeholders\(^{179}\).

While the collaborative approach has its benefits, the lack of overall project leadership and management has resulted in duplication across projects, and inefficiencies\(^{180}\). It has been identified that the establishment of a dedicated resource to oversee and manage the implementation of rock fishing education and communication activities (and potentially coordination of the implementation of the state-wide strategy) would be necessary\(^{181}\). The primary stakeholders related to these activities were identified as the Recreational Fishing Alliance, the Australian National Sportfishing Association and Surf Life Saving New South Wales\(^{182}\). There may be some efficiency to embedding the resource within SLSNSW to take advantage of existing infrastructure, and established multidisciplinary team.

**Action Item 2.2: A joint resource should be explored and established to manage rock fishing education and communication initiatives between key stakeholders and rock fishing communities**

**Consistent Messages**

The establishment of a series of consistent messages for use across all stakeholders is paramount to the success of any education initiatives. An advised set of minimum rock fishing safety information is included in the Australian Coastal Public Safety Guidelines\(^{183}\). The ANSA, RFA, SLSA campaign featuring a DVD and booklet translated into three languages (Chinese, Vietnamese and Korean) currently provides the following advice:

**BE PREPARED**

- Always wear a lifejacket
- Carry a rope and float with you
- Wear light clothing
- Wear shoes with non-slip soles

**BE SAFE**

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\(^{179}\) NSW Department of Primary Industries interview process. *Research review of rock fishing in NSW*, Stakeholder interview process. Subject de-identified for publication. Subject de-identified. SLSA, 2012

\(^{180}\) Ibid.

\(^{181}\) Ibid.

\(^{182}\) Ibid.

• Ask advice from the locals
• Fish only in places that you know are safe
• Spend at least half an hour watching the wind and waves action
• Know the tides and weather
• Never fish alone
• Tell someone where you are
• If conditions worsen, find a calmer, more sheltered spot – or go home

SURVIVE

• Do NOT jump in is someone else is washed into the water
• Use your rope or something that floats to rescue the person
• Dial Triple Zero Emergency (000) on your mobile phone or go and get help
• If you’re swept in don’t panic. Stay calm and swim away from the rocks
• If there’s an angel ring nearby, know how to use it

WHAT SHOULD YOU DO IN AN EMERGENCY

• Never fish in exposed areas during rough seas, find a calmer spot
• If someone is washed into the water, DON’T jump in after them
• Throw a lifebuoy, or something that floats, to the person in the water
• Look for an available angel ring, life buoy or something else that floats
• Dial triple zero emergency (000) on your mobile phone or go to get help

ALWAYS CHECK THE WEATHER CONDITIONS BEFORE GOING ROCK FISHING

These messages are currently in use as part of a national campaign supported by ANSA, RFA and SLSA. There are several variants on these messages employed for different mediums and purposes. The establishment of a consistent set of messages including reference to legislative efforts where necessary is a foundational step in the establishment of the campaign.

**Action Item 2.3: The Safer Coastal Waters Sub Committee will establish a prioritised set of key messages for rock fishing safety for consistent promotion by all agencies in public education and communication initiatives.**

**Code of Conduct**

While legislative efforts and public education campaigns provide a ‘top down’ approach to promoting public safety, empowerment of individuals is also considered a key strategic advantage to achieve long term cultural change.

The establishment of a Code of Practice has been proposed by several reports including the NSW Interdepartmental Committee on Water Safety, the Jones report in 2003, and by Mitchell et al...
in the recent TARS report\textsuperscript{190}. Furthermore, Mitchell et al\textsuperscript{191} consider the code of conduct once developed could be included in the \textit{National Guidelines for Managing Risks in Water}\textsuperscript{192}. This may assist in legislative efforts and promotion of consistent messages nationally.

There was widespread support for the development of a code of conduct for rock fishers by stakeholders\textsuperscript{193}.

\textbf{Action Item 2.4: The Safer Coastal Waters Sub Committee should establish and implement a Rock Fishers Code of Conduct in consultation with key stakeholders and the community based on the key messages developed as an outcome of action item 2.4.}

\textbf{Public Relations, Advertising and Ambassadors}

Public relations was raised during stakeholder interviews as a concern of anglers, including the perception conveyed by the media of rock fishing as a ‘dangerous sport’ and the anglers themselves as ‘idiots’ or ‘reckless’\textsuperscript{194}.

Promotion of safe fishing behaviours through available media opportunities was considered a cost effective means of communicating key messages, though it was noted that these activities were highly resource dependent\textsuperscript{195}.

Any media opportunities should rely on communicating the key messages enshrined by the Safer Coastal Waters Sub Committee.

A key limitation of all educational approaches, including advertising is that exposure to a message, and message recall does not necessarily equate to behavioural change, it requires an identification that negative consequences of actions can occur within an individual, and actions taken to mitigate them to adequately reduce risk\textsuperscript{196}.

Identifying a target audience, and choosing an appropriate medium, tone, and execution to communicate determined key messages is critical. Campaigns conducted by Multicultural Marketing (on behalf of SLSA and ANSA)\textsuperscript{197} and Piliskic et al\textsuperscript{198} reached half and a third respectively of surveyed

\begin{thebibliography}{99}
\bibitem{190} Mitchell, R., Ware, L., Bambach, M., \textit{Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia}. University of New South Wales, Transport and Road Safety Research, Sydney.
\bibitem{191} Ibid.
\bibitem{192} National Health and Medical Research Council, \textit{Guidelines for Managing Risks in Recreational Water}. 2008, Australian Government, Canberra.
\bibitem{193} NSW Department of Primary Industries interview process. \textit{Research review of rock fishing in NSW}, Stakeholder interview process.. Subject de-identified for publication. Subject de-identified.. SLSA, 2012
\bibitem{194} NSW Department of Primary Industries interview process. \textit{Research review of rock fishing in NSW}, Stakeholder interview process.. Subject de-identified for publication. Subject de-identified.. SLSA, 2012
\bibitem{195} Ibid.
\bibitem{197} Multicultural Marketing and Management, Safe Fishing is the Key! Rock Fishing Safety Campaign Evaluation Survey. 2010, Surf Life Saving Australia and Australian National Sportfishing Alliance; Parramatta.
\end{thebibliography}
anglers, and unprompted recall stood at 33% at best\textsuperscript{199}. There is little evidence provided to indicate translation into behavioural change, which has partly been attributed to financial limitations\textsuperscript{200}.

There is evidence available to support the use of varied mediums both for ethnic fishing communities (Chinese, Vietnamese and Korean) vs. mainstream media. Survey results indicated that ethnic anglers sourced safety information from ethnic newspapers or publications (28.2%), English Publications (20.5%), followed by publicity materials at local fishing and tackle shops (20.5), with internet rating as the least likely place that fishing safety would be found (2.6)\textsuperscript{201}.

Piliskic et al found the majority of respondents found safety information on the internet (55%), followed by bait shops (46%) then fishing clubs (38%). This variance could be attributed to cohort stratification, with Piliskic et al having a smaller cohort of Asian anglers, the fact the survey was conducted only in English, and that it was only available online which may have biased the sample.\textsuperscript{202}

Further consultation has indicated that radio both ethnic and mainstream, may also be considered an effective, medium for future rock fishing communications\textsuperscript{203}.

It was noted that brochures, booklets, and reading materials did not feature prominently in these results, and were also identified as the least successful initiatives by stakeholders\textsuperscript{204}.

It was also noted that existing rock fishing safety campaigns require further review to determine effectiveness beyond recall into actual behavioural change should be a key priority for continuous improvement of the campaign:

\textit{“You have to test it, if it’s working great, keep going. If it’s not working, then try something else and stop wasting time and money”}\textsuperscript{205}

Depending on the identified market, tone and execution created for each piece of communication, there will be a variety of initiatives undertaken as part of this strategy. It is highly likely that a multi-faceted campaign incorporating a mix of both ethnic and mainstream media will achieve the greatest exposure to the community.

Existing rock fishing safety campaigns currently use Mr Andrew Ettinghausen, a celebrity Anglo-Saxon angler\textsuperscript{206}. It has been identified in the literature that ethnic communities in particular prefer to be spoken to by representatives of their own communities\textsuperscript{207}.

\textsuperscript{199} Multicultural Marketing and Management, Safe Fishing is the Key! Rock Fishing Safety Campaign Evaluation Survey. 2010, Surf Life Saving Australia and Australian National Sportfishing Alliance; Parramatta.

\textsuperscript{200} NSW Department of Primary Industries interview process. Research review of rock fishing in NSW, Stakeholder interview process... Subject de-identified for publication. Subject de-identified... SLSA, 2012

\textsuperscript{201} Multicultural Marketing and Management, Safe Fishing is the Key! Rock Fishing Safety Campaign Evaluation Survey. 2010, Surf Life Saving Australia and Australian National Sportfishing Alliance; Parramatta.


\textsuperscript{203} NSW Department of Primary Industries interview process. Research review of rock fishing in NSW, Stakeholder interview process... Subject de-identified for publication. Subject de-identified... SLSA, 2012

\textsuperscript{204} Mitchell, R., Ware, L., Bambach, M., Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia. University of New South Wales, Transport and Road Safety Research, Sydney.

\textsuperscript{205} Mitchell, R., Ware, L., Bambach, M., Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia. University of New South Wales, Transport and Road Safety Research, Sydney.
Stakeholders support the use of ambassadors advertising campaigns\(^{208}\) with 80.6% indicating they perceived their use as either very effective or somewhat effective. There was also a belief that ambassadors are also appropriate for use as educators in workshops, seminars or independent promotion activities, with due consideration to the appropriate appointment of ambassadors for different target markets\(^{209}\).

**Action Item 2.5: That a range of recognisable ambassadors should be appointed as spokespeople for safe rock fishing, to use in public relations activities, advertising materials, resources, and educational programs and other initiatives.**

**Workshops and Seminars**

Rock Fishing Workshops involve the delivery of a semi-structured program at a coastal location regarding rock fishing safety, ideally allowing participants to fish and receive advice from experts who are on hand from a variety of organisations and agencies\(^{210}\).

Stakeholders generally perceive that workshops are very effective (45.9%) or somewhat effective (40.5%). The strengths of the workshop included providing anglers the opportunity to hear safety messages and see them put into practice in a realistic setting, asking questions and being provided with immediate feedback, and being provided in a context targeted to various cultural, linguistic, and attitudinal groups\(^{211}\). Although there are some issues and risks identified which should be addressed for future workshops or seminars.

A significant risk is the attraction of appropriate attendees to the workshops. A repeated notion advised from stakeholders is that publicity needs to be generated and workshops widely advertised\(^{212}\). A challenge to this process, if the reliance on funding and resourcing to maintain the consistent delivery of workshops:

> “Last year we ran workshops with Surf Life Saving and Multicultural Marketing, but the funding, it’s not there this year. We would very much like this to return”\(^{213}\)

If recurrent funding for the systematic delivery of seminars and workshops, then advertisement of the programs could be begin well in advanced of the program. There are also suggestions of the establishment of rock fishing safety days or weeks held annually\(^{214}\).
A key concern raised by stakeholders was the lack of formalised structure for the delivery of the workshops, which are currently reliance on the inherent knowledge of a small number of individual volunteers. The development of formalised syllabus, lesson plan and delivery structure enables a review of current content, and the possible inclusion of specific subjects identified through this review including:

- Recognition and interpretation of standard signage
- Technique associated with the use of Public Rescue Equipment
- Accidental immersion and lifejacket demonstrations
- The development of basic aquatic survival skills
- CPR and First Aid
- Introduction to mandatory lifejacket legislation (if applicable)

There is little evidence to support the current success of rock fishing safety workshops in altering behaviour. Simple before and after surveys have indicated an increase in participants intention to carry safety equipment while rock fishing, this does not adequately measure actual behavioural change.

**Action Item 2.6:** SLSNSW in partnership with NSWDPI, ANSA, the RFA and other relevant stakeholders will develop a syllabus, lesson plan, implementation plan and evaluation process to support the coordinated delivery of rock fishing safety seminars and workshops.

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215 NSW Department of Primary Industries interview process. Research review of rock fishing in NSW, Stakeholder interview process... Subject de-identified for publication. Subject de-identified... SLSA, 2012

216 Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012

217 Multicultural Marketing and Management, Safe Fishing is the Key! Rock Fishing Safety Campaign Evaluation Survey. 2010, Surf Life Saving Australia and Australian National Sportfishing Alliance; Parramatta.
Recommendation 3: Legislate the mandatory wearing of Personal Floatation Devices (PFDs) while rock fishing at coastal locations in New South Wales.

There has been considerable community debate, and media comment on the subject of PFD use while rock fishing. An examination of the evidence provides ample justification for the introduction of legislation to enforce the wearing of PFDs while rock fishing. The introduction of mandatory PFD legislation has been recommended in two independent reports. 219, 220 A summary of the evidence and opinion both for and against is provided, as well as action items for consideration in the drafting of legislation.

Argument Supporting Mandatory PFD Use While Rock Fishing

The absence of evidence that anglers have drowned while wearing lifejackets indicates a significant benefit to their proper wearing. Of the 74 rock fishing related drownings occurring between 1992-2000, no victims were wearing a lifejacket221. For the cases analysed between 2000 and 2010 where information was available regarding any PPE being worn by the decedent (n=26), only one was wearing a fishing vest with flotation, though it was noted this was not described as either a lifejacket or PFD222.

It is also noted that immersion resulted in only 6% of hospitalisations (n=388) between 2002 and 2009, indicating more people drowned during the same period than were hospitalised due to immersion223. It has been hypothesised that this indicates a severely reduced survivability rate compared to those wearing a lifejacket224.

Survivability studies have been conducted relating to boating in the United States. The results indicated that following accidental immersion, those wearing a PFD were twice as likely to survive compared to those that were not225.

In all cases where mode of entry into the water is known, 100% were either being swept off rocks or falling off rocks226. This summary indicates that rock fishers who enter the water do so in unexpected circumstances. For those who do enter the water, very few are hospitalised comparative to the mortality rate by drowning. This allows the hypothesis to be developed that for those

223Ibid.
224Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
individuals who cannot swim, the consequences of accidental entry into the water are regularly dire. However, the evidence also provides details on the decedents known swimming ability (n=200; unknown=48%), where the majority of were recognised as swimmers (41%) compared to non-swimmers (11%)\textsuperscript{227}. This demonstrates that perceived swimming ability does not always prevent drowning resulting from accidental immersion.

The experience of the angler is also commonly suggested as a rationale for drowning, being that the majority of decedents are inexperienced. Of the 24 cases between 2000-2010 which provided information on rock fishing experience of the decedent, 96% were considered experienced; furthermore, of the 23 cases which provided information on familiarity with the location, 91% had fished the exact location where the incident occurred\textsuperscript{228}. This information indicates that inexperience may be a perceived factor, though is not sufficient to indicate that experienced fishers or swimmers will not gain benefit from the wearing of a lifejacket in the result of a wash in situation.

The reliance on fellow fishers to come to angler’s assistance in the case of accidental immersion also provides evidence to support the use of PFD. Of the cases between 2000-2010 which provide information on whether an angler was fishing alone or with others (n=55), three quarters were fishing with at least one other person (n=41), most commonly one other person (n=23)\textsuperscript{229}. Of these cases, the other angler/s were not able to successfully assist the person. The further quarter (n=14) fishing alone provided themselves with no opportunity for external assistance.

The anglers who were fishing with others afforded themselves the opportunity to have public rescue equipment or makeshift flotation devices employed to provide extra buoyancy. Unfortunately, while public rescue equipment can be a valuable addition to the rocky coast environment for anglers and other recreational users, their use is not always guaranteed, and is not always successful. An inquiry into 12 rock fishing related drownings heard that 7 of these locations had public rescue equipment in place\textsuperscript{230}.

In all of these cases, the provision of extra buoyancy through a PFD would have provided the decedent with extra time, and fellow anglers or bystanders the opportunity to raise the alarm with emergency services, allowing the person to float independently until rescue.

There is also evidence to support PFD use to improve the ability of rescue authorities to recover a person (either alive or deceased) while wearing a lifejacket. From all fatalities between 2000-2010, there were 14 cases (17%) where the body was not recovered\textsuperscript{231}. For each of these cases, had the person been wearing a lifejacket, emergency services indicate that they would definitely have recovered the person either alive or deceased. In the case of the later, the body can at least be repatriated to loved ones to provide a dignified funeral/burial service:

\textsuperscript{227} Mitchell, R., Ware, L., Bambach, M., Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia. University of New South Wales, Transport and Road Safety Research, Sydney.
\textsuperscript{229} Ibid.
\textsuperscript{230} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
“If they’re wearing a lifejacket, we’ll find them. I’ve never pulled out a deceased body in a lifejacket, plenty of alive ones, but never a (deceased). When they’re not, they can sit underwater, and depending on visibility, sometimes you just can’t see anything from above. Or they can get stuck under a crevice in the rocks. It’s just painful to search for days”

The testimony above also introduces the benefits to rescue organisations on the introduction of mandatory lifejacket legislation. There is a consistent belief among rescue organisations and authorities that legislation will see an increase in lifejacket adherence on the rocks, and the key benefits to them are a reduction in exposure to deceased anglers, and a reduction in resources dedicated to recovery operations.

Of the stakeholders surveyed, there was strong support for PFD legislation, with 75.9% indicated the notion would be either very effective or somewhat effective (n=30). Comments provided indicated a belief that ethnic anglers representing the target demographic, would be most likely to abide by regulations as they were not perceived to experience the same ‘cultural cringe’ as non-ethnic anglers. It is however noted that participants in this survey were from a varied range of professional affiliations, with anglers representing only 18.5% of participants. It is noted however, that the anglers included were representatives of their community, and their opinions about legislation have been weighted accordingly below.

There was also some opinion expressed that the opposition to legislation could be perceived as a benefit to the introduction of legislation:

“I’d support it…. It’s controversial, and controversy is good. It gets people talking”

It is also worth noting that currently all publicly available information encourages the voluntary use of PFDs both from the fishing community and rescue authorities. NSW Maritime also suggested the use of a PFD Type 3 Lifejacket while rock fishing. This overt promotion of the use of lifejackets makes the serious presentation of an argument against lifejacket legislation difficult, as if there were significant problems with their use, these recommendations for use would have been questioned or amended.

**Argument Against Mandatory PFD Use While Rock Fishing**

The common feedback from representatives of the fishing community was that any moves to legislate wearing PFDs would be met with resistance from anglers. Some of this can be attributed to the ‘cultural cringe’ factor alluded to earlier, and some is attributable to the discounted belief that
their experience allows them to make the appropriate decisions about avoiding dangerous situations rather than wearing a lifejacket:

“There are lots of guys who will never wear a lifejacket. They’re telling us this. I’m coping it because of this business. They just won’t wear one. They just say if it’s so dangerous I need to wear a lifejacket, I shouldn’t be fishing”\(^\text{241}\)

In some cases, a significant challenge raised has been the perception of lifejackets as foam block style PFDs or former PFD type 1 style (including collar) which would restrict movement on the rock shelves and in the water, be hot and uncomfortable\(^\text{242}\). There are similar anecdotal concerns regarding attitudes towards lifejackets for commercial and rescue related vessels.

When regulation was introduced into the commercial boating industry in Tasmania, attitudes towards lifejacket wear were negative. Some manufacturers engaged with the staff and developed practical products which also met stringent Australian PFD standards:

“By incorporating aspects of design which addressed the needs of the client such as keeping them warm, dry protected from the elements as well as technical requirements, but it was also their lifejacket. Then it just becomes normal to wear”\(^\text{243}\)

Similarly, when new maritime regulations were introduced in Victoria in 2005, it required the occupants of all vessels under 5m (including rescue vessels) to wear a PFD. Life Saving Victoria undertook a research study to determine an appropriate lifejacket type for use in their inflatable rescue boats (IRBs) which operate in the surf zone. The results indicated that participants in the trial considered an inherently buoyant PFD Type 3 to be comfortable, not to interfere with general lifesaving duties, as well as allowing the participant to duck dive, dive under waves, and generally assist patients unencumbered\(^\text{244}\).

Cost of lifejackets has also been considered a significant barrier by many stakeholders, particularly ethnic anglers\(^\text{245}\). Consultation with representatives of the ethnic rock fishing community, and multicultural experts has indicated that this may and may not be the case:

“No cost is not a barrier, no, not at all. (Some of them) only cost around $30, that’s $30 to save your life.”

“Compared to how much we spend on other equipment, no it’s not expensive.”

“Price is one barrier, for some ethnic fishers. I have been told by the English speaking fishers that they don’t need to wear a lifejacket. But within our community, we strongly encourage people to wear lifejackets at all times, because you don’t know what will happen”\(^\text{246}\)

\(^{241}\) Ibid.
\(^{242}\) Ibid.
\(^{243}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
\(^{245}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
\(^{246}\) Ibid.
Throughout the stakeholder interviews conducted, there was a strong belief in the use of lifejackets, and a sympathy to legislative practices by ethnic anglers, consistent with the comments above indicating longer term ‘English speaking’ anglers are the primary source of resistance\(^{247}\).

It is however not unexpected or unusual to be faced with opposition to any similar public safety legislation. This sentiment was expressed through stakeholder consultation regularly, indicating that once legislation is in place, and following a concerted effort through education, the culture can change:

“Human being will be a barrier (to legislation), they will jump up and down against the nanny state and personal freedoms, and I understand that, to an extent I agree with them”\(^{248}\)

Legislation on its own will not be effective without ongoing education and enforcement efforts to ensure compliance. Inability to enforce legislation was a recurring theme through both stakeholder survey\(^{249}\) and interviews\(^{250}\), and is discussed elsewhere in this report.

This issue has also been faced in the maritime industry, requiring commercial sailors to wear PFDs, and resulted in the development of functionally designed PFDs which provide added benefits to the angler besides possible flotation in the event of accidental immersion\(^{251}\). Examples of this process applied to different requirements are provided below:

![Figure 19: Functional PFD design. Stormy Australia.](image)

**Action Item 3.1:** A working group should be established including PFD manufacturers and anglers to identify and/or develop practical rock fishing PFDs to improve the voluntary wearing compliance.

\(^{247}\) Ibid.

\(^{248}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012


\(^{250}\) Ibid.

\(^{251}\) Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Partial Legislation or Grace Period

Another proposal to improve the acceptance of legislation by anglers has been either partial legislation based on black spot status, geographic or meteorological factors, or the implementation of a grace period following the introduction of legislation. These efforts would be aimed to develop voluntary compliance with legislation and smooth the process of introduction from the sentiment proposed below:

“Blanket regulation will not be well received at all by recreational anglers, there will be issues with enforcement, and the uptake of experienced anglers will be minimal so see a huge backlash.”

It has been proposed in discussions, coronial inquests, surveys, interviews and reports that mandatory lifejacket legislation may be introduced at defined black spot locations only. While this may sound like a reasonable compromise to meet the opposition of anglers, several issues were uncovered during stakeholder consultation:

“(limiting legislation to black spots) makes education and enforcement much more complicated.”

“Don’t limit legislation to black spots. It’s like saying you can’t use your mobile phone while driving in the city, but you can in the country”

“If you trialled lifejackets in one location, but nothing happened (no rescues or drownings) then you find out nothing (from the trial), but people might keep drowning elsewhere. So do you expand it? Your trial won’t tell you anything.”

“If you legislate it in one black spot area, then people might choose to stay away from that location, and move to more isolated or more difficult to access locations. It could cause a bigger problem.”

The notion was also raised that several black spot locations may be deemed black spots based on a small amount of drownings, and multiple drowning events may cause the addition of new black spots in the future. An example was provided:

“Take Catherine Hill Bay, there were no drownings at that spot previously, none. Then we had 5 people go in, and it becomes one of the top black spots.”
The education and enforcement challenges of a black spot or condition based system have the potential to be greatly confusing, and minimise efficacy and therefore the effect of legislation on public safety.

**Action Item 3.2: Any legislation efforts should not be restricted to either periods of heightened risk or high risk geographic locations.**

An alternative to partial legislation is the use of a grace period following legislation. This would see no penalties enforced for a period, and assist in the introduction of education and communication strategies:

“A period of non penalty for a trial period is probably the way to go, similar to what NSW Maritime have done with their life jacket legislation. Implement the legislation, then give a period of grace, and work with the community to educate and improve voluntary compliance”

**Action Item 3.3: Following the implementation of any legislation a grace period may be given where no penalties are enforced. During the grace period, concentrated education, or reward initiatives should be implemented to increase voluntary PFD compliance.**

**Enforcement**

The perceived inability to enforce any legislation has been considered a key factor in the discrediting of any legislative suggestions and has previously been recommended for further investigation. The ability to enforce the legislation is considered an absolute necessity to the introduction of any legislation by stakeholders:

“There needs to be a lot of discussion about the enforcement side of things”

“If you create legislation it has to be enforceable, who and how would it be enforceable is another barrier”

Opinion regarding the ability to enforce legislation is mixed; ranging from sincere belief in inability to adequately enforce based on coastline to absolute belief in possibility depending on available resources. There is also an element which believes legislation would improve voluntary compliance with or without active enforcement. There are a number of government agencies involved in compliance of water based activities with potential capacity to enforce mandatory lifejacket legislation:

“Enforcement is absolutely possible; it’s just the resources that are required to do it”

“There are a range of different agencies that could compel people to comply”
Enforcing any legislation for lifejacket use while rock fishing has been compared to that of policing seat belt legislation:

“You can’t have a policeman in every car, but people are still expected to wear them. Some people could say, ‘I’ve been driving for 34 years and never had an accident’, but they might tomorrow”\textsuperscript{267}

Comparative studies of Maritime legislation of partial legislation at times of ‘heightened risk’ versus comprehensive legislation indicate significant advantages to a simple, objective definition. Rates of adherence while boating are relatively low during periods of heightened risk, while compulsory wearing of a lifejacket for people under tow achieves 98% compliance\textsuperscript{268}.

This approach requires a comprehensive education and communication campaign to be implemented to support the introduction of any legislation. It has been noted that work already conducted including rock fishing workshops which emphasise the importance of lifejackets, have already started this process of implementing cultural change to develop voluntary compliance as an accepted practice\textsuperscript{269}.

Further discussion on the implementation of an education and communication campaign is provided under recommendation 2.

\textsuperscript{267} Ibid
\textsuperscript{269} Mitchell, R., Ware, L., Bambach, M., \textit{Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia}. University of New South Wales, Transport and Road Safety Research, Sydney.
Types of Lifejackets

There is considerable legacy information provided in the literature to the outdated lifejacket standard AS1512\textsuperscript{270} which included the PFD Type 1, Type 2 and Type 3 nomenclature. This standard has been superseded at both the domestic and international level. An overview of approved PFD types is provided by the Australian Maritime Safety Authority (AMSA) below\textsuperscript{271}:

<table>
<thead>
<tr>
<th>Level 150</th>
<th>PFD type 1</th>
<th>Level 100</th>
<th>PFD type 2</th>
<th>Level 50</th>
<th>PFD type 3</th>
<th>Level 50S</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="https://example.com/image1.png" alt="Image" /></td>
<td><img src="https://example.com/image2.png" alt="Image" /></td>
<td><img src="https://example.com/image3.png" alt="Image" /></td>
<td><img src="https://example.com/image4.png" alt="Image" /></td>
<td><img src="https://example.com/image5.png" alt="Image" /></td>
<td><img src="https://example.com/image6.png" alt="Image" /></td>
<td><img src="https://example.com/image7.png" alt="Image" /></td>
</tr>
</tbody>
</table>

A Level 150 provides greater buoyancy support when a higher level of performance is needed.

A Level 100 and a PFD Type 1 are designed to keep you in a safe 'face up' floating position.

A Level 50 and a PFD Type 2 have less buoyancy than a PFD Type 1 or Level 100 and will not rotate you to a 'face up' floating position.

Level 50S and PFD Type 3's have similar buoyancy characteristics to the PFD Type 2 but are manufactured in a wider range of colours.

| Designed to keep you in a 'face up' floating position | Suitable for offshore and general boating in all waters | They are the minimum requirement for offshore use. They can be worn for general boating in all waters. | Normally used for sailing, waterskiing, kayaking, canoeing, wind surfing and on personal watercraft | Favoured by water skiers, wake boarders, kayakers and canoeists. |

**Table 19: An overview of Australian Standard PFD types. Australian Maritime Safety Authority.**

The current Australian Standard Personal Flotation Devices (PFDs) is AS4758.1:2008\textsuperscript{272}. There are varied types of lifejackets described in the standard based on their suggested uses, inherent buoyancy, manually inflated buoyancy or hydrostatically charged inflation. There are varied opinions about the benefits of different types while rock fishing:

“*We’ve been criticized for promoting inflatable lifejackets....because if you hit the rocks or a barnacle then you might pop it. The servicing is also very, very lax*”

“*Either the 100n or the 150n would be recommended; you would still need to be a fairly good swimmer with a 50n jacket*”

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“The manually inflated type 3 seems to answer most people’s requirements, if you go in and you can swim, you can dive under the waves and pop it away from the rocks”\textsuperscript{273}

It has also been proposed that the use of inherently buoyant PFDs may result in angler who are washed into the water to be caught in the swash zone between the breaking waves and the rocks, unable to dive under the waves and escape, which could result in further head injuries\textsuperscript{274}. This notion was considered by subject experts:

“A lifejacket keeps the person on the surface. The breaking wave will tend to return underneath the water, so they may end up being banged against the rocks a little bit. But the alternative if that they go under, and that has to be a worse consequence. They could be anywhere under there”\textsuperscript{275}

This notion of inability to adequately move or function is further discounted when considering the findings of the Victorian Lifesaving Study which determined that Type 3 PFDs (50n) were easier to dive under waves than other types to the satisfaction of the lifesavers\textsuperscript{276}.

It must be considered that if a person cannot swim, the possible consequences of water entry include drowning, compared to physical injuries sustained while possibly caught in the swash zone are considered negligible based on the evidence provided above. However, for the person who can swim, choosing a PFD which allows them freedom of movement to dive deeper under waves if necessary would be an advantage. Therefore, freedom of personal choice must be considered in the drafting of legislation.

Action Item 3.3: Legislation will specify that PFDs must comply with Australian Standard AS4758 - Personal flotation devices.

Emergency Flotation Devices

The emergence of several products which provide flotation to the individual, but are not considered traditional lifejackets provides an alternative source of personal protection for rock fishers. Described herein as emergency flotation devices (EFDs) they are generally small, lightweight and can be worn unobtrusively on the person’s belt or waist and then either manually or automatically inflated hydrostatically\textsuperscript{277}.

It has been considered by some that the inclusion of EFDs into legislation for mandatory lifejackets may improve adherence among anglers resistant to PFD wearing\textsuperscript{278}. Presently, these devices are not compliant with an Australian Standard. Until these devices can be quality assured under an Australian Standard, it is not recommended that they are considered for inclusion in any legislative effort related to mandatory PFD use.

Action Item 3.4: That Emergency Flotation Devices (EFDs) not be considered for inclusion in mandatory PFD legislation until they are quality assured under an Australian Standard.
Redemption Scheme
The establishment of a lifejacket redemption scheme has been suggested following the successful implementation of a voucher redemption scheme in New Zealand\textsuperscript{279}. The scheme could see variations of a voucher being provided to anglers to purchase a lifejacket from a manufacturer, or a voucher to reward lifejacket wearing for spend on any stock at a partnered retailer. It was noted that there is some support for this scheme from lifejacket manufacturers in Australia\textsuperscript{280}.

It was also noted by stakeholders that such a scheme could be open to ‘abuse’ by individuals from outside the rock fishing community such as boaters, taking advantage of the scheme and purchasing discount lifejackets in large numbers\textsuperscript{281}. There was also concern that the scheme may have little effect on actual wearing of lifejackets while rock fishing and this situation would need to be monitored closely\textsuperscript{282}. However, abuse of the scheme would still increase ownership of lifejackets in the general population, and possibly save lives across other recreational activities, as well as shifting the stigmatization to lifejackets in the general community\textsuperscript{283}.

\textsuperscript{280} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
\textsuperscript{281} Mitchell, R., Ware, L., Bambach, M., Research review of rock fishing in NSW: A TARS Report for Surf Life Saving Australia. University of New South Wales, Transport and Road Safety Research, Sydney.
\textsuperscript{282} Ibid.
\textsuperscript{283} Research review of rock fishing in NSW, Stakeholder interview process. Subject de-identified. SLSA, 2012
Further Research

Educational initiatives are expensive in both monetary and human resources. Currently, evaluation of campaigns focuses on message recall, and reported efficacy, though the actual measures of success are:

- Actual behavioural change
- Decrease in rock fishing related morbidity and mortality\textsuperscript{284}

Resources must be made available to accurately measure the success or failure of any intervention in order to continuously improve, and prevent wastage of funding.

**Action Item 4.1: Develop and implement a robust independent monitor and review program of rock fishing safety initiatives including but not limited to; unprompted recall, reported behavioural change, actual behavioural change, and epidemiological data.**

Several identified primary intervention strategies rely on a sound understanding and classification of the rock platforms themselves. The benefits of this process of data collection and classification have been seen through the development of ABSAMP for sandy beaches, resulting in several user interfaces such as Beachsafe.org.au or the Beachsafe App which can disseminate and inform the beach user simply and easily, providing a variety of up to date information on conditions and hazards\textsuperscript{285}. Development of this process has begun in a trial under the University of Melbourne, and further development and assessment of more rock platforms provides several opportunities to improve communication and warning capacity.

The effectiveness and appropriate uses of coastal public rescue equipment currently has very little quantitative evidence to support current beliefs. It was noted that the RNLI Guide to Coastal Public Rescue Equipment provided no methodology for the determination of appropriateness of both PRE type, and effectiveness of use. This area requires significant emphasis for the development, or future improvement of an Australian guideline for public rescue equipment.

Signage was identified as a system which has a wide variation in perceived effectiveness among stakeholders. While there has been significant resources invested into the development of the Australian Standard for Aquatic Safety Signage and Flags, there are still doubts into the comprehension and effectiveness of signage. The authors are aware of the ongoing work of Rob Andronaco from Life Saving Victoria, and commend future work aiming to quantify and improve the potential effectiveness of safety signage in preventing morbidity and mortality.

The timely compilation and analysis of water related incidents, both morbidity and mortality is a system that can be improved in Australia. The United Kingdom has developed the Water Accident and Incident Database (WAID)\textsuperscript{286}. The system provides a single source for the maintenance and dissemination of all data available related to a drowning or near drowning. The efficiencies of this data housing would allow for more accurate data analysis, and contribute to a more collaborative effort to contribute and analyse the statistics.


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Appendix 1

Research review of rock fishing in NSW

A TARS Research report for Surf Life Saving Australia

Rebecca Mitchell, Lauren Ware, Mike Bambach
Transport and Road Safety (TARS) Research | School of Aviation | UNSW

March 2012
Research review of rock fishing in NSW

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The authors wish to thank the Centre for Epidemiology and Research at the NSW Ministry of Health for providing access to the Health Outcomes and Information Statistical Toolkit (HOIST) to obtain the data from the NSW Admitted Patients Data Collection and the NSW Population Health Survey program analysed in this study. The HOIST system refers to a data access, analysis and reporting facility established and operated by the Centre for Epidemiology and Research, Population Health Division, NSW Ministry of Health.

We would also like to acknowledge provision of access to the National Coroners Information System and to thank the individuals who took the time to complete the online survey.

This research was funded by the NSW Department of Primary Industries and was subcontracted to TARS Research by Surf Life Saving Australia. The assistance of Anthony Bradstreet, Shauna Sherker and Barbara Brighton is appreciated. The research conclusions are those of the authors and any views expressed are not necessarily those of the funding agency.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>95% CI</td>
<td>95% Confidence Interval</td>
</tr>
<tr>
<td>APDC</td>
<td>Admitted Patients Data Collection</td>
</tr>
<tr>
<td>ABSAMP</td>
<td>Australian Beach Safety and Management Program</td>
</tr>
<tr>
<td>ANSA</td>
<td>Australian National Sports Fishing Association</td>
</tr>
<tr>
<td>BoM</td>
<td>Bureau of Meteorology</td>
</tr>
<tr>
<td>CALD</td>
<td>Culturally and Linguistically Diverse</td>
</tr>
<tr>
<td>CPR</td>
<td>Cardio-pulmonary Respiration</td>
</tr>
<tr>
<td>EFD</td>
<td>Emergency Flotation Device</td>
</tr>
<tr>
<td>EPIRB</td>
<td>Emergency Position Indicating Radio Beacon</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HSSA</td>
<td>Health and Safety Science Abstracts</td>
</tr>
<tr>
<td>ICD-10-AM</td>
<td>International Classification of Diseases, 10th Revision, Australian Modification</td>
</tr>
<tr>
<td>NCIS</td>
<td>National Coroners Information System</td>
</tr>
<tr>
<td>NHMRC</td>
<td>National Health and Medical Research Centre</td>
</tr>
<tr>
<td>NSW</td>
<td>New South Wales</td>
</tr>
<tr>
<td>PFD</td>
<td>Personal Flotation Device</td>
</tr>
<tr>
<td>PFPS</td>
<td>Patients For Patient Safety</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>RAC</td>
<td>Royal Automotive Club</td>
</tr>
<tr>
<td>RFA</td>
<td>Recreational Fishing Alliance</td>
</tr>
<tr>
<td>RoSPA</td>
<td>Royal Society for the Prevention of Accidents</td>
</tr>
<tr>
<td>SLSA</td>
<td>Surf Life Saving Australia</td>
</tr>
<tr>
<td>TARS</td>
<td>Transport and Road Safety Research</td>
</tr>
<tr>
<td>UNSW</td>
<td>University of New South Wales</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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</table>
Executive Summary

Rock fishing, while a popular sport among recreational fishers, can also be a dangerous past time, largely due to the volatility of the ocean. Various initiatives have been proposed and/or implemented in an attempt to improve rock fishing safety, yet few of these initiatives have been evaluated for their effectiveness in improving safety in this area. The aims of this research review were to: (i) review rock fishing fatalities in New South Wales (NSW) using information from existing reports and provide an update of rock fishing-related fatalities in NSW from 2000 to 2010; (ii) describe rock fishing-related hospitalised morbidity in NSW during 2003-04 to 2010-11; (iii) determine self-reported exposure to rock fishing in NSW using data from the NSW Population Health Survey program, 2005; (iv) review and categorise the literature on rock fishing safety methods and programs in terms of education, engineering, enforcement and other methods and programs aimed at improving rock fishing safety; and (v) survey relevant organisations and manufacturers regarding the effectiveness of methods and programs aimed at improving rock fishing safety, including identification of the strengths and limitations of each initiative.

To complete this research review, mortality data from the National Coroners Information System during 2000 to 2010, hospitalised morbidity data from the New South Wales (NSW) Admitted Patients Data Collection from 2003-04 to 2010-11 and survey responses from the NSW Population Health Survey Program in 2005 were examined. A review of the literature on rock fishing safety interventions using nine databases, Google and website searches, and a review of document reference lists was conducted, as was a survey of key stakeholders regarding their opinion of the effectiveness of initiatives designed to improve rock fishing safety, along with the identification of the strengths and limitations and suggested mechanisms for improvement for each initiative.

Information on the mortality and hospitalised morbidity of rock fishers in NSW has shown that patterns of rock fishing-related fatal and non-fatal injuries have largely not changed over the period examined. Data from the NSW Population Health Survey program provided the first population-based data in NSW regarding individuals who rock fish. This survey identified that males were more likely to report having been rock fishing in the last four weeks, compared to females, particularly those aged 16-24 or 45-64 years and that almost half of those surveyed fished for between one to three hours.

The literature on rock fishing safety revealed that various strategies have been developed in an attempt to improve rock fishing safety in NSW, with these efforts focusing largely on awareness raising and engineering initiatives, but disregarding the development of risk rating systems and guidelines, and the use of enforcement strategies. For all of the safety initiatives reviewed, there had been limited evaluations conducted of their success in improving rock fishing safety, and no cost-effectiveness studies of any initiatives were performed.

Forty-five key stakeholder surveys were completed, providing a 57% response rate, and opinions on the effectiveness of 24 educational, engineering, enforcement and other initiatives were obtained, along with the strengths and limitations and suggestions for improvement for each initiative.

Following the review of information obtained from mortality and hospitalisation statistics, the published literature, and also from key stakeholder survey responses, it is likely that a combination of education, engineering, risk assessment and monitoring, and guideline and enforcement initiatives will be useful in improving rock fishing safety in NSW. This research review has identified that the most salient attempts at improving rock fishing safety efforts should involve a
systematic, coordinated approach by all stakeholder agencies and has made 14 recommendations in relation to improving rock fishing safety in NSW. These recommendations are to:

1. Conduct regular monitoring of rock fishing fatal and non-fatal injuries to inform prevention activities and also to provide information for evaluation purposes.

2. Consider the development of mechanisms to collect ‘snap shot’ exposure data from rock fishers, potentially through fishing clubs, regarding the time spent rock fishing to enable a more accurate estimate of risk of fatal and non-fatal injury during rock fishing to be calculated.

3. Develop a state wide plan for improving rock fishing safety in NSW. The plan should consider education, engineering, guideline and enforcement, risk assessment and monitoring strategies in terms of primary, secondary and tertiary prevention efforts. The state wide plan to identify lead agencies to coordinate and agencies to participate in the implementation of preventive strategies.

4. Any signage to raise awareness of hazardous conditions at rock fishing sites should adhere to best practice in relation to using standardised, recognised symbols and contain short, clear text.

5. Any signage needs to be recognised and meaningful for CALD groups and this may involve using the media and/or workshops to increase the awareness of symbols and their meaning.

6. The development of a rollout plan for the conduct of rock fishing technique and safety seminars. Workshops to be targeted to both novice and to intermediate and advanced fishers. Workshops to be conducted in a range of languages.

7. A review of media campaigns and media strategy aimed at improving rock fishing safety, particularly in vulnerable groups, and identification and engagement of a number of safety ambassadors to feature in campaign materials.

8. Develop and promote a weather risk rating system applicable to rock fishing (i.e. extreme, severe, very high, high, low-moderate risk). Encourage broadcast of rock fishing conditions in prime radio and television weather bulletins.

9. Pilot the New Zealand redemption and reward life jacket initiative at a number of locations in NSW.

10. Ensure that the development of a state wide plan for improving rock fishing in NSW considers the development of a risk rating system for rock fishing sites to aid in the placement of rescue equipment, including angel rings.

11. Develop a risk rating system for rock fishing sites and identify black spot locations taking into high injury and mortality incident rates, coastal geomorphology, isolation and site access.

12. Close known rock fishing black spot locations during severe weather conditions identified by a weather risk rating system applicable to rock fishing and explore the development of a notification scheme for anglers regarding adverse weather warnings and official site closures.

13. Develop and enforce legislation, accompanied by awareness raising activities, which would make PFD use at black spot rock fishing sites and at high risk rated locations mandatory.

14. Develop a voluntary code of practice for rock fishing with the aim to later incorporate it into the National Guidelines for Managing Risks in Water.
1. Introduction

Australia-wide it has been estimated that 3.4 million Australian residents aged five years and over engage in recreational fishing each year, with around 1 million of these individuals residing in New South Wales (NSW) [1]. Of the recreational anglers, it has been estimated that approximately 15 to 20% of anglers would rock fish in NSW each year [2].

Rock fishing, while popular among anglers, has been identified as a potentially dangerous pastime [3]. Rock fishing can be conducted in sheltered bays and inlets, but is also often conducted on coastal rock platforms. It is largely while fishing on coastal rock platforms that the dangers of this sport are revealed, as large waves can break unpredictably and sweep an angler off their feet and into the ocean. When the unpredictability of the ocean is combined with slippery rock surfaces, anglers that fish in isolation, and anglers that wear heavy clothing and do not use personal protective equipment (PPE), such as a life jacket or shoe cleats, the reason that rock fishing has claimed many lives in NSW becomes clear [3-4]. Some individuals have stated that they enjoyed the risk associated with this type of rock fishing, stating that:

“Rock fishing is very exciting, especially when a wave comes directly to you at the same time you spot a fish. There is a great pleasure arising from danger and risk. It is a great achievement when you end up making a good catch after all those risks”[5].

Various prevention and intervention strategies have been proposed and/or have been implemented in an attempt to eliminate and/or reduce the number of rock fishing-related injuries and deaths. These have focused on raising awareness of anglers of the risks associated with this sport and possible preventive strategies to reduce the risk through advisory campaigns or workshops [2], engineering initiatives, such as angel rings [6], enforcement initiatives [3], and other initiatives, such as identification of hazardous conditions on coastal rock platforms [7]. Yet very few of these strategies have been evaluated for their effectiveness in improving rock fishing safety.

This aims of this research are to:

(i) review rock fishing fatalities in NSW using information from existing reports and provide an update of rock fishing-related fatalities in NSW from 2000 to 2010;
(ii) describe rock fishing-related hospitalised morbidity in NSW during 2003-04 to 2010-11;
(iii) determine self-reported exposure to rock fishing in NSW using data from the NSW Population Health Survey program, 2005;
(iv) review and categorise the literature on rock fishing safety methods and programs in terms of education, engineering, enforcement and other methods and programs aimed at improving rock fishing safety; and
(v) survey relevant organisations and manufacturers regarding the effectiveness of methods and programs aimed at improving rock fishing safety, including identification of the strengths and limitations of each initiative.
2. Method

This section describes each of the components of the research that was conducted. Section 2.1 describes the data collections that were examined, Section 2.2 outlines the conduct of the literature review on rock fishing safety, Section 2.3 describes the conduct of the stakeholder survey and Section 2.4 outlines the method of data management and analysis. Ethical approval for this project was obtained from the NSW Population and Health Services Research Ethics Committee (Approval number: 2009/06/165), the Department of Justice Ethics Committee (Approval number: CF/09/7427) and the University of NSW Social/Health Human Research Ethics Advisory Panel (Approval number: 9_11_024).

2.1. Data collections

2.1.1 National Coroners Information System

The National Coroners Information System (NCIS) is a national internet-based data storage and retrieval system for Australian coronial cases. The NCIS contains information on every death reported to an Australian coroner since July 2000 (January 2001 for Queensland). Within the NCIS, detailed information regarding the circumstances of the death is available on ‘closed cases’ (i.e., coronial cases finalised by a coroner) and minimal information is available on ‘open cases’ (excluding Western Australia, where information is only available on ‘closed cases’). Information was extracted from the NCIS for deaths that were indicated to be due to rock fishing.

2.1.2 NSW Admitted Patients Data Collection

Data from the NSW Admitted Patient Data Collection (APDC) include information on inpatient separations for individuals from NSW public and private hospitals, private day procedures, and public psychiatric hospitals. Included are data on episodes of care in hospital, which end with the discharge, transfer, or death of the patient, or when the service category for the admitted patient changes. Information collected includes patient demographics, source of referral, diagnoses, and clinical procedures. The hospitalisation data were coded using the International Classification of Disease, 10th Revision, Australian Modified (ICD-10-AM) [8].

Hospital admissions as a result of rock fishing and also other and unspecified types of fishing were identified using the following criteria: (i) the hospitalisation was for a patient during 2003-04 to 2010-11; and (ii) the activity conducted at the time the injury occurred was identified as ‘fishing’ or ‘rock fishing ’ (i.e. ICD-10-AM: U54.10 rock fishing, U54.18 other specified fishing, including spear fishing, and U54.19 fishing, unspecified). Hospitalisations following rock fishing and unspecified fishing are described in this report.

2.1.3 NSW Population Health Survey Program

A total of 13,701 adults aged 16 years and over were sampled in the 2005 NSW Population Health Survey, reflecting an overall participation rate of 57.7% [9]. Specific details concerning the survey methodology are described elsewhere [9], but are summarised here. A two-stage sampling process was used, with the sample stratified by each of the eight former NSW Area Health Services. Within each former Area Health Service, households were randomly selected using a
computer-generated list of telephone numbers and a single respondent was randomly selected from each household for interview [9]. Interviews were conducted from February to December 2005 by trained computer-assisted telephone interviewers. Up to seven call-backs were made to establish contact with a household and up to five call-backs were made to contact a selected respondent [9]. Questions asked included: (i) Have you been in or on the water, at a swimming pool, beach, lake, river, creek, stream or dam in the last 4 weeks? This includes fishing; (ii) In the last 4 weeks, did this include any of the following: swimming, fishing, or rock fishing; (iii) Approximately how many hours in the last 4 weeks did you spend fishing (not including rock fishing)? and (iv) Approximately how many hours in the last 4 weeks did you spend rock fishing? Questions were field tested prior to inclusion in the survey.

2.2. Literature review of rock fishing safety interventions

The literature review involved the critical review and categorisation of the literature on rock fishing safety initiatives aimed at preventing fatal and non-fatal injury. It also examined evaluation studies that have assessed the effectiveness (or potential effectiveness) of countermeasures that might impact on rock fishing safety.

To ensure wide, multidisciplinary coverage of the academic literature a range of databases were interrogated. Table 2.1 details the databases and search terms employed. Literature searches were conducted on all fields, except for Scopus where the search was restricted to ‘abstract only’. All searches were restricted to English language documents. This strategy resulted in 4,534 articles, documents, and reports being identified. The titles and abstracts of each article were then examined individually and irrelevant items were discarded. The remaining ten documents were accessed and a further seven were culled, leaving three in the final review.

Table 2.1: Databases and terms used for search of academic literature

<table>
<thead>
<tr>
<th>Databases</th>
<th>Search terms</th>
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<tbody>
<tr>
<td>AusSport</td>
<td>Rock fishing, sport deaths, fishing</td>
</tr>
<tr>
<td>Compendex</td>
<td>Rock fishing, life jacket, rescue equipment</td>
</tr>
<tr>
<td>Embase</td>
<td>Rock fishing, recreational anglers, beach signage</td>
</tr>
<tr>
<td>Health and Safety Science Abstracts (HSSA)</td>
<td>rock fishing, beach safety</td>
</tr>
<tr>
<td>Medline</td>
<td>rock fishing, beach injuries</td>
</tr>
<tr>
<td>PsycINFO</td>
<td>rock fishing, beach safety for tourists, risk management signage, safety ambassadors, safety champions</td>
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<tr>
<td>Scopus</td>
<td>rock fishing, beach rescue equipment</td>
</tr>
<tr>
<td>SportDiscussion</td>
<td>rock fishing, coastal audit, rock fishing injury</td>
</tr>
<tr>
<td>Web of Science</td>
<td>rock fishing, coastal hazard rating systems, tourist beach safety, ocean search and rescue, theory of planned behaviour</td>
</tr>
</tbody>
</table>
To access the grey literature, targeted searches were conducted of Australasian government, research and other agency websites where the organisations were known to be involved in fishing and/or rock fishing safety (Table 2.2). These websites were searched for the following material related to rock fishing: (i) educational material; (ii) information on enforcement; (iii) information on engineering interventions designed to improve rock fishing safety; or (iv) information on other interventions designed to improve rock fishing safety. The documents and reports were then examined individually and classified by type of literature (see Section 3.4). Ten documents were identified for detailed review.


The reference lists of all identified literature were scanned for any other reports or documents missed during the formal search process. A further 15 articles and reports were identified in this process and ten of these documents were retained after examination.

The references identified were classified into the following categories for analysis and reporting:

(i) Education initiatives;
(ii) Engineering initiatives;
(iii) Enforcement initiatives; and
(iv) Other methods or programs.

In some instances where there was no information available regarding the effectiveness of an initiative for improving rock fishing safety, evaluation studies that examined the effectiveness of a safety initiative are reported for other areas of public health, such as life jacket use in boating. This was conducted as there may be potential transfer of safety initiatives that have shown success in other public health arenas to rock fishing.
### Table 2.2: Australian government, research and other agency websites searched for grey literature

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Recreational Fishing Alliance of NSW</th>
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<tr>
<td></td>
<td>Recreational Fishing Freshwater Trust</td>
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<tr>
<td></td>
<td>Expenditure Committee</td>
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<td></td>
<td>Royal Life Saving Australia</td>
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<td></td>
<td>SafeFishing.com.au</td>
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<td></td>
<td>SafeWaters NSW</td>
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<td></td>
<td>Schools NSW</td>
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<td></td>
<td>SmartPlay</td>
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<td></td>
<td>Surf Life Saving Australia</td>
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<td></td>
<td>Surf Life Saving New Zealand</td>
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<td></td>
<td>Tasmania Association for Recreational Fishing</td>
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<td></td>
<td>University of Canberra</td>
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<td></td>
<td>University of Melbourne</td>
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<tr>
<td></td>
<td>University of NSW Water Research Laboratory</td>
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<td></td>
<td>Victorian Department of Primary Industries</td>
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<td></td>
<td>WaterSafe Auckland Inc.</td>
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<td></td>
<td>Water Safety Victoria</td>
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<td></td>
<td>Western Australian Department of Environment and Conservation</td>
</tr>
<tr>
<td></td>
<td>RoSPA (Royal Society for the Prevention of Accidents)</td>
</tr>
<tr>
<td></td>
<td>Royal National Lifeboat Institution</td>
</tr>
</tbody>
</table>
2.3.  Key stakeholder survey

A convenience sample of key stakeholders from organisations and manufacturing industries who had an interest in rock fishing safety or who were responsible for developing and/or implementing safety methods or programs for rock fishing were invited to complete a 54 item on-line survey regarding the effectiveness of different types of interventions and/or devices aimed at improving rock fishing safety.

Surf Life Saving Australia (SLSA) identified n=79 key stakeholders who were invited to take part in the survey. Individuals received an email from SLSA (Appendix 1) inviting them to take part in the research between 19 December 2011 and 31 January 2012. A total of 45 respondents (57%) participated in the survey during the specified timeframe. However, not all respondents answered every question.

The survey asked participants about their opinions regarding the effectiveness of different types of interventions and/or devices aimed at improving rock fishing safety. It also asked for participants’ opinions regarding the strengths and limitations of each initiative and for opinions on how each initiative could be improved (Appendix 2).

2.4.  Data management and analysis

Previous reports on rock fishing fatalities in NSW during the periods from 1 January 1992 to 31 December 2000 [3], and from 1 July 2000 to 30 June 2007 [10], were reviewed. A set of variables describing the general characteristics of the individuals and the circumstances of the fatality were derived. Rock fishing fatalities during the period from 1 July 2007 to 30 June 2010 in NSW were retrieved from the NCIS, and the values for the variables of interest were determined. The results for the variables of interest were then summarised for the two periods of 1992-2000 and 2000-2010. There is a small overlap of cases between these two periods of fatalities that occurred between 1 July 2000 and 31 December 2000.

In the APDC, hospitalisations relating to transfers or statistical discharges were excluded from the APDC in order to attempt to partly eliminate ‘multiple counts’. These exclusions refer to transfers between hospitals or changes in the service category (e.g. a change from acute to rehabilitation) for a patient during one episode of care in a single facility.

To analyse the NSW Population Health Survey program data, the SURVEYFREQ procedure was used to calculate Rao-Scott design-adjusted chi-square [11]. Data were stratified by the former eight Area Health Services and a sampling weight was applied to adjust for differences in the probabilities of selection among respondents due to the varying number of people living in each household, the number of residential telephone connections for the household, and the varying sampling fraction in each of the former Area Health Services.

Analysis was performed using SAS version 9.1 [12].
3. Results

The results are presented in five Sections. Section 3.1 provides an update of the mortality data associated with rock fishing in NSW, Section 3.2 examines the hospitalised morbidity of individuals identified as engaging in rock fishing at the time of the incident that resulted in their hospitalisation, and Section 3.3 describes the results of interview responses from the NSW Population Health Survey that examined exposure to rock fishing. Section 3.4 describes the results of the literature review of rock fishing safety initiatives and Section 3.5 provides the results of the key stakeholder on-line survey regarding the effectiveness of various initiatives to improve rock fishing safety.

3.1. Mortality

Results for the general characteristics of rock fishing fatalities for the periods 1992-2000 and 2000-2010 are presented in Table 3.1 and Figures 3.1 to 3.4. The general characteristics of persons who died while rock fishing in NSW between 1992 and 2010 include:

- nearly all were males with an average age in the mid-forties;
- the majority were Australian residents, but not born in Australia, where the most common country of origin was in the Asia-Pacific region;
- predominantly were able to swim;
- alcohol was involved in a substantial number of cases;
- the majority were not wearing PPE, including life jackets, cleats, wetsuits or vests with flotation devices;
- predominantly were swept off the rocks by a wave;
- the majority were rock fishing either alone or with one other person;
- predominantly the fatality occurred between 6am and 6pm;
- the majority of fatalities occurred between Friday and Sunday.

Comparisons of the occurrence of fatalities between the two time periods of 1992-2000 and 2000-2010 indicate that:

- aside from yearly fluctuations, there has been no significant change in the number of fatalities per year;
- there were proportionally more regional fatalities compared with fatalities in Sydney in the 2000-2010 period compared with 1992-2000;
- there were more persons recorded as wearing PPE in the 2000-2010 period compared with 1992-2000; and
- there were more cases recorded as being alcohol involved in the 2000-2010 period compared with 1992-2000.
Table 3.1: General characteristics of rock fishing fatalities in NSW, 1992-2010

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 74</td>
<td>n = 75</td>
<td>n = 74</td>
<td>n = 75</td>
</tr>
<tr>
<td></td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>96</td>
<td>95</td>
<td>95</td>
<td>96</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum (years)</td>
<td>9</td>
<td>15</td>
<td>96</td>
<td>54</td>
</tr>
<tr>
<td>Maximum (years)</td>
<td>76</td>
<td>82</td>
<td>64</td>
<td>47</td>
</tr>
<tr>
<td>Mean (years)</td>
<td>46</td>
<td>43</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sydney</td>
<td>64</td>
<td>75</td>
<td>64</td>
<td>75</td>
</tr>
<tr>
<td>Regional NSW</td>
<td>36</td>
<td>25</td>
<td>36</td>
<td>25</td>
</tr>
<tr>
<td>Personal protective equipment (PPE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum (years)</td>
<td>9</td>
<td>15</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Maximum (years)</td>
<td>76</td>
<td>82</td>
<td>64</td>
<td>47</td>
</tr>
<tr>
<td>Mean (years)</td>
<td>46</td>
<td>43</td>
<td>46</td>
<td>43</td>
</tr>
<tr>
<td>Mode of entering water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swept off rocks</td>
<td>55</td>
<td>59</td>
<td>55</td>
<td>59</td>
</tr>
<tr>
<td>Fell off rocks</td>
<td>13</td>
<td>5</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Unknown</td>
<td>32</td>
<td>36</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Activity upon entering water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swimming/returning to rocks</td>
<td>16</td>
<td>46</td>
<td>16</td>
<td>46</td>
</tr>
<tr>
<td>Rescue attempted</td>
<td>12</td>
<td>7</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Panicking</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Nothing</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Unknown</td>
<td>68</td>
<td>34</td>
<td>68</td>
<td>34</td>
</tr>
<tr>
<td>Number of people fishing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>23</td>
<td>24</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>27</td>
<td>36</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>18</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>11</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>5+</td>
<td>9</td>
<td>11</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Unknown</td>
<td>17</td>
<td>0</td>
<td>17</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^{a}\) results from Jones [3].

\(^{b}\) results for 2000-2007 from Piliskic et al. [10] and updated to 2010 from the NCIS analysis (Section 2.1.1).

\(^{c}\) Personal Flotation Device (PFD) wearing rates were not reported for rock-fishers in Piliskic et al. [10], however in Jones [3] it was reported that no rock-fishers were recorded as wearing a PFD.
Figure 3.1: Number of rock fishing fatalities in NSW, 1992-2010

For the period 1992-1999 the value represents the number of fatalities in the calendar year. For the period 2000-2009 the value represents the number of fatalities from the 1st July of that year to the 30th June of the following year. There may be an under-enumeration of fatalities in 2000 due to Jones [3] and Piliskic et al. [10] not covering the period between 1st January 2000 and 30th June 2000.

Figure 3.2: Number of rock fishing fatalities by month in NSW, 1992-2010
Figure 3.3: Number of rock fishing fatalities by weekday in NSW, 1992-2010

Figure 3.4: Number of rock fishing fatalities by time of day of incident in NSW, 1992-2010
3.2. Hospitalised morbidity

There were 1,080 individuals who were hospitalised during 2003-04 to 2010-11 who were identified as fishing at the time of the incident that resulted in their hospitalisation. Of these, 304 (28.2%) individuals were identified as undertaking rock fishing, 182 (16.9%) individuals were identified as performing other specified fishing, including spear fishing, and for 594 (55.0%) individuals the type of fishing undertaken was not specified.

During the 8 year period there were, on average, 38 hospitalisations following rock fishing each year and an average of 74 hospitalisations each year for unspecified fishing (Figure 3.5). Almost all of the individuals who were hospitalised were male and the proportion of individuals hospitalised following rock fishing and unspecified fishing was equally common across all age groups from 25 years and over (Figure 3.6). The mean age of hospitalised rock fishers was 47 years (range 6 to 82 years). Just less than one-third of individuals hospitalised had English identified as their preferred spoken language, with almost two-thirds of the preferred spoken language of individuals unspecified. Less than 3% of individuals hospitalised had a preferred language other than English. For both hospitalised rock fishers and unspecified fishers, Australia was the most common country listed as their country of birth (71.1% and 81.0%, respectively) (Table 3.2).

Figure 3.5: Number of individuals who were hospitalised with rock fishing or unspecified fishing identified as the activity performed at the time of the incident in NSW, 2003-04 to 2010-11
Table 3.2: Gender and age group of individuals who were hospitalised with rock fishing or unspecified fishing identified as the activity performed at the time of the incident in NSW, 2003-04 to 2010-11

<table>
<thead>
<tr>
<th></th>
<th>Rock fishing</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>291</td>
<td>95.7</td>
<td>542</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>4.3</td>
<td>52</td>
</tr>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;15 years</td>
<td>7</td>
<td>2.3</td>
<td>47</td>
</tr>
<tr>
<td>15-19 years</td>
<td>11</td>
<td>3.6</td>
<td>32</td>
</tr>
<tr>
<td>20-24 years</td>
<td>18</td>
<td>5.9</td>
<td>48</td>
</tr>
<tr>
<td>25-29 years</td>
<td>28</td>
<td>9.2</td>
<td>58</td>
</tr>
<tr>
<td>30-34 years</td>
<td>25</td>
<td>8.2</td>
<td>48</td>
</tr>
<tr>
<td>35-39 years</td>
<td>21</td>
<td>6.9</td>
<td>51</td>
</tr>
<tr>
<td>40-44 years</td>
<td>26</td>
<td>8.6</td>
<td>51</td>
</tr>
<tr>
<td>45-49 years</td>
<td>29</td>
<td>9.5</td>
<td>61</td>
</tr>
<tr>
<td>50-54 years</td>
<td>30</td>
<td>9.9</td>
<td>42</td>
</tr>
<tr>
<td>55-59 years</td>
<td>21</td>
<td>6.9</td>
<td>35</td>
</tr>
<tr>
<td>60-64 years</td>
<td>29</td>
<td>9.5</td>
<td>29</td>
</tr>
<tr>
<td>65-69 years</td>
<td>24</td>
<td>7.9</td>
<td>32</td>
</tr>
<tr>
<td>70+ years</td>
<td>35</td>
<td>11.5</td>
<td>60</td>
</tr>
<tr>
<td><strong>Language spoken at home</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>91</td>
<td>29.9</td>
<td>173</td>
</tr>
<tr>
<td>Language other than English</td>
<td>8</td>
<td>2.6</td>
<td>16</td>
</tr>
<tr>
<td>Language unspecified</td>
<td>205</td>
<td>67.4</td>
<td>405</td>
</tr>
<tr>
<td><strong>Country of birth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>218</td>
<td>71.7</td>
<td>481</td>
</tr>
<tr>
<td>China (excluding Taiwan)</td>
<td>14</td>
<td>4.6</td>
<td>9</td>
</tr>
<tr>
<td>England</td>
<td>6</td>
<td>2.0</td>
<td>8</td>
</tr>
<tr>
<td>New Zealand</td>
<td>7</td>
<td>2.3</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>53</td>
<td>17.4</td>
<td>85</td>
</tr>
<tr>
<td>Not specified</td>
<td>6</td>
<td>2.0</td>
<td>6</td>
</tr>
</tbody>
</table>
For rock fishers, three-quarters of all hospitalisations were following a fall and exposure to inanimate mechanical forces, such as striking against objects or being hit by falling objects, represented around one in ten hospitalisations. For individuals involved in unspecified fishing, exposure to inanimate mechanical forces represented around one in five hospitalisations and falls represented almost one-third of the mechanisms of injury (Table 3.3).

Almost all of the principal diagnoses were related to injuries for individuals who were rock fishing and unspecified fishing at the time of the incident (89.1%; n=271 and 86.0%; n=511, respectively). Small cell sizes preclude identification of the other types of principal diagnoses. For rock fishers, injuries to the knee and lower leg (29.9%) and head injuries (12.9%) were the most common type of injury sustained, while for individuals engaged in unspecified fishing, injuries to the wrist and hand accounted for over one-third (35.6%) of all hospitalisations (Table 3.4).

Almost two-thirds (64.4%) of the rock fishers were hospitalised for up to one to two days. Likewise, 73.9% of individuals engaged in unspecified fishing were hospitalised for up to one to two days (Table 3.5).
Table 3.3: Injury mechanism (principal) of individuals who were hospitalised with rock fishing or unspecified fishing identified as the activity performed at the time of the incident in NSW, 2003-04 to 2010-11

<table>
<thead>
<tr>
<th>Injury mechanism</th>
<th>Rock fishing</th>
<th></th>
<th>Unspecified fishing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Transport accidents, including water transportation</td>
<td>0</td>
<td>0</td>
<td>36</td>
<td>6.1</td>
</tr>
<tr>
<td>Falls</td>
<td>230</td>
<td>75.4</td>
<td>167</td>
<td>28.1</td>
</tr>
<tr>
<td>Fall on same level from slipping, tripping and stumbling</td>
<td>72</td>
<td>23.7</td>
<td>57</td>
<td>9.6</td>
</tr>
<tr>
<td>Fall from cliff</td>
<td>51</td>
<td>16.8</td>
<td>21</td>
<td>3.5</td>
</tr>
<tr>
<td>Other fall from one level to another</td>
<td>62</td>
<td>20.4</td>
<td>22</td>
<td>3.7</td>
</tr>
<tr>
<td>Other fall on same level</td>
<td>21</td>
<td>6.9</td>
<td>19</td>
<td>3.2</td>
</tr>
<tr>
<td>Other and unspecified fall</td>
<td>98</td>
<td>32.2</td>
<td>475</td>
<td>80.0</td>
</tr>
<tr>
<td>Exposure to inanimate mechanical forces</td>
<td>43</td>
<td>14.1</td>
<td>234</td>
<td>39.4</td>
</tr>
<tr>
<td>Struck by thrown, projected or falling object</td>
<td>8</td>
<td>18.6</td>
<td>22</td>
<td>9.4</td>
</tr>
<tr>
<td>Striking against or struck by other objects</td>
<td>10</td>
<td>23.3</td>
<td>27</td>
<td>11.5</td>
</tr>
<tr>
<td>Caught, crushed, jammed or pinched in or between other objects</td>
<td>8</td>
<td>18.6</td>
<td>11</td>
<td>4.7</td>
</tr>
<tr>
<td>Contact with knife or glass</td>
<td>#</td>
<td>#</td>
<td>59</td>
<td>25.2</td>
</tr>
<tr>
<td>Contact with hand tools</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>5.6</td>
</tr>
<tr>
<td>Foreign body entering body</td>
<td>10</td>
<td>23.3</td>
<td>57</td>
<td>24.4</td>
</tr>
<tr>
<td>Exposure to other and unspecified inanimate mechanical forces</td>
<td>#</td>
<td>#</td>
<td>45</td>
<td>19.2</td>
</tr>
<tr>
<td>Exposure to animate mechanical forces</td>
<td>#</td>
<td>#</td>
<td>41</td>
<td>6.9</td>
</tr>
<tr>
<td>Accidental drowning and submersion</td>
<td>17</td>
<td>5.6</td>
<td>9</td>
<td>1.5</td>
</tr>
<tr>
<td>Other accidental threats to breathing</td>
<td>#</td>
<td>#</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other injury mechanism</td>
<td>5</td>
<td>1.6</td>
<td>80</td>
<td>13.5</td>
</tr>
<tr>
<td>Accidental exposure to other and unspecified factors</td>
<td>#</td>
<td>#</td>
<td>27</td>
<td>4.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>304</td>
<td>100.0</td>
<td>594</td>
<td>100.0</td>
</tr>
</tbody>
</table>

# Cell size less than five hospitalisations or data have been removed to prevent identification of cell sizes less than five.
Table 3.4: Injury type of individuals who were hospitalised with rock fishing or unspecified fishing identified as the activity performed at the time of the incident in NSW, 2003-04 to 2010-11

<table>
<thead>
<tr>
<th>Injury type</th>
<th>Rock fishing</th>
<th></th>
<th>Unspecified fishing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Injuries to head</td>
<td>35</td>
<td>12.9%</td>
<td>54</td>
<td>10.6%</td>
</tr>
<tr>
<td>Injuries to neck and thorax</td>
<td>21</td>
<td>7.7%</td>
<td>21</td>
<td>4.1%</td>
</tr>
<tr>
<td>Injuries to abdomen, lower back, lumbar spine and pelvis</td>
<td>14</td>
<td>5.2%</td>
<td>15</td>
<td>2.9%</td>
</tr>
<tr>
<td>Injuries to shoulder and upper arm</td>
<td>15</td>
<td>5.5%</td>
<td>29</td>
<td>5.7%</td>
</tr>
<tr>
<td>Injuries to elbow and forearm</td>
<td>32</td>
<td>11.8%</td>
<td>31</td>
<td>6.1%</td>
</tr>
<tr>
<td>Injuries to wrist and hand</td>
<td>28</td>
<td>10.3%</td>
<td>182</td>
<td>35.6%</td>
</tr>
<tr>
<td>Injuries to hip and thigh</td>
<td>10</td>
<td>3.7%</td>
<td>9</td>
<td>1.8%</td>
</tr>
<tr>
<td>Injuries to knee and lower leg</td>
<td>81</td>
<td>29.9%</td>
<td>76</td>
<td>14.9%</td>
</tr>
<tr>
<td>Injuries to ankle and foot</td>
<td>22</td>
<td>8.1%</td>
<td>48</td>
<td>9.4%</td>
</tr>
<tr>
<td>Other injuries</td>
<td>13</td>
<td>4.8%</td>
<td>46</td>
<td>9.0%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>271</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>511</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

*There were n=271 principal diagnoses of injury. Small cell sizes preclude identification of the other types of principal diagnoses.*

Table 3.5: Length of stay for individuals who were hospitalised with rock fishing or unspecified fishing identified as the activity performed at the time of the incident in NSW, 2003-04 to 2010-11

<table>
<thead>
<tr>
<th>Length of stay</th>
<th>Rock fishing</th>
<th></th>
<th>Unspecified fishing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Up to one day</td>
<td>154</td>
<td>50.7%</td>
<td>355</td>
<td>59.8%</td>
</tr>
<tr>
<td>2 days</td>
<td>42</td>
<td>13.8%</td>
<td>84</td>
<td>14.1%</td>
</tr>
<tr>
<td>3 to 4 days</td>
<td>44</td>
<td>14.5%</td>
<td>69</td>
<td>11.6%</td>
</tr>
<tr>
<td>5 to 7 days</td>
<td>39</td>
<td>12.8%</td>
<td>47</td>
<td>7.9%</td>
</tr>
<tr>
<td>8 to 14 days</td>
<td>15</td>
<td>4.9%</td>
<td>25</td>
<td>4.2%</td>
</tr>
<tr>
<td>15 days or more</td>
<td>10</td>
<td>3.3%</td>
<td>14</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

Of all the rock fishers and unspecified fishers, almost all individuals were discharged (98.1%; n=881), 1.2% (n=11) were transferred, and six (0.7%) died.
3.3. NSW Population Health Survey program

3.3.1 Swimming, fishing or rock fishing

For the 11,271 adults who had a valid response (i.e. yes or no) for their exposure to water, 3,033 (26.9%) stated they had been in or on the water, at a swimming pool, beach, lake, river, creek, stream or dam in the last 4 weeks, including fishing. There were 2,378 (21.1%) adults that reported that they had either been swimming, fishing or rock fishing in the last 4 weeks. Of these, 2,055 (18.2%) adults reported they had been swimming in the last 4 weeks, 483 (4.3%) adults indicated that they had been fishing in the last 4 weeks, and 80 (0.7%) adults indicated that they had been rock fishing in the last 4 weeks.

3.3.2 Fishing

Overall, 14.7% (95% CI: 13.0-16.3) of adults indicated that they had been fishing in the last 4 weeks. A higher proportion of males compared to females across all age groups indicated that they had been fishing in the last 4 weeks. Males aged 55-64 years represented the highest proportion of all age groups that indicated that they had been fishing in the last 4 weeks (Table 3.6). Of the adults who stated that they had been fishing in the last 4 weeks, 45.2% indicated that they fished for between 1 to 4 hours, 31.7% indicated that they fished between 5 to 10 hours, and 23.1% indicated that they fished for 10 hours or longer in the last 4 weeks.

Table 3.6: Proportion of adults aged 16 years and over who indicated they had been fishing in the last 4 weeks by age group and gender, NSW Adult Health Survey, 2005

<table>
<thead>
<tr>
<th>Age group</th>
<th>Males</th>
<th>95% CI</th>
<th>Female</th>
<th>95% CI</th>
<th>All persons</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-24 years</td>
<td>16.2</td>
<td>10.0-22.4</td>
<td>8.6</td>
<td>4.2-13.0</td>
<td>12.5</td>
<td>8.6-16.3</td>
</tr>
<tr>
<td>25-34 years</td>
<td>20.3</td>
<td>13.2-27.4</td>
<td>7.9</td>
<td>4.2-11.6</td>
<td>14.1</td>
<td>10.0-18.1</td>
</tr>
<tr>
<td>35-44 years</td>
<td>20.1</td>
<td>14.0-26.1</td>
<td>9.2</td>
<td>4.7-13.6</td>
<td>15.2</td>
<td>11.3-19.2</td>
</tr>
<tr>
<td>45-54 years</td>
<td>15.0</td>
<td>10.5-19.6</td>
<td>9.6</td>
<td>5.9-13.3</td>
<td>12.7</td>
<td>9.7-15.7</td>
</tr>
<tr>
<td>55-64 years</td>
<td>31.1</td>
<td>23.6-38.9</td>
<td>7.8</td>
<td>5.4-11.2</td>
<td>20.9</td>
<td>16.2-25.4</td>
</tr>
<tr>
<td>65+ years</td>
<td>24.9</td>
<td>18.7-31.1</td>
<td>5.6</td>
<td>2.3-8.9</td>
<td>16.2</td>
<td>12.3-20.1</td>
</tr>
<tr>
<td>All ages</td>
<td>20.1</td>
<td>17.5-22.8</td>
<td>8.4</td>
<td>6.6-10.2</td>
<td>14.7</td>
<td>13.0-16.3</td>
</tr>
</tbody>
</table>

1 95% confidence interval.
3.3.3 Rock fishing

Overall, 2.8% (95% CI: 2.0-3.6) of adults indicated that they had been rock fishing in the last 4 weeks. A higher proportion of males compared to females across all age groups indicated that they had been rock fishing in the last 4 weeks (Table 3.7). Of the adults who stated that they had been rock fishing in the last 4 weeks, 45.7% indicated that they fished for between 1 to 3 hours, 26.6% indicated that they fished between 4 to 10 hours, and 27.8% indicated that they fished for 10 hours or longer in the last 4 weeks. Of the adults who stated that they fished for 3 hours or less in the last 4 weeks, 12.7% fished for at least 1 hour, 20.3% for 2 hours, and 12.7% for 3 hours.

Table 3.7: Proportion of adults aged 16 years and over who indicated they had been rock fishing in the last 4 weeks by age group and gender, NSW Adult Health Survey, 2005

<table>
<thead>
<tr>
<th>Age group</th>
<th>Males %</th>
<th>95% CI</th>
<th>Female %</th>
<th>95% CI</th>
<th>All persons %</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-24 years</td>
<td>5.7</td>
<td>1.5-9.8</td>
<td>0.2</td>
<td>0.0-0.6</td>
<td>3.0</td>
<td>0.8-5.1</td>
</tr>
<tr>
<td>25-34 years</td>
<td>3.3</td>
<td>0.03-6.7</td>
<td>2.3</td>
<td>0.04-4.6</td>
<td>2.8</td>
<td>0.8-5.8</td>
</tr>
<tr>
<td>35-44 years</td>
<td>3.2</td>
<td>0.8-5.5</td>
<td>3.2</td>
<td>0.1-6.3</td>
<td>3.2</td>
<td>1.3-5.1</td>
</tr>
<tr>
<td>45-54 years</td>
<td>4.1</td>
<td>1.5-6.8</td>
<td>0.9</td>
<td>0.0-2.0</td>
<td>2.7</td>
<td>1.1-4.3</td>
</tr>
<tr>
<td>55-64 years</td>
<td>3.6</td>
<td>0.3-7.0</td>
<td>1.5</td>
<td>0.0-3.1</td>
<td>2.7</td>
<td>0.7-4.8</td>
</tr>
<tr>
<td>65+ years</td>
<td>1.7</td>
<td>0.4-3.1</td>
<td>1.6</td>
<td>0.0-3.5</td>
<td>1.7</td>
<td>0.6-2.8</td>
</tr>
<tr>
<td>All ages</td>
<td>3.8</td>
<td>2.5-5.1</td>
<td>1.7</td>
<td>0.8-2.6</td>
<td>2.8</td>
<td>2.0-3.6</td>
</tr>
</tbody>
</table>

¹ 95% confidence interval.
3.4. Literature review of rock fishing safety interventions

Each year around 4 million people head to water in Australia to enjoy recreational fishing [13]. With Australia having one of the most impressive marine ecosystems in the world, fishing is an extremely popular past time, yet rock fishing has earned the ignominious label of the most dangerous sport in NSW [3]. Since 1992, more than 140 lives have been lost in NSW to rock fishing [10, 14], six in 2011 alone [14]. This is even more than the fatalities attributed to hang-gliding, parachuting, scuba diving and snowboarding combined in the year 2002 [15]. Yet while the dangers involved in these other sports are readily appreciated, attitudes towards rock fishing often remain lax, despite a survey of 2,776 fishing club members identifying rock fishing as one of the riskiest fishing activities undertaken [16].

One survey conducted by SLSA [17] found that, of the 55 respondents who were rock fishing at sites in the Randwick council area, 34.5% agreed with the statement, ‘rock fishing is no more dangerous than other aquatic activities’. It seems that the thrill of the catch is often prioritized over safety among rock fishers. Piliskic et al. [10], who conducted an English-language survey online in 2009, found that for the 466 NSW respondents, most fishers consider their familiarity with the location, fish size and ease of access when choosing a location, before considering the potential danger of the site. Furthermore, half of the study group reported fishing regularly in rough waters and strong wind, and more than a third fished in thunder and lightning storms. Moran [18], in interviews with 250 adult rock fishers around popular rock fishing sites in the Auckland region, found that 76% of the sample had limited or no ability to perform a deep water rescue, and 62% did not know how to perform cardiopulmonary respiration (CPR).

The danger associated with rock fishing appears to be underestimated by some rock fishers, yet the reality that dozens of anglers are washed from the rocks into the water every year with dire consequences [19]. In fact, one investigation that studied rock fishing fatalities between 1992 and 2000, identified 74 deaths in NSW from coronial records, most of which were male [3]. The overwhelming majority of deaths were of seasoned rock fishers, yet 94% were caught unprepared and entered the water after a large wave engulfed the rocks on which they were standing. In 80% of these cases, the angler was able to tread water for a period of time before disappearing beneath the waves, yet none of the anglers were using any personal floatation devices (PFD). This lack of preparation has been echoed in more recent fatality reports between 2000 and 2007, with no safety equipment being used in 91% of fatal incidents in NSW [10] and this is thought to have directly contributed to the drowning in 76% of cases.

According to Jones [3], injured rock fishers often conform to one of three profiles: (i) those who are aware of the risks and choose to continue to fish under any condition despite the danger; (ii) those who lack experience and awareness of the risks; and (iii) responsible rock fishers who know the danger and are prepared, yet are caught out by the volatility of the ocean. The safety of all rock fishers however, is strongly dependant on the angler’s behaviour. Primarily, the decision to fish at dangerous and turbulent locations, partnered with a lapse in attention to the ocean, can lead to anglers being swept out to sea, and survival is then highly affected by whether the angler is alone or in a group, if they know how to swim, what clothes they are wearing and their use of personal protection devices.
NSW SafeWaters [20], one of the initiatives of the NSW Government, identified a number of key safety messages that appear at the heart of many rock fishing safety campaigns. These include:

- Plan your trip and inform others of your plans;
- Check the weather forecast;
- Never fish alone;
- Wear light clothing and appropriate footwear;
- Carry safety gear and personal floatation devices;
- Check for safety signs;
- Stay alert and pay attention to the ocean; and
- Refrain from drinking alcohol while rock fishing.

More recently, SafeFishing.com.au have produced 11 rock fishing safety tips, which include:

- Never fish by yourself;
- Inform others of your plans;
- Wear light clothing;
- Wear appropriate footwear;
- Carry safety gear;
- Fish only in places you know are safe and never fish in exposed areas during rough or large seas;
- Observe first, fish later;
- Plan an escape route in case you are washed in;
- Stay alert;
- Ask for advice from locals who know the area; and
- Do not jump in if someone is washed into the water.

These messages suggest that preparation, planning and vigilance must be paid before and during rock fishing as well as in the event that someone inadvertently enters the water. From a safety perspective, these safety messages call for safety to be approached from four different directions, specifically through initiatives relating to:

1. Education;
2. Engineering;
3. Enforcement; and
4. Other related programs.

As illustrated later in this report, these approaches work best in combination. Education initiatives seek to inform rock fishers on what constitutes safe rock fishing behaviour and encourage responsible conduct, while engineering measures are instrumental in both preventing rock fishers from being washed into the ocean and then increasing safety and prompt rescue in the event that an angler enters the water. Enforcement increases compliance with safety actions embodied in the education and engineering efforts, and other programs assess risk and track the number of rock fishing incidents, as well as offering anglers guidelines for choosing their rock fishing locations. Both separately and in combination, these initiatives have the potential to improve rock fishing safety in NSW.
3.4.1 Education initiatives

Much of a rock fisher’s safety is dependent on their behaviour in terms of their choice of location, whether they fish alone or with others, whether they choose to drink alcohol while fishing, the attention they pay to the ocean and their familiarity with rescue procedures. As education has the potential to influence these decisions, it is perhaps one of the strongest tools available to assist in improving rock fishing safety. Significant effort has therefore been undertaken to propagate key safety messages through various awareness raising campaigns in NSW.

A characteristic of rock fishing incidents that should be noted is the cultural and linguistic background of the fisher. Between 1992 and 2000, 31% of individuals who died whilst rock fishing had Australia identified as their country of origin, with 36% of fishers having their country of origin identified in an Asian region, such as China, Korea, Vietnam, Taiwan, Hong Kong, Laos and Cambodia [3]. In 2010, 83% of deaths of rock fishers were identified as having an Asian origin, mainly from China, Vietnam and Korea [21]. While less than 10% of rock fishers who have died have been foreign tourists, a significant portion have spoken languages other than English [3]. Given the popularity of rock fishing, particularly among the Asian community [5], the need for safety interventions to be appropriate for Culturally and Linguistically Diverse (CALD) populations is clear.

3.4.1.1 Signage

Signage is used widely around coastal areas to warn beachgoers of local hazards and to encourage safe behaviours. A number of water safety signs have been designed by the Australian and New Zealand Standards, which use image-based, simply coloured signs that have been tested to ensure that they are easily comprehended in Australia and New Zealand [22]. Prohibitive signage for example, such as ‘swimming prohibited’, ‘snorkelling prohibited’ and ‘diving prohibited’ all feature a black stick figure depicting the action inside a red circle with a bar across the front. Warning signs such as ‘warning: deep water’, or ‘warning: unstable cliff edge’ feature a black stick figure within a yellow triangle with black edges. Information signs such as ‘public rescue equipment’ or ‘tsunami evacuation location’ feature white figures on a green square background. A fourth type of mandatory directives, such as ‘wear personal floatation devices’, or ‘keep children under constant surveillance’ involve white figures on a blue, circular background. These signage types can be seen in Figure 3.7.
While there are no specific rock fishing symbols approved by the Australian and New Zealand standards, there are at present some signs in place at popular rock fishing locations to warn fishers of the danger and instructing them on the use of rescue materials, such as angel rings, and making contact with the emergency services. These signs sometimes rely solely on images to convey their intent, and sometimes incorporate text.

The limitation of all signage however, is that beach signs are not always well understood by non-English speakers. One study by Mitchell and Haddrill [5] showed that among a sample of 95 Chinese speakers, most of whom had participated in some beach activity in Australia, only 34% of respondents recognized the image-only symbol for ‘swimming prohibited’, only 16.1% understood ‘fishing prohibited’ and less than 10% knew the signs for ‘beware of sharks’ and ‘vessels prohibited’. Furthermore, a survey of rock fishers in New Zealand where most spoke English as a second language, revealed that almost half the participants were not sure that angel rings and their signage were accompanied by clear text and picture instructions [23].

In recent times, there has been a push by the Royal Life Saving Society to have the Australian standards for risk signage implemented nation-wide [24]. This is a standard with broader applications than the water safety signage guidelines stipulated by the Australian and New Zealand Standards. Specifically, these rules would require signs to have the internationally recognized ‘danger’ triangle prominently displayed, clear advice to people regarding what the danger is and the details of the risk, for example, ‘strong rips and currents occur on this beach’ and also advice regarding how the danger can be avoided, for example, ‘watch out for freak waves’ [24]. Such an example can be seen in Figure 3.8. When including text in signage, Beachsafe [25] recommends that it is best to keep the number of words to a minimum, and the messages positively skewed, for example, ‘fish with a friend’ rather than ‘never fish alone’.
Given the high proportion of non-English speakers using Australian coasts, there is also a need for any safety messages to be available in multiple languages. The Department of Tourism and Immigration identified eight widely spoken languages after cross referencing languages spoken by visitors to Australia with incidences of drowning; explicitly, English, Chinese, Simplified Chinese, Korean, Japanese, Hindi, Malay and Arabic languages were advised [25]. In rock fishing hotspots, warning signage conveyed in Asian languages would be of particular merit. Of note however, Mitchell and Haddrill [5] demonstrated that direct translations from English were not always possible or informative, and idiomatic translations were found to be more useful. For example, when considering young children who should be closely supervised near water, there is no direct translation in Chinese for ‘supervision’, so instead ‘keep a close watch, never lose sight’ was recommended as a more appropriate idiomatic translation.

3.4.1.2 Rock fishing advertising and advisory campaigns, including workshops

Several advisory campaigns have been conducted in NSW to warn fishers of the dangers associated with rock fishing and to promote rock fishing safety. Research conducted by Jones [3] and Mitchell and Haddrill [5] for the then NSW Water Safety Taskforce, under the banner of NSW Safewaters, assisted in developing safety messages for rock fishing in NSW. The overarching theme of the NSW Safewaters [20] key safety messages described earlier (see Section 3.4) was preparedness. This refers to the ability to choose and monitor safe fishing locations and be ready for a rescue, if necessary. Multiple campaigns have focused on conveying these messages and demonstrating safe rock fishing behaviour.

The NSW Rock Fishing Safety Awareness program for example, was launched in 2004 and involved the development and distribution of a safety information resource folder, including a DVD [10].
The SLSA and NSW SafeWaters then built on this premise with their ‘Don’t put your life on the line’ program [17]. This program is multi-faceted and provides multilingual resource kits, community based advertising and rock fishing safety workshops for anglers. The ‘Don’t put your life on the line’ program has distributed 50,000 education kits since 2006 [10]. The program also has other goals around improving hazard alert systems and general safety. The framework for this initiative can be seen in Figure 3.9. However, the framework does not appear to include standards or guideline-related initiatives, instead focusing on research and education initiatives. This is in contrast to the structure of the then NSW Water Safety Taskforce that used a lead agency approach to tackle the three prongs of research, education and standards aiming to conduct research, then use research findings to inform policy and practice [26].

Figure 3.9: The process flow for the ‘Don’t put your life on the line’ intervention

The Australian National Sports fishing Association (ANSA) launched the Asian Awareness Project in 2009 in collaboration with SLSA [10]. This effort involved a series of rock fishing safety advertisements published in a range of Asian newspapers, and information about free rock fishing safety workshops which are targeted to non-English speakers.

Face-to-face workshops are a vital element of many educational campaigns as they demonstrate key safety behaviours and considerations in an interactive format. In NSW, the ‘Don’t put your life on the line’ program includes rock fishing safety workshops that are specifically targeted to non-English speaking anglers [27]. This program is supported largely by funds generated through the compulsory fee anglers pay for recreational fishing permits [28], and participants are recruited through the SafeFishing website as well as through organisations, such as the Australian-Korean Welfare Association [27]. In each workshop, which is run in English with Asian language translators, participants are provided with a life jacket and cleats which they keep at the end of the session, and the course commences with a presentation which outlines the different kinds of
life jackets and footwear which are suitable for rock fishing. A discussion is then facilitated in which resources available for checking weather and wave forecasts are described, and the workshop finishes with an on-location tutorial, during which the instructor shows the participants how to assess the wind, weather and wave conditions, the safety of the location, how to identify safe spots to fish, as well as what type of fish are available at given locations.

Mr Malcolm Poole, the chairman of the Recreational Fishing Alliance of NSW, is a strong believer in the importance of these workshops, particularly for the multicultural community. In one correspondence, he explains that migrants and visitors to Australia often do not have an innate appreciation of the movement of water and the danger of the coast [29]. Many individuals, for example, do not know how to float and relax in water to conserve energy. A major component of the workshops, therefore, encompass general beach safety, covering not only the basic ocean dangers, such as spotting a rip or submerged rocks, but also the use of publicly available rescue equipment, such as angel rings, stormy weather grenades and life jackets, as well as how to make impromptu flotation devices, such as by inflating the bladder of a wine cask or an empty soft drink bottle.

There have been a limited number of evaluations of the success of education interventions and particularly of their impact on rock fishing safety. In 2007, NSW Sport and Recreation reported that the SafeFishing website, offering a ‘Don’t put your life on the line’ safety DVD, was experiencing more than 9,000 hits per month to download the DVD and had additionally received another 300 requests for the DVD to be delivered via mail [30], all suggesting that the information was being disseminated.

In November 2009, the Rock Fishing Safety campaign was re-launched in Sydney, with safety workshops held in Sydney, Melbourne and Perth [31]. This was followed by a three week long ethnic media campaign as well as advertisements in English placed in suburban newspapers twice a month from November through to January. In January 2010, 117 participants of various linguistic backgrounds were approached at rock fishing locations across Australia and participated in a survey to assess the success of the education campaign. It was found that the campaign had reached approximately one third of rock fishers surveyed, and a strong unprompted recall rate (33%) of all educational media used was found, which was well above the industry average of proven recall of 22%. Furthermore, rock fishing safety advertisements were consistently rated as clear, important and easy to understand, and more than half the participants interviewed indicated a willingness to change their behaviour after viewing the campaign. This was a strong statistic, compared to the industry average of only 2% of audiences motivated by advertising to change their behaviour [31].

The Rock Fishing Safety campaign appeared to reach Eastern Asian language speakers, who reported more familiarity with the education material than speakers of Northern European languages, such as English or German [31]. This was in line with the intention of the campaign and the budget spent, but it was also a significant achievement, as reaching CALD fishers in a meaningful way has proved to be both a challenge and a priority. Rock fishing is an extremely popular pastime among Asians, but overall they demonstrated both a low level of appreciation for the safety measures that should be adopted while rock fishing [5] and showed some difficulty in understanding English-centric safety messages. Mitchell and Haddrill [5] surveyed Chinese speakers in Sydney in 2004 and found a strong preference for safety information to be propagated among the Chinese community by Chinese spokespeople, expressly by those with personal experience in the dangers of rock fishing.
Piliskic et al. [10] conducted an English on-line survey in 2010 to assess fishers’ knowledge of safety behaviours. There were 322 respondents who identified themselves as rock fishers and just under half (49%) reported having heard about or noticed any fishing safety campaigns. Most commonly participants had heard about general rock fishing safety tips (45%) followed by information about angel rings (44%) and the importance of life jackets (14%).

Internationally, New Zealand has put considerable effort into improving rock fishing safety. A particular black spot was identified around the Auckland west coast area where 11 lives were lost between 1999 and 2005 [18] and thus the Water Safety and Auckland’s West Coast Fishers project was implemented in 2006 [32]. Initially, anglers were approached to partake in a survey to ascertain their knowledge about safety practices. From the 250 fishers who participated, it was found that one third of respondents believed that rock fishing was no more dangerous than other aquatic activities, while a third also did not consider drowning to be a constant threat. Furthermore, half of respondents believed that they were strong swimmers and therefore were less at risk of drowning than other fishers and while almost three quarters agreed that wearing a life jacket would increase the safety of rock fishing, the same number claimed that they never wore a PFD.

These results suggested an underestimation of the fishers’ perceived level of risk in New Zealand and spurred a tailored education program to increase anglers’ appreciation of the dangers of rock fishing and the need to take precautions. As part of this program, the New Zealand ‘Don’t put your life on the line’ campaign was launched in 2007 [33], with particular focus on increasing safe fishing practices through increased life jacket use. The intervention entailed the release of multilingual safety information included in leaflets and posters which accentuated the importance of life jackets (Figure 3.10) and coupons were also distributed to anglers to redeem a free life jacket. After one year, the project was reviewed with encouraging results. Of the 112 participants interviewed, there was a significant decrease in the number of fishers who reported never wearing a life jacket, and there was an increased appreciation of the dangers of drowning and general knowledge of safety practices [33].

The following year, the project continued and included a reward component, in which fishers who were seen wearing their life jackets were presented with a NZD$20 gift voucher to redeem at buoyancy aid distributors [34]. Monthly rock fishing safety workshops were also run in the Chinese community and life jackets were offered at the workshops as prizes [35] and a prominent Maori All Black rugby player was also recruited to act as a spokesman for rock fishing safety.

When the campaign was evaluated again in 2009, the results again showed promise. There was a 38% increase in the number of fishers who reported sometimes or always wearing a life jacket or buoyancy aid compared to the 2006 statistics, and more than half of the fishers considered their safety knowledge to have improved from the previous year [23]. The most significant finding, however, was the direct effect the education campaign had on lives lost while rock fishing; while there were five deaths in a two month period in 2005, this decreased to one fatality in 2006, two in 2007 and one death in 2008 [35].
There is limited information available about the success of rock fishing safety workshops. In 2009 and 2010, Multicultural Marketing Management [36-39] assessed the attitudes and intended behaviours of rock fishers before and after participating in a rock fishing safety workshop. The workshops were rated very highly in terms of usefulness, relevance and presentation and were particularly well-reviewed for their outdoor component and training in reading the ocean. The workshop generated a 40% increase in participants’ intention to carry safety gear with them while rock fishing (52.0% before the workshop compared to 92.3% after the workshop), a 36% increase in intention to seek advice as needed from local rock fishers (56.8% before and 92.8% afterwards) and a similar increase of 32.5% who aimed to plan an escape route before commencing fishing at every location (62.8% compared to 95.3%). It had less success in changing attitudes towards rock fishing in rough areas, with an actual increase of 1.3% from 24.5% to 25.8% of individuals who plan to fish in rough seas.

A clear limitation to educational approaches, including media campaigns and workshops, is that attitudinal change does not necessarily equate to behavioural change [40]. Moreover, reaching the target audience can also prove to be a challenge. After intensive media campaigns, Multicultural Management Marketing [31] and Piliskic et al. [10] both reported reaching between only one third and a half of surveyed rock fishers, and of that, unprompted recall of the material stood at only 33% at best [31]. While this statistic was quite good compared to industry standards, it suggests that a large portion of safety messages aimed at rock fishers are going unnoticed. Interestingly, the two campaign evaluations reported that rock fishers absorbed information from distinctly different sources. Multicultural Management Marketing [31], who focused on an ethnic media

campaign, found that the majority of participants who could recall ever seeing a rock fishing safety advertisement viewed it in an ethnic newspaper or publication (28.2%), followed by English publications (25.6%), then publicity materials available at local fishing and tackle shops (20.5%). This report suggested that print sources were the best medium for reaching the target audience while the internet was the least likely place that fishing safety advertisements would be viewed (2.6%). Piliskic et al [10] on the other hand found that the majority of surveyed fishers turn to the internet as a means to find fishing safety information (55%), followed by bait shops (46%) then fishing clubs (38%). Fishing magazines and other media sources were consulted in only a small amount of cases (4%).

Given the huge costs that are invested in education initiatives, further research should evaluate the effectiveness of different mediums and approaches used to target rock fishers, including not only the effect on the fishers’ attitudes, but also the number and incidence of rock fishing-related injuries and fatalities. The key messages used must also be honed to target specific audiences; Multicultural Marketing and Management [31] for example, found that the print advertising used in the 2010 Rock Fishing Safety Campaign appealed to adult males through its imagery and clear-cut language. It was suggested however, that future advertisements could also focus on women (particularly wives of fishers) and children, perhaps equating safe fishing with being a responsible parent. In fact, the ‘Get hooked: It’s fun to fish’ education program is currently being conducted in primary schools in NSW to inform children about safe, responsible and sustainable fishing, accompanied by a coastal fishing workshop [41]. It is possible that information regarding rock fishing safety could also be incorporated into this program.

3.4.1.3 Rock fishing safety ambassadors

Given the demonstrated success in some arenas of using popular spokespeople, such as sports players or celebrities, in advertising campaigns to promote brands [42], the use of suitable ambassadors to promote rock fishing safety could be considered, such as individuals already known in recreational fishing, such as Mr Rex Hunt or Mr Andrew Ettinghausen. Mr Andrew Ettinghausen is already featured on the ‘Don’t put your life on the line’ rock fishing safety video available online at SafeFising.com.au. This approach of using safety ambassadors is used by the National Road Safety Council [43] who utilize a range of individuals as road safety advocates to promote road safety, including television personalities, sports stars, business men and police officers. The Australian Quarantine Inspection Service [44] also uses a similar system using celebrities, such as Mr Steve Irwin in the past, to promote local quarantine rules.

Other areas of community safety promotion have also used ‘safety champions’ to secure ground-up involvement in safety issues. Safety champions are independent individuals who, in some instances, have been appointed by a regulatory body to give feedback about issues and/or to promote key community safety messages. For example, the World Health Organization’s (WHO) Safe Communities program regularly uses the abilities of key champions to promote and/or to improve community safety. Within the Safe Communities movement, key individuals, such as Mr Paul Kells in Canada, have taken on leadership roles to engage others and to promote key safety messages aimed at preventing injuries and deaths [45].

Safety champions are also commonly used in the health care setting. For example, the Health Consumers Council of Western Australia coordinated the Australian Patients for Patient Safety (PFPS) workshop in Perth in 2009, where a mixture of health care professionals and patients, who had been harmed unnecessarily in a hospital setting, were brought together to air issues and
develop strategies to improve future patient safety [46]. Fifty safety champions have also been nominated to bring dangerous roads to the attention of the Royal Automotive Club (RAC) in Western Australia [47]. Recreational fishing bodies could implement a similar system, nominating rock fishers from diverse geographical and linguistics backgrounds to partake in the design of, and to promote, future rock fishing safety initiatives. Another approach may be to encourage private industries, including rock fishing gear and bait shops, to include safety messages in their advertising or to refer customers to focused safety resources, such as safefishing.com.au [48].

3.4.1.4 Utilising extension services and distributing PFD redemption coupons

One way of addressing the limitations of mass media campaigns and safety workshops is to expand existing beach safety programs and have volunteers frequent popular rock fishing locations to share their knowledge about safety practices. Already, SLSA [49] has an established program to recruit volunteers to work as life savers, junior life saver instructors, first aid and radio officers as well as general beach patrol agents. The Australian Volunteer Coastguard [50] also successfully uses unpaid staff to propagate and exemplify safe boating behaviours and perform rescues, as necessary. In addition, the NSW Department of Primary Industries currently runs a Fishcare volunteer program, of which there are an estimated 350 volunteers in NSW, who are active in approaching anglers around their local grounds to advise them on responsible fishing and local safety hazards [41].

These services could be extended to specifically address rock fishers, and this would fulfil the preference among rock fishers to receive information from knowledgeable spokespeople who have personal experience and are from their own community [5], as well as providing rock fishers immediate access to information, while also bridging the gap in content which is not covered in media campaigns or workshops, such as how to choose a fishing position on a specific rock shelf. Safety assessments would need to be conducted in relation to access to coastal rock platforms in some locations prior to volunteers frequenting and promoting safety measures at high risk locations.

The involvement of rock fishing volunteers could also facilitate the operation of an Australian reward system similar to that used in New Zealand. Providing rock fishers who were seen wearing their life jackets with a voucher for fishing-related stores in New Zealand contributed to an increase in life jacket wearing in the Auckland area [34], and such an initiative may have the same potential for improved life jacket use by rock fishers in NSW.

3.4.2 Engineering initiatives

One of the primary concerns, in terms of safety, for rock fishers is the danger of them entering the water unexpectedly, submerging and drowning. Engineering initiatives, therefore, have been designed with two aims in mind: to prevent the fisher from being swept from the rocks and into the sea and to increase the chance of survival and successful rescue once the fisher is in the water.

3.4.2.1 Anchor points and eye bolts

In Western Australia, one structure used to assist in preventing fishers from being swept from rocks are anchor points. Anchor points are steel rings embedded into the rock that allow fishers to secure themselves to the shore via a length of rope. These anchor points provide a secure harness
in the event that a wave sweeps over the rock shelf [24]. Anchor points and harnesses can be seen in Figure 3.11, however they do have limitations. There is limited evidence in Western Australia that these anchor points are being used systematically by rock fishers, they can be expensive to install and maintain, and the rings must be expertly mounted and tested annually for weight bearing capability. Specialized signage must also be available to educate fishers on how to tie off ropes on anchor points [24] and they also restrict movement of the rock fisher, and present a possible tripping risk to passersby [29]. It is also possible that fishers who do lose their footing after a freak wave may be swept up against the rock surface.

Given these constraints, anchor points are used only in a limited capacity in Western Australia, and not at all in NSW. In NSW, there has been some discussion about installing eye bolts along the coastline which have a similar design and would achieve a similar result, although many of the same issues as with anchor points would be encountered [29].

**Figure 3.11: Fishers using an anchor point at Naturalise National Park, Western Australia**

![Figure 3.11](image)


### 3.4.2.2 Appropriate clothing and footwear

At a more individual level, the clothing that anglers choose to wear can greatly impact their safety, if swept into the water. Ideally, any attire should provide the wearer with protection against the elements, but when rock fishing it is also essential that the garments can be easily removed in water. To this end, shoes such as gumboots or sneakers and heavy clothing fabrics are inadvisable as they offer little grip on slippery surfaces and can fill with water and rapidly become very heavy [10]. Footwear with non-slip soles or cleats are recommended, along with lightweight clothing and jackets which open at the front that can easily be removed when wet to reduce mass when in the water [3].
3.4.2.3 Personal flotation devices

One of the most important items to wear to increase the chance of survivability if swept into the ocean is a life jacket or PFD. Currently, life jacket use is not mandated for rock fishers in NSW [51], however there is extensive evidence supporting their potential safety benefits. Of the 74 rock fishers who died between 1992 and 2000 in NSW, none were wearing a PFD [3]. Survivability and life jacket use have not been extensively investigated for fishers. Life jacket use has been investigated during other marine activities, such as boating. In Washington, during an observational study of 5,306 boat occupants during two weekends in August and September 2010, it was found that of the 896 individuals who were fishing from a vessel, only 21% used a PFD [52]. Similarly, in an observational study of 4,181 boaters during April and June 1995 in Washington and Oregon, only 25% of boat occupants were observed to wear a PFD [53].

O’Connor [54], in a study of boating fatalities in Australia during 1997 to 2004, found that life jackets doubled the chance of survival in the water. As 80% of rock fishers who died managed to tread water for a period of time before disappearing beneath the waves [3], the use of a PFD could be instrumental in aiding individuals to stay afloat, particularly if unconscious, while rescue efforts are organised.

Prior efforts to increase PFD wearing rates among rock fishers in New Zealand are described earlier in Section 3.4.1.2 as these efforts predominantly involved an advisory campaign and subsidy scheme for life jackets that saw a 38% increase in the number of rock fishers who reported sometimes or always wearing a life jacket or buoyancy aid [23]. In Victoria, an observational study of PFD use preceding and following the introduction of legislation in December 2005 that required all occupants of small powered recreational vessels (up to and including 4.8 metres in length) to wear a PFD, found a significant increase in PFD using from 22% in 2005 to 63% in 2007 [55].

In Australia, three categories of life jackets are available in inherently buoyant or manually inflatable forms, or in a flaccid form which automatically inflates on contact with water [51]. They are Type 1 jackets, which provide the highest level of buoyancy and are designed to keep the wearer’s head above the water, particularly while unconscious, Type 2 life jackets which provide buoyancy but less support of the wearer’s head, and Type 3 life jackets, which are much slimmer, flexible and unobtrusive while still providing buoyancy (Figure 3.12).

Figure 3.12: The different types of life jackets

![Type 1 Life Jacket](image1.png) ![Type 2 Life Jacket](image2.png) ![Type 3 Life Jacket](image3.png)

A major argument against wearing a life jacket while rock fishing is that the bulkiness of the vest could restrict mobility. In addition, life jackets which inflate upon contact with water can inadvertently activate after being wet with ocean spray, rather than upon the wearers’ full immersion in water. In 2005, the Victorian Life Saving Club faced the same issue when new marine laws required all personnel operating powered boats up to 4.8 metres in length, including rescue vessels, to wear a PFD [56]. As life savers must have free use of their arms and legs in order to perform complex rescues, a number of different life jacket types were trialled, specifically, Type 1 life jackets that were either inherently buoyant, or could be manually inflated, once contact with water was made, and Type 2 and Type 3 life jackets. The life savers reported that the Type 3 life jackets were not only comfortable and unobtrusive, but so much so that they would be happy wearing these vests at all times, not just while operating the rescue boats. They also reported that the manually inflatable Type 1 jackets were reasonably comfortable and did not interfere with their flexibility.

Since then, life jackets have been developed even further to suit water sports people. In 2011, the 9th Life Design life jacket, as depicted in Figure 3.13, was presented at the James Dyson design awards, winning second place [57]. Unlike other jackets which are either inherently buoyant or automatically inflated by contact with water, the 9th Life design is activated by oxygen levels measured through an inbuilt pulse oximeter. The jacket, which otherwise consists of a vest made from wetsuit material, inflates to a full Level 1 life jacket only when the oxygen reading is symptomatic of a drowning risk [58]. This design circumvents the issue of both bulkiness and discomfort in life jackets, and the issue of ocean spray contact deploying the inflation device. Furthermore, it advances on manually inflatable jackets as it will still inflate if the individual is unconscious.

Figure 3.13: 9th life jacket in various stages of inflation

Currently NSW Maritime [51] recommends rock fishers wear a minimum of a Type 3 life jacket at all times on a rock shelf, and given the range of products currently available, there appears to be no strong argument against regular life jacket use. Education and publicity campaigns have the potential to increase the popularity of life jackets among the rock fishing community, and life jacket giveaways – similar to those used in New Zealand – could instigate changes in social fishing norms.

3.4.2.4 EPIRBs, emergency marker systems and emergency beacon systems

Once in the water, there are a number of small devices that are designed to increase the fisher’s safety. Emergency Position Indicating Radio Beacons (EPIRBs) are one such intervention. These are small gadgets that are either carried on the angler or are inbuilt in a life jacket, and on contact with water, they emit a distress signal which continues for a minimum of 24 hours and provides the emergency service ongoing information about the wearer’s geographic location in the water [59].

Emergency marker systems are also integral to commencing a rapid and focused search. At popular rock fishing locations around the country, these large signs bear a location code to quote to ensure rapid and unambiguous information is conveyed to emergency services [60]. Additionally, emergency beacon systems, or pre-programmed satellite phones, which are available at some locations allow fishers to contact rescue services directly [24]. In areas of general phone reception, emergency services can be reached either by dialling ‘000’ from any phone or ‘112’ on a digital mobile phone which will connect to any telecommunication network available [61]. These satellite phones are particularly useful in remote areas where normal telephone reception is not available.

3.4.2.5 Rescue equipment: angel rings, EFDs, stormy weather grenades and silent sentries

Of the rescue equipment available, angel rings have had demonstrated success. As shown in Figure 3.14, angel rings are buoyancy aids which aim to keep individuals afloat in the water and away from the rocks while a rescue operation can be arranged [6]. The angel rings are installed and maintained by ANSA and currently are located at 120 popular rock fishing locations around NSW. In addition, ANSA has also worked with NSW Police Force to provide 150 angel rings to be stored in first response police cars and local area commands in NSW [62]. As of May 2011, 47 lives have been confirmed as being saved by angel rings [6] and it is thought that of the rock fishing fatalities the occurred during 1 July 2000 to 30 June 2007, 74% of deaths could have been prevented if an angel ring or PFD were available and used [10]. This determination of the preventability of a rock fisher drowning was made on a case-by-case basis following review of the incident circumstances.

The angel ring program is constantly expanding around Australia. ANSA arranges for the funding and installation of the rings at no cost to the community, and the program is fully supported by an educational component, available in multiple languages, that is currently expanding in other Australian states [63]. However, where rock fishers are fishing alone at remote sites and are swept into the ocean, an angel ring will not be useful, unless a second individual is present to throw the ring to the fisher. The 2011 James Dyson Award finalist, Mr Benjamin Lau, has addressed this issue with his new Emergency Flotation Device (EFD) design [64]. The EFD consists of a U-shaped flotation aid which is compacted into a small canister and stored on the rock fisher’s belt. In the event that the fisher is swept into the ocean, they can activate the inflation of the EFD by pulling
on a toggle on the canister. The result is instant access to a buoyancy aid, without the need of a second person to provide assistance.

Figure 3.14: An angel ring at a popular rock fishing location

![Image of an angel ring at a popular rock fishing location]


The Stormy and Longreach grenades are other buoyancy devices that are particularly useful to individuals who have been swept into sea. The Stormy canister can be hand thrown to an individual in the water and, once immersed in water, a life jacket contained within the canister automatically inflates. The Longreach buoy, made out of hydrophobic foam, is able to be propelled up to 150 metres by a launcher, and then inflates up to 40 times its original size, thus allowing an individual to stay afloat with no fear of the device springing leaks [10]. The Longreach grenade is equipped with flares to attract attention at night, and it is itself brightly coloured.

A fourth type of buoy is the silent sentry [24]. Inside canisters located at popular rock fishing locations, silent sentries consist of three flotation balls on a rope and an EPIRB which automatically sends a signal to emergency services to initiate a rescue. Similar to the angel rings and the stormy weather grenades, the sentries aim at keeping the individual afloat, away from dangerous rocks, and to reduce panic.

As effective as these devices may be at improving safety at rock fishing locations, many sites have experienced ongoing issues of vandalism, theft and misuse of the products, leading to their breakage or removal [24]. There is no obvious answer to this issue. Making the devices more difficult to access for malicious purposes also prevents access in true emergency situations, and the loss of equipment appears to be the unfortunate cost of these community safety initiatives.

In recent times, a number of asset tracker devices have been implemented on angel rings [29]. These small global positioning system (GPS) devices are equipped with an electronic ‘geo-fence’, and issue an alarm to ANSA if the ring leaves a geographic field. This allows the monitoring body to
know that the angel ring has left its holder whether it is for genuine use or theft, and also allows its location to be tracked and thus the ring to be recovered.

To date, economic pressures restrict the application of asset trackers on other rescue equipment, such as silent sentries. While a single angel ring equipped with a GPS tracker costs around $600 [29], the cost would run into the tens of thousands if all rescue equipment were fitted with these tracking devices. At present, other methods to deter vandalism, such as regular inspections of equipment and roaming patrols of popular rock fishing sites, are being explored by regulatory bodies.

3.4.3 Enforcement initiatives

3.4.3.1 Restricting access to rock fishing sites and coastal risk audits

Enforcement is often an important component of any safety program. In terms of rock fishing safety, Piliskic et al. [10] have argued that regulations should control access to rock fishing sites so that restrictions are increased in dangerous locations, and decreased at relatively safer locations. This would aim to encourage fisher traffic to safer sites and would aim to reduce overall fatality risk. Restrictions may come in the form of physical barriers to block access to certain sites, or monetary fines for trespassing. In turn, however, this type of enforcement would require ongoing and consistent monitoring, which given the vastness of the Australian coastline, may be an unattainable goal.

In Western Australia, the Department of Environment and Conservation has audited the Western Australian coastline, rated regions on their stability and identified what safety measures could be offered at these sites [24]. These ratings range from ‘low risk’ where fishing may be promoted with parking, fish cleaning facilities and rock fishing safety promotional signage, through to ‘very high risk’ at known repeat-drowning sites, where visitors were to be discouraged through barriers, a lack of roads up to the rocks, and signs elucidating past rock fishing-related fatalities. These high risk sites may be candidates for anchor points and emergency evacuation plans. At present though, the rating scheme is purely theoretical and safety measures have not been systematically installed across the 3,600 kilometres of Western Australian coast [24].

In NSW, a similar auditing process took place in the early 1990s [65]. The NSW Beach Safety Rating System assessed the natural make up of beaches, and generated a descriptive summary for each beach emphasizing its physical characteristics including ease of access, facilities available and suitability for sun bathing, surfing and fishing with reference to natural hazards. This system also rated all beaches in terms of their public beach safety and were scaled from 1 (safest) to 10 (least safe).

Given the enormity of the Australian coastline, it is not possible to constantly monitor all possible rock fishing locations. In some regions, signage, such as that seen in Figure 3.15, has simply been erected to warn visitors of the hazardous area and caution them that they enter at their own risk.
3.4.3.2 Making life jacket wearing compulsory

Compared to banning access to rock fishing sites, the enforcement of safety behaviours while rock fishing, specifically mandating the use of life jackets in some instances, might be a more realistic option. For example, in Victoria, PFD use is only mandatory for occupants of small powered recreational vessels (up to and including 4.8 metres in length). This legislation does not apply for recreational vessels greater than 4.8 metres in length. Currently, there are no laws, or official WorkCover NSW guidelines, in place to direct the use of PFDs similar to those which exist for recreational boating, diving or snorkelling, yet NSW Maritime [51] recommends the use of a minimum Type 3 life jacket while rock fishing on a coastal rock platform. Developing guidelines for PFD use may prove highly beneficial, and while monitoring and enforcing life jacket use may initially present the same issues as physical barriers or monetary fines, partnering legislation with education programs and life jacket giveaways, as seen in New Zealand, may instigate a high level of compliance over time.

As with the education and engineering initiatives, there has been a lack of evaluation to date regarding how enforcing rock fishing safety recommended safety precautions has affected overall fatality and injury incidence rates. There has, however, been some research into evaluating the effectiveness of safety interventions during boating and other marine activities. For example, Cummings et al. [66] conducted a matched cohort study of United States Coast Guard data and found that in incidents where multiple recreational boaters fell into the water from the same boat in the same weather conditions and time frame, those who were wearing a life jacket, or other PFD, were twice as likely to survive as those who were not (Risk Ratio adjusted for age and sex 0.51; 95%CI 0.35-0.74). Yet in the United States, where life jacket wearing is recommended for
recreational boating, but not required, only 21.7% of boaters, on average, choose to wear one [67].

As described in Section 3.4.1.2 there was a 38% increase in the number of rock fishers who reported sometimes or always wearing a life jacket or buoyancy aid following an advisory and reinforcement campaign [23] and, as mentioned in Section 3.4.2.3, an observational study of PFD use preceding and following the introduction of legislation that required all occupants of small powered recreational vessels (up to and including 4.8 metres in length) to wear a PFD in Victoria, found a significant increase in PFD use from 22% in 2005 to 63% in 2007 [55].

In Australia, the laws on life jacket wear vary from state-to-state and depend on both the body of water and the size of the boat, but the overall wear rate for fishers in boats in NSW is just 8% [68]. Yet across all Australian states, PFDs are compulsory for persons being towed, such as when waterskiing or wakeboarding. Here, where the rules are unambiguous, the life jacket wear rate increases drastically to up to 98% [68]. With the correct educational and enforcement components, high rates of compliance with life jacket use could also potentially be observed among rock fishers.

3.4.3.3 Guidelines, code of practice and licencing

The use of guidelines and codes of practice can assist to promote and improve safety. The National Health and Medical Research Centre (NHMRC) have developed Guidelines for Managing Risks in Recreational Water [69] that aim to ensure that recreational water environments are managed as safely as possible. Hazards and interventions for reducing the risk of injury and death following a fishing-related incident are outlined and include the use of: life jackets, warning notices, broadcast weather alerts, education, legislation, availability of rescue services and personal care [69].

In 2011, a national industry development strategy was produced that identified goals, and a structured progress for the future in recreational fishing [70]. One of the key principals of this strategy was for recreational fishers to use best practices in all aspects of their fishing activities [70], which should naturally extend to the taking of appropriate safety precautions. Furthermore, one of the key strategies of this national industry development strategy is to improve safety in recreational fishing by: (i) promoting safety in fishing, particularly in areas that are considered dangerous, (ii) rolling out the Angel Ring program around Australia to enhance the safety of rock fishers and other shore-based fishers, and (iii) implementing recommendations from the Recreational Fishing and Safety in Australia scoping study that centred around targeting safety messages to anglers, undertaking analyses of fishing-related injuries, and providing information about basic first aid treatment [71].

In addition to considering enforcement actions by regulatory bodies, the NSW Interdepartmental Committee on Water Safety in 1994 [72] and Jones in 2003 [3] have both suggested the introduction of a voluntary code of practice for rock fishers. This suggestion compliments the Department of Agriculture, Fisheries and Forestry’s existing national code of practice for recreational and sporting fishing [73] which defines fishers’ responsibilities towards protecting the fragile marine ecosystem through conscientious fishing practices while respecting the greater environment and landowners. A specific rock fishing code of practice could promote discussion between rock fishers and fishing clubs, encourage fishers to look out for one another and increase
media attention on the risks associated with the sport. It would also establish basic expectations of rock fishers in terms of safety practices, and is an option that could be further developed.

It has been estimated that there are around half a million recreational fishing licences purchased in NSW each year [10]. Although the number of recreational fishers could be higher as some individuals are excluded from having to purchase a licence, such as Indigenous individuals or pensioners. One idea that surfaced during the provision of evidence at a coronial investigation in 2011 of 12 rock fishing-related drownings in NSW was the introduction of a separate fishing license for rock fishers [74]. However, this suggestion was not included in recommendations made by the Coroner at the inquest. It would be a difficult initiative to implement and would likely result in backlash from the rock fishing community, who already are required to purchase a recreational fishing licence.

3.4.4 Other methods and programs

3.4.4.1 Hazard rating systems

The overall safety of rock fishers is often dependent on their behaviour and their decision to fish in dangerous conditions at dangerous locations. This decision, however, could be positively influenced if an appropriate hazard rating system became available which warned fishers of the level of current danger at various locations. Currently, there are no specific risk rating systems that provide information about popular rock fishing spots in NSW. However, there are a number of more general information sources. Beachsafe, for example, is an organisation which provides daily updates about general beach conditions around the country, such as weather forecasts, tide information as well as information on whether the beach is patrolled or not [25]. The Australian Bureau of Meteorology (BoM) [75] also provides marine forecasts and information about ocean movement. It is possible that these systems could be extended, with potential for information on rock fishing safety to also be included.

In Victoria, one rating system was conceptualized to identify family friendly beaches [76]. This project proposed that information could be taken from the Australian Beach Safety and Management Program (ABSAMP) which has gathered data 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 [77] to determine a rating for beaches across Australia for its appropriateness for family-orientated visits. Rating systems for rock fishers could also be more precise in terms of providing information regarding hazards at specific locations. Shand et al. [78] have developed a rock platform risk rating system to predict the occurrence of large waves on rock shelves along the NSW coastline on a given day. Australian CoastSafe is also in the process of mapping and assessing the length of Randwick’s coastline for public safety and water risk [17]. This information could be combined and extended to include weather forecasts and facility records taken from the ABSAMP to provide fishers with an overall impression of the safety of a location on a given day, as well as information about rescue equipment available at that location.

There are some limitations to the development of a specific rock fishing rating system. In Victoria, the ‘family friendly’ beach ratings proposal encountered significant reluctance from beach managers due to concerns over liability, specifically to the opportunity for litigation should a child be injured or killed on a beach deemed ‘family friendly’ [76]. Yet, if indemnity could be ensured, there is considerable potential for the development of a rock fishing risk rating system. Any such
information could easily be circulated through the following channels: (i) through the addition of local beach guides published annually which would give a very general rating of conditions at given rock fishing locations; (ii) through the development of a specialist website or additions to existing websites, such as Beachsafe or SafeFishing.com.au, to offer general and daily guides; or (iii) through public daily bulletins in newspapers or radio, with conditions at popular rock fishing spots mentioned alongside existing surf reports in coastal communities.

3.4.4.2 Rescue service charge

The suggestion has also been put forth that individuals who require rescuing should pay for the costs involved in the rescue [3]. As this cost can easily run into the hundreds of thousands [79], the idea has been largely discounted due to how negatively it could potentially affect innocent family members and/or dependents. One possibility, however, is to impose a set fee on rock fishers who require rescuing in order to encourage safe fishing practices.

3.4.4.3 Stakeholder engagement

One program that has been used to generate discussion and progress in rock fishing safety is an adaptation of the WHO Safe Communities model [2]. This model seeks to create networks of relevant experts at a local level to enact efforts to make a community safer. In the past, this model has been used extensively to prevent injuries, violence, suicide and natural disasters. In 2005, Mitchell and Haddrill [2] used this model flexibly and hosted community forums for key stakeholders with interests in reducing the drowning rate in three high risks groups, specifically, (i) rock fishers, (ii) Chinese-speaking residents and tourists, and (iii) residents of rural and remote NSW. Rock fishing stakeholders included representatives from the NSW Fisheries, NSW Department of Tourism, NSW Sport and Recreation, NSW Maritime, NSW Ministry of Health, various fishing associations, and representatives from the fishing industry. The rock fishing community forum discussed initiatives around policy development, education and safety seminars as well as other initiatives, such as the development of a standard reporting template for police officers for rock fishing fatalities. As a result of this forum, each of the stakeholders had a better understanding of their own responsibilities in reducing rock fishing-related drowning deaths in NSW, and as a direct result of this initiative, rock fishing technique and safety seminars were conducted, as was a survey of rock fisher behaviours, and rock fishing safety brochures were translated into three languages and distributed.

3.4.4.4 Emergency response systems and incident monitoring

Since 2007 SLSA [80] has maintained a specific emergency response system for ocean rescues. Persons in need contact the emergency services through a standard ‘000’ call (or also 112 from digital mobile phones). The emergency services can then send a message to the new 13SURF (13 7873) telephone number which requires the SLSA State Duty Officer to liaise with necessary lifesaving teams to initiate a rescue mission. This telephone number is not promoted to the public, but it streamlines the rescue process by nominating one person to authorise and coordinate a rescue, as oppose to requiring multiple channels of communication, as was the case with the pre-2007 system. It also strengthens record keeping of rescue efforts.
There are a number of data collections that can be used to monitor the number of rock fishing-related fatalities, injuries and rescues in NSW. Information has been provided earlier in this report on rock fishing-related fatalities using data from the NCIS (See Section 3.1) and hospital admissions for incidents that occurred when an individual was rock fishing (See Section 3.2). In addition, SLSA’s [81] SurfGuard database includes information on incidents that involve: (i) major first aid (i.e. an incident where a person has been treated and will need further follow up medical treatment); (ii) minor first aid; (iii) major rescue (i.e. a rescue where a person who required assistance was returned to shore, or place of safety, and who, without assistance would have drowned or become injured); (iv) search and rescue; (v) drowning; and (vi) any injuries that have occurred during a surf club competition, a surf patrol, training for competition, or carnivals. Information recorded includes basic demographics of the person injured or rescued, the incident type, the contributing factors to the incident, and the nature of any injuries received. SLSA also subscribe to a media monitoring service and Google alerts to identify possible rock fishing-related incidents. It is possible that these three data collections could be regularly examined to report on and monitor the number of rock fishing-related fatalities, injuries and rescues in NSW, along with routine media monitoring based on key words, such as ‘rock fish’ and ‘drown’.

All of these data collections (i.e. the NCIS, the APDC and SurfGuard) have limitations. The NCIS only contains complete information regarding a death once the case has been ‘closed’ and an inquest either held or a finding made. In some cases, it can take up to 13 months or longer for a coronial case to be ‘closed’. Information on hospital admissions from the APDC are released for each financial year, after only a couple of months time lag. However, information used to indentify rock fishing-related admissions comes from the ‘activity performed at time of incident’ data variable, which can be unspecified for up to two-thirds of activities. The SurfGuard database contains data variables that are not mutually exclusive for recording the incident type and location. Information on the type of activity conducted at the time of the incident is inconsistently recorded. Lastly, data quality and completeness is variable, as many of the data variables required text or multiple responses [82].

A recent national study has examined national rock fishing-related deaths, national hospital admissions and emergency department presentations in two states to provide a picture of the burden of rock fishing-related fatal and non-fatal injury in Australia [83]. This study found that between 1 July 2002 and 30 June 2009, 388 rock fishing injuries requiring hospitalisation were recorded across Australia, 208 in NSW alone [83]. A specific injury code to identify rock fishing-related admissions is included in the ICD-10-AM, used to classify injury-related admissions in hospitals since July 2002, and this information has been used by various injury surveillance units, including the Queensland Injury Surveillance Unit and the Monash University Injury Research Institute to produce estimates of rock fishing injuries and incidents [83]. It is, however, very difficult to estimate the number of rock fishing incidents that have occurred that have not required hospital attention. Emergency department presentations for rock fishing injuries that did not require admission have only been collated in Victoria and Queensland [83].

Currently only one measure is in place to detect rock fishing-related incidents that do not result in injury and this is using the asset trackers on angel rings. These trackers can detect not only theft, but also when the ring enters the water for a legitimate rescue effort [84]. These figures may give insight into how many rock fishing incidents there are across the state, but these estimates may be overly conservative.
3.5. Key stakeholder survey responses

For the 45 survey respondents, 27 (60.0%) specified their usual industry of employment. Of the 27 respondents that provided their industry information, six (22.2%) worked for government organisations, six (22.2%) for rescue organisations, five (18.5%) for angler organisations, four (14.8%) worked in academia, four (14.8%) were Fishcare volunteers, and two (7.4%) were manufacturers. The remaining 18 (40.0%) respondents worked in other and unspecified areas (Figure 3.16).

3.5.1 Educational initiatives

3.5.1.1 Signage

Thirty-three (73.3%) respondents indicated that they found standard pictorial signage ‘somewhat effective’ (62.2%; n=28) or ‘very effective’ (11.1%; n=5) at improving rock fishing safety. The remaining 13.3% (n=6) found signage to be ‘neither effective nor ineffective’ and two respondents (4.4%) indicated they thought standard pictorial signage was ‘ineffective’ at improving rock fishing safety.

Seventeen (38.6%) respondents indicated that they found interactive signage, such as touch screens or digital signage, ‘somewhat effective’ (34.1%; n=15) or ‘very effective’ (4.5%; n=2) at improving rock fishing safety. The remaining 43.2% found signage to be ‘neither effective nor ineffective’ (22.7%; n=10) or ‘somewhat ineffective’ (20.5%; n=9) and eight respondents (18.2%) indicated that they thought interactive signage was ‘ineffective’ at improving rock fishing safety.
Thirty-seven (82.2%) respondents indicated that they found multilingual signage ‘somewhat effective’ (48.9%; n=22) or ‘very effective’ (33.3%; n=15) at improving rock fishing safety. Only 13.4% found multilingual signage ‘neither effective nor ineffective’ (6.7%; n=3) or ‘somewhat ineffective’ (6.7%; n=3) and two respondents (4.4%) indicated they thought multilingual signage was ‘ineffective’ at improving rock fishing safety (Figure 3.17).

**Figure 3.17: Perceived effectiveness of standard and interactive signage at improving rock fishing safety**

Note: 45 participants answered the questions regarding the effectiveness of standard pictorial signage and multilingual signage (Questions 1 and 3) and 44 respondents (97.8%) answered the question regarding the effectiveness of interactive signage (Question 2).

Thirty-six (80.0%) survey respondents provided their opinion on the perceived strengths and limitations of signage. Respondents indicated that the greatest benefits of signage were that they could alert fishers, especially those new to the sport, to the dangers of rock fishing and explain measures that could be taken to increase personal safety. Other strengths of signage conveyed were that it was thought to be relatively inexpensive and able to provide relevant and accessible information to allow fishers to make informed decisions about whether to fish at the location. Signage was always available to the fisher and was also believed to reduce liability of Park and Water officials, yet many limitations of signage were also identified by respondents. Specifically, signage was thought to be overlooked or simply ignored by fishers, with respondents feeling that many individuals become complacent due to a likely sense of their own invincibility. Some signs were also thought to be ambiguous and not understood by fishers and, according to some respondents, many individuals fail to heed guidelines, without the fear of any sort of enforcement or penalty. Signage can be damaged by vandals, can be difficult to place around rock shelves and multiple signs can foster confusion. Existing signage was also thought to lack location-specific
detail, such as how to identify local risks and, conversely, to identify the safest areas on a rock shelf.

Forty-four (97.8%) respondents answered the question on whether improvements could be made to signage to make it more effective at improving rock fishing safety. Twenty-eight (63.6%) respondents believed that there were improvements that could be made, seven (15.9%) respondents did not think any improvements could be made, and nine (20.5%) respondents did not know if any improvements could be made to make signage more effective at improving rock fishing safety.

Twenty-seven (77.1%) respondents provided suggestions regarding what improvements could be made to rock fishing signage. There was a strong sentiment among respondents that personal responsibility and liability for one’s own safety should be emphasized and key messages such as ‘Enter at your own risk’ be displayed prominently on signage. It was suggested that warning signs should be standardised and simplified (i.e. use clearly understood signs and symbols), be available in multiple languages, include drowning or injury statistics relevant to each high-risk site, and that they could be quite graphic, including images of fishers who had been injured, similar to the graphic, pictorial hazard warnings appearing on cigarette packaging. Respondents suggested that signage could be more numerous, especially at high-risk locations, and it was also suggested that flashing lights could be erected on top of sign posts to draw attention to the warnings during both the day and at night. Respondents indicated that signs needed to be made ‘vandal-proof’ or, alternatively, repaired/replaced on a regular basis.

The respondents indicated a desire for an increased breadth of information to be available on signage around popular rock fishing sites. It was suggested that interactive signage could incorporate new technologies, could contain location markers, and provide current interpretations of local conditions in terms of weather and wave forecasts. If one rock fishing site was particularly dangerous on a given day, then another nearby site could be suggested on the sign. It was thought that partnering with angler associations, or at-risk target groups, to develop signage could encourage fishers to take safety messages on board.

It was also proposed that interactive signage could function as a visitor log. Fishers at known rock fishing black-spots could sign in and out of the site, and an alert could be sent to rescue services if a person failed to log out again far beyond their intended exit time. It was also suggested that interactive signage could be improved by running on solar power.

3.5.1.2 Rock fishing safety workshops

Thirty-seven (82.2%) respondents answered the question regarding how effective rock fishing workshops were at improving rock fishing safety for anglers. Thirty-two (86.5%) respondents indicated they believed that rock fishing workshops were either ‘very effective’ (45.9%; n=17) or ‘somewhat effective’ (40.5%; n=15) at improving safety for anglers. Three (8.1%) respondents thought that workshops were ‘neither effective or ineffective’, two (5.4%) thought that workshops were ‘somewhat ineffective’ and none rated workshops as ‘ineffective’ (Figure 3.18).

Thirty-three (73.3%) survey respondents provided their opinion on the perceived strengths of rock fishing workshops. Respondents indicated that the strengths of rock fishing workshops were that they were an opportunity for anglers to hear safety messages and to be provided with detailed examples of technique and safety strategies in a realistic setting, with fishers often sharing experiences. Workshop attendees are able to ask questions and receive feedback on their
performance in a context that is targeted to various cultural, linguistic and attitudinal groups, which can improve global understanding of the teaching material and also strengthen partnerships within the community. As individuals don’t know what they don’t know, workshops were seen as a great opportunity to instil safety messages face-to-face, including providing information on the correct safety gear that should be used, such as PFDs, or even the basics of clothing and footwear.

However, 34 (75.6%) respondents also identified limitations associated with rock fishing workshops. Lack of enrolment in such programs by anglers was identified as the main limitation of the initiative. Respondents suggested that attendance itself would need to be either made a compulsory requirement of a special rock fishing provision in the NSW fishing license scheme, or be integrated into the general school curriculum for children along with general beach and fishing safety. There were also concerns raised by respondents regarding the costs involved, language barriers, the limited availability and regularity of workshops, and the lack of translation from classroom to real-life skills in various and unique rock fishing locations.

**Figure 3.18: Perceived effectiveness of rock fishing workshops at improving rock fishing safety**

![Chart showing perceived effectiveness of rock fishing workshops](image)

Note: 37 participants (82.2%) answered the question regarding the effectiveness of workshops (Question 8).

Twenty-one (55.3%) respondents answered the question on whether improvements could be made to rock fishing workshops to make them more effective at improving rock fishing safety. A repeated notion was that publicity needs to be generated and the workshops widely advertised, particularly around the beginning of the fishing season. It was also suggested that more workshops be held in a structured roll-out plan at a variety of venues, particularly for CALD community groups, and that the workshops should be tailored as introductory workshops for inexperienced anglers versus more intermediate, or advanced, workshops for experienced anglers.

It was suggested that the workshops could be made more attractive, if they were restructured as a fishing tips and techniques workshop with more interactive components, and with safety messages interspersed throughout. It was also thought that workshops could also provide information about what to do if a rock fisher was swept into the ocean, that they could also
involve measures of swimming abilities and emergency medical techniques, such as CPR. Having the impact of workshops evaluated, to determine if safety messages were being retained, and also having rock fishing safety information available for workshop attendees to take home were also highlighted by respondents as ways to improve rock fishing workshops.

3.5.1.3 Rock fishing safety campaigns

Thirty-five (77.8%) respondents answered the question regarding how effective rock fishing awareness raising campaigns were at improving rock fishing safety for anglers. Thirty (85.7%) respondents indicated that they thought rock fishing safety campaigns were either ‘very effective’ (31.4%; n=11) or ‘somewhat effective’ (54.3%; n=19) at improving safety for anglers. Four (11.4%) respondents thought that safety campaigns were ‘neither effective or ineffective’, and one (2.9%) respondent thought that safety campaigns were ‘somewhat ineffective’ (Figure 3.19).

Figure 3.19: Perceived effectiveness of awareness raising campaigns at improving rock fishing safety

![Bar chart showing perceived effectiveness of awareness raising campaigns at improving rock fishing safety.](image)

Note: 35 participants (77.8%) answered the question regarding the effectiveness of awareness raising campaigns (Question 13).

Media advertising, including television and billboards, was rated to be ‘very effective’ (42.9%; n=15) as a medium for safety awareness raising campaigns. This was followed by websites containing information on rock fishing safety (11.5%; n=4), instructional DVDS on rock fishing safety (5.7%; n=2), and newsletters or other information sheets with tips on rock fishing safety (5.7%; n=2). Newsletters (57.1%; n=20), instructional DVDS (54.3%; n=19) and websites (48.6%; n=17) were more likely to be rated as ‘somewhat effective’ compared to media advertising, with around one-third (n=12) of respondents indicated that they found newsletters ‘somewhat ineffective’. Media advertising (11.4%; n=4) and websites (2.9%; n=1) were the only mediums to be rated by survey respondents as ‘ineffective’ (Figure 3.20).
Thirty (66.7%) survey respondents provided their opinion on the perceived strengths and limitations of safety awareness campaigns to improve rock fishing safety. The respondents reported that the strengths of safety awareness campaigns lie in their ability to reach a large number of people in one hit and to reach different target groups in the community, such as CALD groups. The safety messages were thought to saturate not only the rock fisher demographic, but also the family and friends of rock fishers, who may then encourage fishers to be more cautious. Safety awareness campaigns were perceived as being able to inform the inexperienced fishers of the safety aspects of rock fishing and to also remind the more experienced anglers of existing safety hazards, especially by utilising stories from other fishers. Safety campaigns were thought to be able to provide a more visual and often a more memorable message to fishers.

Yet in a saturated advertising domain, the success of rock fishing messages actually remaining salient to the intended audience was thought to be questionable by some respondents. The cost of media advertising was thought to be another limitation of safety campaigns and the ability to reach all target groups was questioned by respondents, especially with some target groups not accessed mainstream media avenues. It was suggested that, if campaigns are not done thoughtfully, they can contribute to a negative community perception of rock fishers as irresponsible individuals who ignore safety messages, often needing to be rescued as a result.

Note: 35 participants (77.8%) answered the question regarding the effectiveness of different initiatives as part of awareness raising campaigns (Question 14).
Twenty-three (65.7%) respondents answered the question on whether they thought improvements could be made to safety awareness raising campaigns to make them more effective at improving rock fishing safety. It was suggested by respondents that rock fishing safety awareness campaigns should be popularised, like the Laurie Lawrence ‘Kids Alive: Do the Five’ safety messages aimed at improving the safety and survivability of young children around swimming pools, that rock fishers should be involved in any initiatives, that prominent individuals, or celebrities, could be involved in awareness raising campaigns to engage widespread interest, and that campaigns should be targeted and conducted at the start of the rock fishing season.

Respondents indicated that any television, radio or DVD material should be presented in an encouraging voice and that there could be more television programs on the ‘best way to fish’ targeting anglers that could also promote safe behaviours. The ability to reach the target demographic could also be enhanced by including advertising about safety measures on international flights bound for Australia, by making available posters and DVDs in all stores where fishing equipment and bait are sold, and also by targeting newspapers, magazines or radio programs aimed at CALD communities. The respondents recommended that the material could include presenting an incident from the perspective of a fisher being swept into the ocean and facing injury, or drowning, to personalize the dangers of rock fishing.

3.5.1.4 Rock fishing alert systems

Thirty-three (73.3%) respondents answered the question regarding how effective they thought dangerous rock fishing alert systems, such as the Recreational Fishing Alliance (RFA) alerts and the NSW Maritime coastal waters forecasts, were at improving rock fishing safety for anglers. Twenty-four (72.7%) respondents indicated that they thought rock fishing safety campaigns were either ‘very effective’ (27.3%; n=9) or ‘somewhat effective’ (45.5%; n=15) at improving safety for anglers. Seven (21.2%) respondents thought that alert systems were ‘neither effective or ineffective’, and two (6.1%) respondents thought that alert systems were ‘somewhat ineffective’ (Figure 3.21).

Twenty-nine (64.4%) survey respondents provided their opinion on the perceived strengths and limitations of alert systems to improve rock fishing safety. The respondents thought that alert warning systems in publishing relevant danger forecasts aided rock fishers to make informed decisions regarding their fishing plans and to formulate contingency plans, if necessary. These sorts of alert systems were thought to promote immediate awareness of dangerous conditions and, as these alerts are more widely promoted, they will be able to create more general public awareness, including having alert notices appear in mainstream media avenues, such as weather forecasts on the television news. Given the standard format already used by other forecasts systems, such as general weather forecasts, participants remarked that these warning systems could be easily understood and have the potential to reach a wide audience, especially the family and friends of rock fishers.

On the other hand, alert systems currently rely on fishers consulting them on their own initiative, therefore, these systems were thought to be widely underused. Respondents indicated that ‘real-time’ updates were not available on current alert systems, nor was information provided for all language groups. These alert systems were not widely known about in the general community, so occasional fishers might not be aware of their existence. According to some of the respondents, warning forecasts are not able to provide highly localised risk appraisals of specific locations, and generally do not educated about the risk of medium sea conditions which can still be highly dangerous.
Figure 3.21: The perceived effectiveness of dangerous rock fishing alert systems at improving rock fishing safety

Note: 33 participants (73.3%) answered the question regarding the effectiveness of rock fishing alert systems (Question 19).

Thirty-five (77.8%) respondents answered the question on whether improvements could be made to rock fishing alert systems to make them more effective at improving rock fishing safety. Of the 35 respondents, 22 (62.9%) indicated that they felt that rock fishing alert systems could be improved. Increasing accessibility to the information was one suggestion repeated by respondents as a mechanism to improve the effectiveness of rock fishing alert systems, and this could be done by including the forecast with weather forecasts on prime time television and radio programs, or by making the information available at popular rock fishing sites, perhaps conveyed through interactive signage. Closing rock platforms and using the alert systems to provide alternate locations for fishers when there are dangerous conditions forecast at some locations was viewed as an improvement that could be made to current alert systems. In addition, social networking sites and smart phone applications could also be utilised to provide information to fishers about dangerous conditions. Respondents indicated that any information should be provided in multilingual formats, and possibly be accompanied by a standardised warning rank, similar to that already in use for bush fire risks.

3.5.1.5 Extension services

Thirty-three (73.3%) respondents answered the question regarding how effective they thought extension services, such as multilingual educations officers, Fishcare and other volunteer programs, were at improving rock fishing safety for anglers. Twenty-eight (84.8%) respondents indicated that they thought extension services were either ‘very effective’ (45.5%; n=15) or ‘somewhat effective’ (39.4%; n=13) at improving safety for anglers. Three (9.1%) respondents
thought that extension services were ‘neither effective or ineffective’, and two (6.1%) respondents thought that extension services were ‘somewhat ineffective’ (Figure 3.22).

**Figure 3.22: The perceived effectiveness of extension services at improving rock fishing safety**

![Bar chart showing the perceived effectiveness of extension services.](chart)

Note: 33 participants (73.3%) answered the question regarding the effectiveness of rock fishing alert systems (Question 24).

Twenty-six (57.8%) survey respondents provided their opinion on the perceived strengths and limitations of extension services to improve rock fishing safety. According to the respondents, the strengths of extension services were that they are able to engage anglers on-site, and this sort of face-to-face interaction allows direct communication and offers the opportunity for fishers to have any questions they have about safety or the specific site conditions answered. Volunteers are also able to target and engage the non-English speaking population in safety strategies while rock fishing ‘without blame or shame’, which was thought to contribute to a sense of feelings of inclusiveness among CALD fishers at specific sites. Yet some respondents felt that extension service initiatives lacked manpower and that these services were inconsistent with their presence at various sites, and also in the safety messages that were provided. There was also a concern raised by respondents that many fishery officers approached anglers with intolerance and a focus on blame and punishment.

Thirty-two (71.1%) respondents answered the question on whether improvements could be made to extension services to make them more effective at improving rock fishing safety. Twenty (62.5%) respondents felt that the extension services currently offered could be improved. Specifically, the number of educators out and around rock platforms could be bolstered, possibly by the inclusion of paid, multilingual and experienced fishers. It was suggested that educators should attend sites during prime fishing time to increase the number of fishers that they were able to reach. There was also a suggestion of integrating safety messages with a wider audience,
possibly through school programs. The respondents indicated that the primary role of any extension services could shift away from enforcement and focus more on education and cultural development, with volunteers sharing their knowledge and expertise on both rock fishing techniques and safety.

3.5.1.6 Discounts or subsides for the purchase of life jackets

Thirty-two (71.1%) respondents answered the question regarding how effective they thought the provision of discounts or subsidies for the cost of life jackets would be at improving rock fishing safety for anglers. Twenty-six (81.3%) respondents indicated that they thought providing discounts or subsides for the purchase of life jackets would be either ‘very effective’ (34.4%; n=11) or ‘somewhat effective’ (46.9%; n=15) at improving safety for anglers. Four (12.5%) respondents thought that providing discounts or subsides for the purchase of life jackets would be ‘neither effective or ineffective’, one (3.1%) respondent thought that providing discounts or subsides would be ‘somewhat ineffective’ and one (3.1%) respondent thought that it would be ‘ineffective’ (Figure 3.23).

Figure 3.23: The perceived effectiveness of life jacket subsidies at improving rock fishing safety

![Graph showing the perceived effectiveness of life jacket subsidies]

Note: 32 participants (71.1%) answered the question regarding the effectiveness of life jacket subsidies (Question 24).

Twenty-seven (60.0%) survey respondents provided their opinion on the perceived strengths and limitations of providing discounts or subsides for the purchase of life jackets to improve rock fishing safety. Respondents believed that such an incentive would make life jackets more accessible and affordable, particularly to fishers on a budget and could encourage use. It would be likely that fishers would purchase the less bulky varieties of life jackets, as these would now be more affordable, which could contribute to increased wearing rates. However, such a scheme
would need to be monitored for its effectiveness to determine where it had increased life jacket use among fishers.

Respondents indicated that there were also limitations of such an incentive scheme. There could be potential for abuse; persons outside of the rock fishing community (such as boaters) might also take advantage of subsidies meant for rock fishers in large numbers, which may render the initiative financially unsustainable. There was concern raised about who would fund this initiative on an on-going basis and that this sort of initiative should not be a ‘once off’ program. It was indicated by respondents that owning a life jacket did not ensure that it was always worn, as comfort and convenience were often factors that contributed to life jacket use. Hot weather was seen as a deterrent to life jacket use, with jackets viewed as cumbersome. There was also concern by some respondents that discounts would have little effect on actual wear rates of life jackets. It was indicated that there was a need change the perception of fishers regarding wearing a life jacket, with a need to ‘make it cool’ to wear a life jacket while rock fishing. Some respondents indicated that any sort of compulsory use of life jackets could have a negative impact among the fishing community and would be impossible to regulate. It was also thought that fishers may take greater risks if they were wearing a PFD, which could make them complacent and over-confident.

3.5.1.7 Safety ambassadors to promote rock fishing safety

Thirty-one (68.9%) respondents answered the question regarding how effective they thought the use of safety ambassadors would be at improving rock fishing safety. Twenty-five (80.6%) respondents indicated that they thought using ambassadors to promote rock fishing safety would be either ‘very effective’ (41.9%; n=13) or ‘somewhat effective’ (38.7%; n=12) at improving safety for anglers. Five (16.1%) respondents thought that using ambassadors to promote rock fishing safety would be ‘neither effective or ineffective’, and one (3.2%) respondent thought that using safety ambassadors would be ‘somewhat ineffective’ at promoting rock fishing safety (Figure 3.24).

Twenty-eight (62.2%) survey respondents provided their opinion on the perceived strengths and limitations of using safety ambassadors to promote rock fishing safety. Some respondents expressed the opinion that using ambassadors to promote rock fishing safety would have the potential to not only educate rock fishers on relevant dangers, but to also create a positive community perception of the sport. Respondents indicated that any role models would need to be individuals that fishers could easily related to, such as sports people or prominent anglers, and that they would have to be individuals that were respected for their knowledge of the sport. Ambassadors would also need to be sourced from CALD communities, so the CALD population could easily related to individuals promoting rock fishing safety messages.

Respondents thought that the choice of ambassador must be made carefully. If an individual is chosen on the basis of their celebrity status alone and had no real personal experience with the sport or the hazards faced by anglers, rock fishers would be likely to ignore their advice. Some participants also warned that Anglo-Saxon representatives may hold no sway with CALD groups. Another concern raised by respondents was the possibility of ambassadors over-advertising certain ‘safer’ rock fishing sites which could lead to over-crowding and unrest among the local rock fishing community. These issues would have to be overcome if ambassadors were to be used successfully to promote rock fishing safety.
Figure 3.24: The perceived effectiveness of using ambassadors to promote rock fishing safety

Note: 31 participants (68.9%) answered the question regarding the effectiveness of safety ambassadors (Question 32).

3.5.2 Engineering initiatives

Respondents were asked how effective they believed various engineering initiatives were at improving rock fishing safety. These initiatives included: angel rings, silent sentries, anchor points, PFDs (e.g. life jackets, emergency flotation devices, stormy rescue grenades), emergency communication beacons, emergency location markers, personal EPIRBS, and appropriate footwear.

Thirty (93.8%) respondents indicated that they thought angel rings were either ‘very effective’ (37.5%; n=12) or ‘somewhat effective’ (56.3%; n=18) at improving rock fishing safety. Silent sentries were thought to be ‘somewhat effective’ (55.2%; n=16) or ‘neither effective or ineffective’ (31.0%; n=9) at improving rock fishing safety. Anchor points were perceived to be ‘somewhat effective’ by 33.3% (n=10) of those surveyed, while a further 26.7% (n=8) thought they were ‘very effective’. Personal flotation devices, such as life jackets, were well regarded, with almost all respondents (96.9%; n=31) rating them either ‘highly effective’ (75.0%; n=24) or ‘somewhat effective’. Personal flotation devices, such as life jackets, were well regarded, with almost all respondents (96.9%; n=31) rating them either ‘highly effective’ (75.0%; n=24) or ‘somewhat effective’. Personal flotation devices, such as life jackets, were well regarded, with almost all respondents (96.9%; n=31) rating them either ‘highly effective’ (75.0%; n=24) or ‘somewhat effective’.

Twenty-two (73.3%) respondents indicated that they thought emergency communication beacons were either ‘very effective’ (33.3%; n=10) or ‘somewhat effective’ (40.0%; n=12) at improving rock fishing safety, with 23.3% (n=7) reporting that they thought that beacons were ‘neither effective or ineffective’ in this role. Emergency location markers were rated by 46.7% (n=14) as ‘somewhat effective’ and by 40.0% (n=12) as ‘very effective’ in improving rock fishing safety. Personal EPIRBS were thought by 45.2% (n=14) of respondents to be ‘very effective’ and by 35.5% (n=11) to be ‘somewhat effective’ at improving rock fishing safety. Lastly, 51.6% (n=16) of respondents thought that appropriate footwear was ‘very effective’ and a further 48.4% (n=15) believe that they were ‘somewhat effective’ in improving rock fishing safety (Table 3.8)
Table 3.8: Ratings of effectiveness of engineering initiatives by respondents to improve rock fishing safety

<table>
<thead>
<tr>
<th>Engineering initiatives</th>
<th>Very effective</th>
<th>Somewhat effective</th>
<th>Neither effective or ineffective</th>
<th>Somewhat ineffective</th>
<th>Ineffective</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Angel rings</td>
<td>12</td>
<td>37.5</td>
<td>18</td>
<td>56.3</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>Silent sentries</td>
<td>2</td>
<td>6.9</td>
<td>16</td>
<td>55.2</td>
<td>9</td>
<td>31.0</td>
</tr>
<tr>
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<td>26.7</td>
<td>10</td>
<td>33.3</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td>Personal flotation devices</td>
<td>24</td>
<td>75.0</td>
<td>7</td>
<td>21.9</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>Emergency communication beacons</td>
<td>10</td>
<td>33.3</td>
<td>12</td>
<td>40.0</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>Emergency location markers</td>
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<td>40.0</td>
<td>14</td>
<td>46.7</td>
<td>3</td>
<td>10.0</td>
</tr>
<tr>
<td>Personal EPIRBs</td>
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<td>35.5</td>
<td>4</td>
<td>12.9</td>
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<tr>
<td>Appropriate footwear</td>
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<td>51.6</td>
<td>15</td>
<td>48.4</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

Twenty-three (51.1%) respondents provided their opinion on the perceived strengths and limitations of engineering initiatives aimed at improving rock fishing safety. The respondents felt that any measure that had a direct effect on preventing a person from entering the water involuntarily or keeping them afloat in the water was a good initiative. However, respondents indicated that engineering initiatives needed to be adopted by, rather than imposed, on fishers and should be accompanied by other safety initiatives, such as drowning prevention plans and awareness raising campaigns. However, nothing was thought to substituted for selecting a smart location from which to fish. It was expressed that on-site safety equipment, such as angel rings and silent sentries, acted as both a rescue device and a reminder of the inherent dangers of rock fishing. Engineering initiatives were thought by respondents to be important initiatives as, with the exception of appropriate footwear, they did not require rock fishers to come to the location pre-prepared. Investments in infrastructure, such as galvanised stair access, at popular fishing locations was thought to be an engineering initiative that would send a positive message about rock fishing and a commitment to the future of the sport.

There were several limitations mentioned by respondents in relation to on-site engineering initiatives. Anchor points were thought to be impractical, as they restricted the mobility needed to land fish and escape on-coming waves. Iron poles, to hang onto in case of a complete wash over, were cited as having some merit. Some respondents thought that engineering initiatives were too costly, were stated to be regularly vandalised or stolen, and were thought to be monitored too infrequently for instances of vandalism or theft. For some initiatives, such as the use of personal safety gear, like cleated footwear, this relied on fishers self-regulation their own safety. Several respondents indicated concern that the presence of rescue equipment could encourage fishing at unsafe locations and could contribute to a false sense of security in novice anglers. It was also expressed that safety devices can impact negatively on the marine environment and present unnecessary physical obstacles for anglers trying to land fish.
Thirty (66.7%) respondents answered the question on whether improvements could be made to any engineering initiatives to make them more effective at improving rock fishing safety. Of these, 16 (53.3%) respondents felt that engineering initiatives could be improved. Specifically, it was suggested that a risk assessment of all rock fishing platforms in NSW should be performed in order to ensure that rescue materials that were appropriate to that specific location were made available. It was suggested that more funding be made available for the Angel Ring Program, including for GPS receivers within angel rings, so that if one is removed, emergency services were alerted, and/or vandals would be deterred from souveniring these devices. Fencing off dangerous, black-spot locations was suggested, as was making ‘safer’ locations more accessible. Ensuring communication devices to contact emergency services were available, particularly in locations of poor telephone reception was also mentioned.

Respondents indicated that concentrating on safety issues, in terms of wearing PFDs, in known black-spot locations, could be better received by fishers, than by providing blanket requirements on PFD use across all locations. Respondents also voiced the concern that the ‘cringe factor’ surrounding personal safety equipment, such as PFDs, and their ‘uncool-ness’ needs to be overcome. It was suggested that a culture of using personal safety devices needs to be developed rather than having legislation imposed upon anglers. One other suggestion involved offering discounts to anglers for all protective gear, including footwear and personal EPIRBs, on presentation of a NSW fishing license at participating stores.

3.5.3 Enforcement initiatives

Respondents were asked how effective they believed enforcement initiatives, such as restricting access to rock fishing sites and compulsory wearing of PFDs, would be at improving rock fishing safety. Thirty (66.7%) respondents answered the question regarding how effective they thought the use of restricting access to rock fishing sites would be at improving safety. Twelve (40.0%) respondents believed that restricting access to rock fishing sites would be ‘ineffective’ in improving rock fishing safety, while another 26.7% (n=8) thought that it may be ‘somewhat effective’.

Twenty-nine (64.4%) respondents answered the question regarding how effective they thought the compulsory wearing of PFDs would be at improving rock fishing safety. Sixteen (55.2%) respondents felt that making the wearing of PFDs compulsory while rock fishing would be ‘very effective’ at improving safety, and a further 20.7% (n=6) thought it would be ‘somewhat effective’. Five respondents (17.2%) believed that compulsory wearing of PFDs would be ‘ineffective’ in improving rock fishing safety (Figure 3.25).

Twenty-three (51.1%) respondents provided their opinion on the perceived strengths and limitations of enforcement initiatives aimed at improving rock fishing safety. The surveyed respondents believed that developing enforcement strategies could have a positive impact on rock fishing safety, if they were complied with. It was thought that CALD rock fishers, who were thought to account for a large percentage of injuries and deaths, would be the individuals who would be most likely to abide by any new regulations as they were not perceived to experience the same ‘cultural cringe’ to what might be viewed as impositions by other non-CALD anglers. Interestingly, it was stated by one respondent that no enforcement initiatives in relation to restricted access to rock fishing sites or compulsory PFD use were in operation in New Zealand.
Some limitations of enforcement initiatives were identified by the surveyed respondents. Respondents identified that restricting the freedom of rock fishers to choose where to fish and what to wear would be a highly contested notion that would be likely to be met with some hostility. It was suggested that rock fishers would reject any attempt to curtail their fishing practices and that any enforcement initiatives would be likely to fail, due to the lack of manpower available to actually impose punitive repercussions, such as short-term bans or fines.

There was concern about the costs involved in creating a restrictive fishing environment, with the cost of consistently policing and enforcing any mandatory wearing of safety equipment, such as PFDs likely to be unsustainable. Respondents thought that mandating PFD use in 'black spot' locations would be difficult, as defining the characteristics of a black spot rock fishing location would be likely to result in ambiguities in any legislation drafted. It was suggested that infringing on rock fishers liberties would only serve to push anglers to more remote and more dangerous sites in an effort to avoid detection. Lastly, it was stated that any discussion of enforcement initiatives should involve rock fishers and fishing clubs and that any enforcement initiatives would need to be coupled with education and awareness raising activities.

**Figure 3.25: Perceived effectiveness of enforcement initiatives at improving rock fishing safety**

Note: 30 participants (66.7%) answered the question regarding the effectiveness of enforcement initiatives (Question 41).
Thirty-one (68.9%) respondents answered the question on whether improvements could be made to any enforcement initiatives to make them more effective at improving rock fishing safety. Of these, 16 (51.6%) respondents made suggestions in terms of the types of improvements that could be made to enforcement initiatives. Respondents suggested that one of the main criticisms of compulsory PFD use would be that it would be impossible to effectively regulate. This issue could be overcome if there was an improved regulatory presence, which could also assist in preventing litter problems along the shoreline, along with adherence with bag and size limit quotas. Respondents thought that the closure of certain sites under defined bad weather and sea conditions may be an option. However, due to the difficulty of regulating rock fisher behaviour through pure enforcement, it was suggested that any punitive initiatives should be secondary to education initiatives, and also restricted to known rock fishing black spots, rather than all rock ledges.

### 3.5.4 Other initiatives

Respondents were asked how effective they believed various other initiatives were at improving rock fishing safety. These initiatives included: coastal risk audits, the Beachsafe hazard rating system, a rock platform risk rating system, coastal emergency rescue response systems (such as the Surf Life Saving NSW system), and a rock fishing incident monitoring program. Fifteen (46.9%) respondents thought that coastal risk audits were ‘somewhat effective’ and a further 28.1% (n=9) thought they were ‘neither effective nor ineffective’ at improving rock fishing safety. The Beachsafe hazard rating system was thought to be ‘somewhat effective’ by 50.0% (n=16) of respondents, with 12.5% (n=4) of respondents indicating they thought it was ‘very effective’ and 9.4% (n=3) indicating they thought that it was ‘ineffective’. A rock platform risk rating system was considered by 53.1% (n=17) of respondents to be ‘somewhat effective’ and by 34.4% (n=11) of respondents to be ‘very effective’ at improving rock fishing safety. Sixty percent (n=18) of respondents believed that coastal emergency rescue response systems were ‘somewhat effective’ and 20.0% (n=6) thought that they were ‘very effective’ at improving rock fishing safety. None of the participants thought that coastal emergency rescue response systems were ‘ineffective’ at improving safety. Rock fishing incident monitoring programs were thought to be ‘somewhat effective’ by 43.8% (n=14) of the sampled respondents, ‘very effective’ by 28.1% (n=9), and ‘neither effective or ineffective’ by 25.0% (n=8) of respondents at improving rock fishing safety. None of the participants thought monitoring programs were ‘ineffective’ (Table 3.9).

Nineteen (42.2%) respondents provided their opinion on the perceived strengths and limitations of other initiatives aimed at improving rock fishing safety. Respondents to the survey indicated that they felt the strength of these other initiatives lay in the holistic approach to safety; initiatives were multi-faceted and had the potential to improve rock fisher safety. Information provided from these initiatives was thought to be able to be used to determine the most suitable measures to protect anglers. It was perceived by respondents that a state-wide coastal risk assessment of rock fishing locations would provide the opportunity to develop a long-term strategy to improve rock fishing safety and could also assist in informing locally targeted safety initiatives.

Concern was voiced by respondents that audits and hazard rating systems could only be effective if sites that were ranked as very dangerous were physically closed and/or monitored, and that these initiatives were also very expensive and possibly financially unsustainable. It was noted that some data monitoring of coastal rock fishing safety incidents had been inaccurate and that this was a potential limitation of all monitoring systems. It was perceived by respondents that some
audits and hazard rating systems appeared to be duplicate initiatives, and, in some cases, that rating systems were not well understood. Some participants expressed a strong desire for no catalogue of rock fishing locations to be publicly available, as it was thought that such a listing would increase liability in the event of injuries or deaths, and would also lead to overcrowding at good, ‘secret’ locations popular among seasoned rock fishers.

Table 3.9: Ratings of effectiveness of other initiatives by respondents to improve rock fishing safety

<table>
<thead>
<tr>
<th>Other initiatives</th>
<th>Very effective</th>
<th>Somewhat effective</th>
<th>Neither effective or ineffective</th>
<th>Somewhat ineffective</th>
<th>Ineffective</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal risk audits</td>
<td>5 (15.6)</td>
<td>15 (46.9)</td>
<td>9 (28.1)</td>
<td>2 (6.3)</td>
<td>1 (3.1)</td>
<td>32</td>
</tr>
<tr>
<td>Beachsafe hazard rating system</td>
<td>4 (12.5)</td>
<td>16 (50.0)</td>
<td>8 (25.0)</td>
<td>1 (3.1)</td>
<td>3 (9.4)</td>
<td>32</td>
</tr>
<tr>
<td>Rock platform risk rating system</td>
<td>11 (34.4)</td>
<td>17 (53.1)</td>
<td>2 (6.3)</td>
<td>1 (3.1)</td>
<td>1 (3.1)</td>
<td>32</td>
</tr>
<tr>
<td>Coastal emergency rescue response system</td>
<td>6 (20.0)</td>
<td>18 (60.0)</td>
<td>5 (16.7)</td>
<td>1 (3.3)</td>
<td>0 (-)</td>
<td>30</td>
</tr>
<tr>
<td>Rock fishing incident monitoring program</td>
<td>9 (28.1)</td>
<td>14 (43.8)</td>
<td>8 (25.0)</td>
<td>1 (3.1)</td>
<td>0 (-)</td>
<td>32</td>
</tr>
</tbody>
</table>

Thirty-one (68.9%) respondents answered the question on whether improvements could be made to any of these other initiatives to make them more effective at improving rock fishing safety. Of these, 14 (45.2%) respondents believed that other rock fishing safety initiatives could be improved. Respondents suggested that hazard rating systems should only be applied to rock fishing black spots or areas that are popular for pedestrian traffic. The development of a state-wide strategy for rock fishing safety, informed by a coastal risk assessment of all rock platforms and cliffs, was thought to be necessary. However, it was noted that hazard rating systems would only be effective in the long-term if more preventive resources were provided and specifically tailored to areas rated as a high risk. It was also suggested by respondents that the funding for volunteer programs and for rescue services should be increased, and communication strengthened, so that volunteers on the ground were more informed about immediate risks and were able to convey these risks to rock fishers on site.

3.5.4.1 Other comments on initiatives

When asked to comment on any other rock fishing safety methods that had not previously been mentioned, some respondents stated that they thought the use of flotation grenades had merit, while others suggested that rock fishing safety DVDs should be updated every few years to include fresh faces and new marketing. It was suggested that a multi-agency awareness raising campaign regarding rock fishing safety should be considered once rock fishing safety initiatives were agreed upon and implemented. It was also mentioned that CALD community leaders could be recruited to form effective educational strategies that are appropriate to CALD rock fishers.
Twenty-five (55.6%) respondents answered the question regarding what they thought were the three most successful initiatives to improve rock fishing safety and 20 (44.4%) respondents answered the question on what they though were the three least successful initiatives to improve rock fishing safety.

The three most common successful initiatives identified by respondents at improving rock fishing safety were: education campaigns; targeted technique and safety workshops and other media; and wearing of PFDs and other safety equipment. The two most common least successful initiatives at improving rock fishing safety identified by respondents were written material, lack of, and uncoordinated, education efforts, and closure or restriction of access to rock fishing platforms (Table 3.10).
Table 3.10: Respondent identification of the most successful and least successful initiatives to improve rock fishing safety

<table>
<thead>
<tr>
<th>Most successful initiatives at improving rock fishing safety</th>
<th>n</th>
<th>Least successful initiatives at improving rock fishing safety</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education campaigns using safety ambassadors and targeting vulnerable groups, possibly commencing with school age children</td>
<td>13</td>
<td>Written material, relying on people to read information - pamphlets, booklets</td>
<td>4</td>
</tr>
<tr>
<td>Targeted technique and safety workshops and other media</td>
<td>11</td>
<td>Lack of education, uncoordinated education efforts</td>
<td>4</td>
</tr>
<tr>
<td>Wearing PFDs and other safety equipment</td>
<td>10</td>
<td>Closure or restricted access to rock fishing platforms</td>
<td>3</td>
</tr>
<tr>
<td>Angel rings</td>
<td>9</td>
<td>Silent sentries/ emergency beacons/ angel rings</td>
<td>3</td>
</tr>
<tr>
<td>Coastal risk assessments</td>
<td>4</td>
<td>Signage</td>
<td>3</td>
</tr>
<tr>
<td>Signage</td>
<td>2</td>
<td>Enforcement</td>
<td>3</td>
</tr>
<tr>
<td>Enforcement - wearing of PFDs</td>
<td>2</td>
<td>Anchor points</td>
<td>2</td>
</tr>
<tr>
<td>Emergency response systems</td>
<td>2</td>
<td>Websites</td>
<td>2</td>
</tr>
<tr>
<td>Access improvements for regulation access</td>
<td>1</td>
<td>Insufficient government support, including closure of Cronulla Fisheries</td>
<td>2</td>
</tr>
<tr>
<td>Rock fishing safety alerts</td>
<td>1</td>
<td>DVDs</td>
<td>2</td>
</tr>
<tr>
<td>Fencing</td>
<td>1</td>
<td>No legislative requirement for an individual to take safety measures</td>
<td>2</td>
</tr>
<tr>
<td>Drowning prevention plans</td>
<td>1</td>
<td>Hydrodynamic models</td>
<td>1</td>
</tr>
<tr>
<td>Free life jackets</td>
<td>1</td>
<td>Getting anglers to understand effects of bad weather conditions and approaching waves</td>
<td>1</td>
</tr>
<tr>
<td>Multilingual education officers</td>
<td>1</td>
<td>Limited funding</td>
<td>1</td>
</tr>
<tr>
<td>Not fishing alone</td>
<td>1</td>
<td>Coastal risk assessments</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alerts</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compulsory PFDs</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: 25 participants (55.6%) answered the question regarding the most successful initiatives and 20 (44.4%) participants answered the question regarding the least successful initiatives at improving rock fishing safety (Questions 52 and 53).
4. Discussion and recommendations

Recreational fishing is a popular past time in Australia. Anglers have reported that their primary motivation for engaging in recreational fishing was to ‘relax and unwind’, to engage in ‘fishing for sport’, to ‘spend time with family’ and to ‘be outdoors and enjoy nature’ [1]. Rock fishing, while popular among anglers, can be an extremely dangerous form of recreational fishing due to the unpredictability of the ocean. In NSW, the number and circumstances of rock fishing-related deaths have remained constant across almost a 20 year period. Compared to the earlier time period studied (i.e. 1992-2000 [3]), a higher number of rock fishers appear to be dying in regional NSW during 2000-2010. However, more anglers were recorded as wearing PPE (i.e. including life jackets, cleats, wetsuits or vests with flotation devices) during 2000-2010 as oppose to previous years (i.e. 1992-2000). Otherwise the characteristics of rock fishing deaths between 1992-2000 and 2000-2010 remained virtually the same. Rock fishing-related deaths were predominantly of males in their mid-forties, born in the Asian-Pacific region, who were swept off rocks by a wave while they were not wearing any PPE. One-quarter of rock fishers were fishing alone at the time of the incident.

Hospital admission records of rock fishers, show a similar pattern of demographic characteristics to rock fisher deaths, but reveal a different picture in terms of the mechanism of injury experienced. During 2003-04 to 2010-11, 304 rock fishers were hospitalised. Almost all were male with a mean age of 40 years. Approximately three-quarters of the rock fishers hospitalised were Australian by birth. The most common mechanism resulting in the need for hospitalisation of the rock fisher was a fall, commonly resulted in knee and lower leg and head injuries. Only 5.6% of these hospitalisations were related to submersion of the rock fisher.

While information is readily available on the number of rock fishers who are fatally and non-fatally injured and hospitalised in NSW, information is seldom available on the proportion of individuals in NSW that rock fish. Information obtained from the NSW Population Health survey program provided the first population-based data in NSW pertaining to rock fishing that included information on the identification of the proportion of individuals who stated that they rock fished in the last four weeks and provided an indication of the time they spent rock fishing. The survey responses indicated that, of the 2,378 adults that reported they had been swimming, fishing or rock fishing in the last four weeks, 80 adults had been rock fishing. Males were more likely to report having been rock fishing in the last four weeks, compared to females, particularly those aged 16-24 or 45-64 years. Almost half those surveyed indicated that they rock fished for between one to three hours.

Having information on the estimated proportion of rock fishers in NSW by age group and gender and the time that they spent fishing can assist to identify the target audience for preventive strategies. However, recreational fishing is an infrequently conducted sport, comparatively, so obtaining information from a more targeted sample of recreational fishers on whether they rock fish and the time they spend rock fishing might provide a more accurate estimate of the proportion of anglers that rock fish. Not having this sort of information routinely available on the number of rock fishers and the number of hours they fish limits any estimation of the number of individuals exposed to the risk for what length of time. Therefore, estimations of the incidence rate of rock fishing-related deaths and injuries are difficult to calculate with any certainty.

Given the ongoing number of rock fishing-related deaths and hospitalised injuries across NSW, the need to extend initiatives aimed at improving safety are evident. A number of safety initiatives...
have already been engaged across NSW and greater Australia, however there has been a distinct lack of evaluation, including of their cost-effectiveness, of the effect of safety initiatives on rock fishing-related mortality and morbidity rates. To this end, improving incident detection and record keeping will provide information as to why rock fishing incidents occur and this data can also be used to provide information for the evaluation of the impact of preventive initiatives.

**Recommendation 1:** Conduct regular monitoring of rock fishing fatal and non-fatal injuries to inform prevention activities and also to provide information for evaluation purposes.

**Recommendation 2:** Consider the development of mechanisms to collect ‘snap shot’ exposure data from rock fishers, potentially through fishing clubs, regarding the time spent rock fishing to enable a more accurate estimate of risk of fatal and non-fatal injury during rock fishing to be calculated.

This research review has triangulated information obtained from mortality and hospitalisation statistics, the published literature, and also from key stakeholder survey responses to review the preventive initiatives currently available and to obtain stakeholder opinion regarding the strengths, limitations and any suggested mechanisms to improve these initiatives. Initiatives aimed at improving rock fishing safety naturally fell into four key areas: education initiatives, engineering initiatives, guideline and enforcement strategies, and risk assessment and monitoring initiatives. It is likely that a combination of these initiatives will be useful in improving rock fishing safety in NSW.

From reviewing the literature and conducting the stakeholder surveys, it appears that there are numerous agencies that are involved in attempts to improve rock fishing safety in NSW. As stated by the NSW Coroner in 2011 [74] there is a need to establish a coordinated, state wide strategy with involvement from all stakeholders aimed at improving rock fishing safety in NSW. Previous safety improvement efforts appear to have been focused on mainly education and engineering strategies, neglecting the role that guidelines and enforcement strategies can play in contributing to efforts to improve safety. To ensure that a state wide plan aimed at improving rock fishing safety addresses all stages of prevention, it would be beneficial to consider improvement strategies (i.e. education, engineering, guideline and enforcement, risk assessment and monitoring initiatives) in terms of primary, secondary and tertiary prevention efforts. Primary, or pre-event, prevention efforts aim to prevent an incident from occurring in the first place. For example, legislation introduced to install four-sided fencing for backyard swimming pools. Secondary prevention strategies aim to prevent or limit the severity of an injury during an adverse incident, such as displaying guidelines for CPR near the swimming pool. Tertiary prevention efforts aim to limit the consequences of an injury that has already occurred, such as through the availability of emergency medical retrieval, treatment, or rehabilitation services.

**Recommendation 3:** Develop a state wide plan for improving rock fishing safety in NSW. The plan should consider education, engineering, guideline and enforcement, risk assessment and monitoring strategies in terms of primary, secondary and tertiary prevention efforts. The state wide plan to identify lead agencies to coordinate and agencies to participate in the implementation of preventive strategies.
4.1. Education initiatives

According to Piliskic et al. [10] rock fishers consider the familiarity of the location, fish size and ease of access in choosing a location to fish, rather than any dangerous aspects of the site. Signage is one mechanism that could assist in providing rock fishers with information regarding the hazards associated with a particular site. Standard pictorial signage was rated by almost three-quarters of key stakeholder respondents as ‘very or somewhat effective’ at improving rock fishing safety, while multilingual signage was rated by 82.2% of respondents as ‘very or somewhat effective’ at improving rock fishing safety, with interactive signage being rated by 38.6% of respondents as ‘very or somewhat effective’ at improving rock fishing safety.

Any signage adopted to raise awareness of hazardous conditions at a rock fishing site needs to adhere to best practice in relation to using standardised, recognised symbols and contain short, clear text. Australian standards for risk signage (see Figure 3.8) provide a good example of this. Signage also needs to be recognised and meaningful for CALD groups and this may involve using the media and/or workshops to increase the awareness of symbols and their meaning in the CALD community.

At this stage, the use of interactive signage in outdoor environments to improve rock fishing safety is not considered to be ideal. While interactive, touch screen information kiosks have shown demonstrated usefulness in health care by allowing individuals to easily access health-related information [85-86], these kiosks are located in health centres, libraries, supermarkets and other indoor locations. It is possible that locating interactive signage regarding rock fishing safety might be of benefit in tourist information centres near coastal areas. However, this would rely on rock fishers visiting these centres. It is acknowledged that interactive signs would be a good mechanism for providing up-to-date information regarding the conditions at a rock fishing site and/or suggesting alternative locations, if the site was experiencing hazardous weather conditions. However, there are alternative sources available for this sort of information (see Section 4.3) that can be accessed prior to a rock fisher arriving on-site. It appears unlikely that an interactive sign and/or kiosk for rock fishing safety would have the same usage figures as they have had for general health, with interactive health kiosks in the United Kingdom having 8,500 to 10,000 health pages viewed per day [85]. At this stage, the development, manufacture and maintenance of interactive signage targeting rock fishing safety is unlikely to be a cost-effective initiative.

**Recommendation 4:** Any signage to raise awareness of hazardous conditions at rock fishing sites should adhere to best practice in relation to using standardised, recognised symbols and contain short, clear text.

**Recommendation 5:** Any signage needs to be recognised and meaningful for CALD groups and this may involve using the media and/or workshops to increase the awareness of symbols and their meaning.

A number of campaigns and awareness raising activities have been conducted in an attempt to improve rock fishing safety in NSW. These campaigns have used a variety of mechanisms to convey safety messages, including newspaper advertisements, workshops, pamphlets, information sheets, newsletters, DVDs and websites. However, there have been only a few evaluations conducted of the reach and the effectiveness of these campaigns and activities. One of the few
evaluations that have been conducted was of rock fishing technique and safety workshops. These evaluations showed an approximate 40% increase pre- and post- workshop regarding the intent to carry safety equipment, seek advice from locals, and plan an escape route [36-39]. In the current review, targeted technique and safety workshops were rated by survey respondents as one of the most successful initiatives at improving rock fishing safety, behind education campaigns. However, survey respondents identified that these workshops should be part of a structured roll-out workshop plan and should be held in a variety of venues. Respondents identified that workshops could be more heavily publicised, particularly at the beginning of the rock fishing season, and that workshops could be tailored for fishers with different levels of experience from novice, to intermediate and advanced. In New Zealand, rock fishers were found to have limited knowledge regarding rescue techniques, including limited knowledge of CPR [18] and it is possible that workshops could also emphasize the importance of first aid knowledge and the need for familiarity with rescue equipment.

Media advertising was rated by respondents as by far the most effective medium to improve rock fishing safety. The key stakeholder interviews identified that respondents thought that a popularised campaign, like Laurie Lawrence’s ‘Kids Alive: Do the Five’ campaign, might be more memorable and be an improvement on existing awareness raising campaigns. The use of prominent individuals, or celebrities, who had experience of rock fishing was thought by respondents to be of benefit, along with promoting safe rock fishing behaviours through television programs aimed at anglers. Having information on the weather and tidal conditions for rock fishing incorporated into nightly weather bulletins would also assist in raising awareness of the impact of weather conditions on rock fishing safety, particularly if a weather risk rating system was adopted for rock fishing similar to that used for bushfire ratings (i.e. extreme, severe, very high, high, low-moderate risk). This would aid rock fishers to immediate recognise the threat of adverse weather conditions.

Any rock fishing safety media campaigns should start at the beginning of the rock fishing season, contain consistent safety messages, and should be available in a range of languages. Information from mortality and hospitalised morbidity data of rock fishers, and from the Department of Tourism and Immigration, suggest that information should be provided in the following languages: English, Chinese, Korean, Japanese, Hindi, Malay and Arabic languages.

Using mainstream media to promote rock fishing safety, along with media avenues targeting CALD communities, is likely to also engage family and friends of rock fishers who may be in a position to influence whether a rock fisher decides to fish in rough weather conditions and/or the type of safety equipment worn while rock fishing. It is also possible that local safety champions could be identified (possibly through fishing clubs and associations) and used to promote rock fishing safety messages at common rock fishing locations with novice fishers. The identification of key media spokespeople from the fishing fraternity would also assist in promulgating key safety messages regarding rock fishing.

**Recommendation 6**: A rollout plan for the conduct of rock fishing technique and safety seminars be developed. Workshops to be targeted to both novice and to intermediate and advanced fishers. Workshops to be conducted in a range of languages.
Recommendation 7: Review of media campaigns and media strategy aimed at improving rock fishing safety, particularly in vulnerable groups, and identification and engagement of a number of safety ambassadors to feature in campaign materials.

Recommendation 8: Develop and promote a weather risk rating system applicable to rock fishing (i.e. extreme, severe, very high, high, low-moderate risk). Encourage broadcast of rock fishing conditions in prime radio and television weather bulletins.

4.2. Engineering initiatives

In occupational health and safety a common framework used to prioritise the implementation of safety initiatives is the hierarchy of controls. This framework is used to identify the most appropriate control measure(s) for a hazardous situation. The hierarchy begins with the most preferred method of control and descends to the least preferred method (Table 4.1).

<table>
<thead>
<tr>
<th>Hierarchy</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimination</td>
<td>Cease the activity.</td>
</tr>
<tr>
<td>Substitution</td>
<td>Replacement with a less hazardous activity.</td>
</tr>
<tr>
<td>Isolation</td>
<td>Limit individual exposure to the hazard.</td>
</tr>
<tr>
<td>Engineering controls</td>
<td>Restricted access.</td>
</tr>
<tr>
<td>Administrative controls</td>
<td>Safe operating procedures; training.</td>
</tr>
<tr>
<td>Personal protective equipment</td>
<td>Life jackets, personal flotation devices.</td>
</tr>
</tbody>
</table>

The use of PPE is the least attractive method of controlling a hazardous situation according to the hierarchy of controls. However, in some instances, PPE is the only available option. Personal protective equipment, in relation to rock fishing, includes the use of life jackets, other PFDs and appropriate clothing, such as cleated footwear. While there is some debate regarding whether or not PPE use, particularly PFD use, should be mandatory for rock fishers, there is merit in the use of PFDs to aid survivability once an individual has been swept into the ocean. In boating, wearing a life jacket was demonstrated to double the chance of survival in the water [54].

Currently, NSW Maritime recommends that rock fishers wear at least a minimum of a Type 3 life jacket at all times while fishing on a coastal rock platform [51]. Indeed, 96.9% of survey respondents from the current research review indicated that they thought PFDs were either ‘very effective’ or ‘somewhat effective’ at improving rock fishing safety and survey respondents rated the wearing of PFDs and other safety equipment as one of the three most successful initiatives aimed at improving rock fishing safety, behind education campaigns and conducting technique and safety workshops. The design of PFDs has improved greatly since the initial development of
bulky life jackets. For example, the recent development of lightweight PFDs, including the 9th life jacket and the EFD (contained in a small canister and worn on a belt), will provide non-bulky, unobtrusive options for anglers and also other individuals engaged in water-based activities in the future.

In New Zealand an awareness raising program was specifically tailored to increase a rock fishers' appreciation of the dangers of rock fishing and the need to increase safe fishing practices, including life jacket use. As part of this initiative, redemption and reward programs regarding life jacket use were instigated, with anglers receiving coupons to redeem a life jacket and, if seen wearing their life jacket on a rock platform, the rock fisher received a gift voucher. This initiative demonstrated a 38% increase in the number of fishers who reported sometimes or always wearing a life jacket or buoyancy aid compared to prior to the commencement of the initiative [23] and was thought to have had a direct effect on reducing the number of lives lost while rock fishing [35].

Approximately 80% of respondents surveyed in this research review indicated that they thought that providing discounts or subsidies for the purchase of life jackets by fishers would be ‘very effective’ or ‘somewhat effective’ at improving rock fishing safety, as this would make life jackets more accessible and affordable. It was also thought by survey respondents that subsidising the cost of a life jacket would encourage fishers to purchase a less bulky variety of jacket and thus contribute to increased rates of life jacket use.

It is likely that an initiative aimed at encouraging life jacket use by replicating the redemption and reward programs used in New Zealand would have a similar impact on life jacket use in NSW. Piloting of the New Zealand redemption and reward life jacket initiative in NSW at a number of locations would provide information regarding the likely success of the roll out of such a program state wide in NSW. It is also possible that combining redemption offers with a free-pass to attend a technique and safety rock fishing workshop with a safety ambassador would have merit.

**Recommendation 9:** Pilot the New Zealand redemption and reward life jacket initiative at a number of locations in NSW.

According to Jones [3] not only novices, but experienced rock fishers have been caught out by large waves while fishing on coastal rock platforms and have been swept into the ocean. In his review of 74 rock fishing-related fatalities during 1992 to 2000, Jones [3] identified that in 80% of cases the angler was able to tread water for a period of time before disappearing in the waves, with none of these fishers wearing any PFDs. It is in cases like this that the existence of rescue equipment, such as angel rings, and the use of emergency positioning devices to identify the location of rock fishers can aid rescue and retrieval efforts and/or provision of medical services.

The angel ring program has been expanding around Australia and the inclusion of GPS devices within the ring, allows ANSA to identify if the ring leaves a particular geographic field. Unfortunately, vandalism and theft are constant problems for this type of rescue equipment, but the GPS device can provide ANSA with the ability to know if a rescue is underway or whether the ring has been stolen and where it is currently located.

To date, angel rings have been accredited with saving 47 lives [6] and 93.8% of survey respondents in the current research review indicated that they thought angel rings were either ‘very or
somewhat effective’ at improving rock fishing safety. Angel rings were nominated by survey respondents as the fourth most successful initiative aimed at improving rock fishing safety.

While the existence of rescue equipment, such as angel rings, can improve chances of survival if a fisher is swept into the ocean, there is no substitute for selecting a smart location from which to fish in the first place. The development of risk ratings for different rock fishing sites in NSW (See Section 4.3), as has been performed for NSW beaches [65], is likely to assist, along with monitoring mortality and morbidity data of rock fishers, in identifying specific locations where rescue equipment, such as angel rings, should be located.

**Recommendation 10**: Ensure that the development of a state wide plan for improving rock fishing in NSW considers the development of a risk rating system for rock fishing sites to aid in the placement of rescue equipment, including angel rings.

### 4.3. Guideline and enforcement initiatives

Responses to the stakeholder survey conducted as part of this research review suggested a strong suspicion among the rock fishing community towards enforcement initiatives. Proposals to mandate the wearing of PFDs or to restrict access to dangerous rock fishing sites have been hotly debated, despite the admission that these measures have the potential to improve rock fisher safety. In other risk management schemes however, restrictions on personal liberties have not only been legislated and enforced, but have passed into cultural acceptance. In Australia, for example, seat belt wearing was mandated in all states in 1973 [87] and drivers and passengers now face fines for non-compliance. Similarly, on hot and dry days, a ‘Total Fire Ban’ can be declared by the Rural Fire Service and lighting any fire in outdoor areas can attract fines up to $5,500 and 12 months gaol [88]. Beaches across the country can also be officially closed by a Surf Life Saving club in adverse weather conditions or other exceptional cases to ensure human safety [89].

None of the above safety initiatives have experienced particular cultural backlash in recent times, yet rock fishing enforcement programs were so unpopular with the surveyed anglers that both restricting access to dangerous sites, and making the wearing of PFDs compulsory were included on a list of the perceived least successful initiatives at improving rock fishing safety (see Table 3.10). It was expressed that blindly applying restrictions would serve only to push rock fishers to more remote and dangerous locations to avert detection, and also be overly conservative at safer, more protected sites. In line with this sentiment and the lack of manpower available to impose safety laws, enforcement initiatives may benefit from becoming more specific, such has been conducted in Victoria where it is only required that occupants of small powered recreational vessels (up to and including 4.8 metres in length) wear a PFD. Just as injury and mortality data is used to identify black spots on NSW roads [90], this existing mortality and morbidity data, along with coastal geomorphologic information, could be used to develop a risk rating of different rock fishing sites, and in partnership with weather risk rating systems, high-danger black spots could be identified which could be subject to more stringent safety rules.
Recommendation 11: Develop a risk rating system for rock fishing sites and identify black spot locations taking into high injury and mortality incident rates, coastal geomorphology, isolation and site access.

Closing black spot rock fishing sites during periods of heightened danger, such as occurs for surf beaches, would complement the hierarchy of controls for risk management as shown in Table 4.1 and potentially improve rock fisher safety. This initiative would be most successful if: (i) rock fishers knew of the closure ahead of time, and (ii) an appropriate alternative location was suggested. Communicating with anglers about closures could be possible not only through public media bulletins, but by publishing information on the SafeFishing website and using their database of angler contact details to issue email or text message warnings which could also suggest alternative locations to fish. There is also potential to develop a specific rock fishing information application for smart phones which could include details about weather forecasts, danger ratings, sites closures and other safety precautions and recommendations for specific locations.

Recommendation 12: Close known rock fishing black spot locations during severe weather conditions identified by a weather risk rating system applicable to rock fishing and explore the development of a notification scheme for anglers regarding adverse weather warnings and official site closures.

Enforcing the wearing of life jackets and other PFDs at black spot locations is an idea that warrants further exploration. The success of life jackets at reducing drowning deaths has been well demonstrated during other marine activities, such as boating [54, 66], and there is reasonable community support for the idea, with 75.9% of surveyed stakeholders in the current research review indicating that making life jacket wearing compulsory would be either ‘very effective’ or ‘somewhat effective’ at improving rock fisher safety. However, not all rock fishing locations (e.g. coastal inlets) experience the same risk of a rock fisher being swept into the sea. Similarly, not all beaches in NSW are closed, if there is rough swell experienced along one coastal stretch.

Currently, reservations regarding the wearing of life jackets circulate around the notion of PFDs being bulky and restricting mobility, but recent developments have addressed these concerns and new products, such as the 9th Life design and EFDs, offer life saving protection in the water with minimal on-shore impediment. Increasing the availability of these items, and limiting the enforcement of their wearing to known black spot areas may lessen the resistance of rock fishers towards any new legislation regarding PFD use.

As with any safety initiative, implementing new rules would be most successful when employing a combination of education, encouragement, enforcement and penalty. For example, prior to the introduction of seatbelt legislation in NSW in 1973, voluntary seatbelt wearing stood around 15% [91]. Yet through a sustained educational and enforcement effort, this statistic has improved drastically to between 95-99% in 2009 [92]. Road safety rules, including seat belt wearing, are regularly monitored and frequent road safety blitzes with punishments, such as double demerit points and high monetary fines, are used to encourage social compliance. In terms of life jackets, the success of legislation has already been demonstrated in other water activities; wearing a PFD is compulsory across all states of Australia while being towed from a boat, such as when water skiing or wakeboarding, and Bentley [68] found a 98% compliance rate with this rule. Given the
increasing number of rock fishers noted to be using PFDs compared to twenty years ago, and the success of educational workshops that emphasise the importance of life jackets, it is possible that over time the use of PFDs at rock fishing black spots will become a culturally accepted practice.

**Recommendation 13:** Develop and enforce legislation, accompanied by awareness raising activities, which would make PFD use at black spot rock fishing sites and at high risk rated locations mandatory.

Both the NSW Interdepartmental Committee on Water Safety [72] and Jones [3] have stated that the development of a voluntary code of practice for rock fishing may be instrumental in changing attitudes and safety behaviours by establishing expectations of rock fishers from within the rock fishing community, rather than any initiatives being handed down from an external body. This initiative could potentially increase responsible safety behaviours, and ultimately be incorporated into the existing *National Guidelines for Managing Risks in Water* [69]. Development of such a code may therefore be an important step and act as a gateway to firm legislation on rock fishing safety behaviours.

**Recommendation 14:** Develop a voluntary code of practice for rock fishing with the aim to later incorporate it into the *National Guidelines for Managing Risks in Water*.

**4.4. Limitations**

Limitations related to each initiative aimed at improving rock fishing safety has been described in earlier sections of this report (see Sections 3.4 and 3.5). With respect to the mortality and hospitalised morbidity information, there are known limitations with using each of these data sources to identify rock fishing-related fatal and non-fatal injuries, which have been discussed in Section 3.4.4.4 and are outlined below.

The NCIS only contains complete information regarding a death once the case has been ‘closed’ by a coroner, which can be up to one year post the incident, resulting in a time delay in obtaining information regarding the causal factors to a rock fishing-related death, including information regarding PPE use. The lack of information available on ‘open’ coronial cases could result in an underestimation of the number of deaths related to rock fishing at a particular point in time. In the NSW APDC, the information recorded on the activity performed at the time of the incident, that is used to identify rock fishing-related admissions, often includes unspecified or unknown classifications. The proportion of unspecified activities in the NSW APDC may have resulted in an underestimation of the number of rock fishing-related hospital admissions in NSW and could have changed the nature of these results.

For the key stakeholder surveys, there was a 57% response rate, which was considered to be good and within the expected range for a web-based survey [93]. Representativeness of key stakeholders was mixed, with only two manufacturers completing the survey, so the views of manufacturers are likely to be underrepresented. Government, rescue, and angler organisations had the highest identified number of representatives completing the survey and this should be taken into account when interpreting the key stakeholder survey results. In addition, not all
respondents answered each question, so the response rates and sample size varied by question from 16 to 45 respondents. Therefore some stakeholders responses are based on small sample sizes and should be interpreted with this in mind.

Lastly, there were a couple of initiatives identified by the study investigators that were not able to be included in this research review as they had not yet been completed. It was identified that researchers at the Department of Resource Management and Geography, School of Land and Environment at the University of Melbourne were conducting a survey of rock fishers entitled ‘Linking Human Interactions to Rocky Coastal Environments’ that aims to understand how rock fishers interact with the rocky coastal environments that they fish in. At the time of writing, data for this survey was still being gathered. In addition, the BoM is currently developing a new rock fisher webpage entitled ‘Rock fishing can be dangerous...check the weather before you go!’. This website is likely to include information regarding weather and tidal conditions, however, it was still under development at the time of writing.

4.5. Conclusions

Rock fishing is a popular, but can also potentially be a dangerous past time, for recreational fishers. Information on the mortality and hospitalised morbidity of rock fishers in NSW has shown that patterns of rock fishing-related fatal and non-fatal injuries have not changed over almost 20 and 8 years, respectively. Various strategies have been developed in an attempt to improve rock fishing safety in NSW, with these efforts focusing largely on awareness raising and engineering initiatives and neglecting the development of risk rating systems and guidelines, and the use of enforcement strategies. For all initiatives aimed at improving rock fishing safety, there have been limited evaluations conducted of their success, and no cost-effectiveness studies of any initiatives have been performed.

This research review has identified that attempts at improving rock fishing safety efforts to a large extent have not been systematically coordinated, nor have they involved, all stakeholder agencies. It is hoped that information from this review will be used to inform preventive strategies aimed at improving rock fishing safety and will act as a guide for the elements that should be addressed in a state wide strategic plan that should hopefully generate a coordinated approach for rock safety prevention initiatives in NSW.
6. References


Research review of rock fishing in NSW


7. Appendices

Appendix 1

INVITATION EMAIL FOR ON-LINE SURVEY

ROCK FISHING SAFETY IN NSW

The University of New South Wales (UNSW) and Surf Life Saving Australia (SLSA) are assisting the NSW Department of Primary Industries to conduct a review of the effectiveness of different types of interventions and/or devices aimed at improving rock fishing safety. It is hoped that the information gained from this review will inform future efforts to improve rock fishing safety in NSW.

Your organisation was selected to participate in the review. Participation will involve you completing an on-line survey, which should take around 30-40 minutes to complete. You will be asked questions about the effectiveness of different types of interventions and/or devices aimed at improving rock fishing safety. The type of interventions and/or devices being reviewed include: educational, engineering, enforcement, and other initiatives. You will also be asked for your opinions regarding the strengths and limitations of each of the different types of interventions and/or devices.

Participation in this research is voluntary and all information provided will be confidential. Your decision whether or not to participate will not prejudice your future relations with UNSW, SLSA, or your employer. UNSW HREA reference number: 9_11_024.

The survey can be accessed at: https://www.surveymonkey.com/s/rock_fishing

Any complaints may be directed to the Ethics Secretariat, The University of New South Wales, Sydney NSW 2052 (Phone: 9385 4234 or email: ethics.sec@unsw.edu.au). Any complaint that you make will be treated in confidence and investigated, and you will be informed of the outcome.
Appendix 2

Rock fishing safety in NSW

The University of New South Wales (UNSW) and Surf Life Saving Australia (SLSA) are assisting the NSW Department of Primary Industries to conduct a review of the effectiveness of different types of interventions and/or devices aimed at improving rock fishing safety.

Participation in this survey is voluntary and by taking the time to fill in the survey you will be assisting to inform future efforts to improve rock fishing safety in NSW.

This survey will ask for your opinion about the effectiveness of different types of interventions and/or devices aimed at improving rock fishing safety. You will also be asked for your opinions regarding the strengths and limitations of each of the different types of interventions and/or devices.

If you choose to participate, please complete this on-line survey. It should take you about 30-40 minutes to complete. All information obtained as part of this research will be confidential.

Your completion of this survey serves as your consent for this information ONLY to be used to examine rock fishing safety in NSW.

Complaints may be directed to the Ethics Secretariat, The University of New South Wales, SYDNEY 2052 AUSTRALIA (phone +61 2 9385 4234, fax +61 2 9385 6648, email ethics.sec@unsw.edu.au). Any complaint you make will be investigated promptly and you will be informed out the outcome. Your decision whether or not to participate will not prejudice your future relations with the University of New South Wales. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice.

If you have any questions regarding the survey, please contact Dr Rebecca Mitchell (02 9385 7555; r.mitchell@unsw.edu.au).

Thank you for your participation.
Research review of rock fishing in NSW

Rock fishing safety in NSW

The following questions will ask your opinion regarding the effectiveness of different types of interventions and/or devices aimed at improving rock fishing safety. You will be asked questions regarding your opinion of initiatives aimed at improving rock fishing safety in four areas: educational, engineering, enforcement, and other initiatives.

A. Educational initiatives

(1) In your opinion, how effective is standard pictorial signage (e.g. at improving rock fishing safety? (please indicate)

- Very effective
- Somewhat effective
- Neither effective or ineffective
- Somewhat ineffective
- Ineffective

(2) In your opinion, how effective is interactive signage (i.e. touch screen digital signage) at improving rock fishing safety? (please indicate)

- Very effective
- Somewhat effective
- Neither effective or ineffective
- Somewhat ineffective
- Ineffective

(3) In your opinion, how effective is multilingual signage at improving rock fishing safety? (please indicate)

- Very effective
- Somewhat effective
- Neither effective or ineffective
- Somewhat ineffective
- Ineffective
(4) In your opinion, are there any improvements that could be made to any of the types of signage to make them more effective at improving rock fishing safety? *(please indicate)*

☐ Yes (go to question 5)
☐ No (go to question 6)
☐ Don’t know

(5) What improvements could be made to make signage more effective at improving rock fishing safety? *(please describe)*

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(6) In your opinion, what are the strengths of the use of signage to improve rock fishing safety? *(please describe)*

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(7) In your opinion, what are the limitations of the use of signage to improve rock fishing safety? *(please describe)*

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(8) In your opinion, how effective are rock fishing workshops for anglers at improving rock fishing safety? *(please indicate)*

- [ ] Very effective
- [ ] Somewhat effective
- [ ] Neither effective or ineffective
- [ ] Somewhat ineffective
- [ ] Ineffective

(9) In your opinion, are there any improvements that could be made to rock fishing workshops for anglers to make them more effective at improving rock fishing safety? *(please indicate)*

- [ ] Yes (go to question 10)
- [ ] No (go to question 11)
- [ ] Don’t know

(10) What improvements could be made to rock fishing workshops for anglers to make them more effective at improving rock fishing safety? *(please describe)*

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(11) In your opinion, what are the strengths of conducting rock fishing workshops with anglers to improve rock fishing safety? *(please describe)*

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(12) In your opinion, what are the limitations of conducting rock fishing workshops with anglers to improve rock fishing safety? *(please describe)*

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(13) In your opinion, how effective are awareness raising campaigns on rock fishing safety at improving rock fishing safety? *(please indicate)*

☐ Very effective
☐ Somewhat effective
☐ Neither effective or ineffective
☐ Somewhat ineffective
☐ Ineffective

(14) In your opinion, how effective are the following initiatives, used as part of an awareness raising campaign on rock fishing safety, at improving rock fishing safety? *(please indicate)*

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Very effective</th>
<th>Somewhat effective</th>
<th>Neither effective or ineffective</th>
<th>Somewhat ineffective</th>
<th>Ineffective</th>
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<tbody>
<tr>
<td>Websites containing information on rock fishing safety</td>
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<tr>
<td>Instructional DVDs on rock fishing safety</td>
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<tr>
<td>Newsletter or other information sheets with tips on rock fishing safety</td>
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<tr>
<td>Media advertising campaign on rock fishing safety (e.g. television ad, billboards)</td>
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</tbody>
</table>
(15) In your opinion, are there any improvements that could be made to rock fishing safety awareness raising campaigns to make them more effective at improving rock fishing safety? (please indicate)

☐ Yes (go to question 16)
☐ No (go to question 17)
☐ Don’t know

(16) What improvements could be made to rock fishing safety awareness raising campaigns to make them more effective at improving rock fishing safety? (please describe)

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(17) In your opinion, what are the strengths of conducting rock fishing safety awareness raising campaigns to improve rock fishing safety? (please describe)

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(18) In your opinion, what are the limitations of conducting rock fishing safety awareness raising campaigns to improve rock fishing safety? *(please describe)*

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(19) In your opinion, how effective are dangerous rock fishing alert systems (e.g. RFA, NSW Maritime coastal waters forecasts) at improving rock fishing safety? *(please indicate)*

☐ Very effective
☐ Somewhat effective
☐ Neither effective or ineffective
☐ Somewhat ineffective
☐ Ineffective

(20) In your opinion, are there any improvements that could be made to dangerous rock fishing alert systems to make them more effective at improving rock fishing safety? *(please indicate)*

☐ Yes (go to question 21)
☐ No (go to question 22)
☐ Don’t know
(21) What improvements could be made to dangerous rock fishing alert systems to make them more effective at improving rock fishing safety? *(please describe)*

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(22) In your opinion, what are the strengths of the use of dangerous rock fishing alert systems to improve rock fishing safety? *(please describe)*

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(23) In your opinion, what are the limitations of the use of dangerous rock fishing alert systems to improve rock fishing safety? *(please describe)*
(24) In your opinion, how effective are extension services (e.g. multilingual education officers, Fishcare and other volunteer programs) at improving rock fishing safety? (please indicate)

- [ ] Very effective
- [ ] Somewhat effective
- [ ] Neither effective or ineffective
- [ ] Somewhat ineffective
- [ ] Ineffective

(25) In your opinion, are there any improvements that could be made to extension services (e.g. multilingual education officers, Fishcare and other volunteer programs) to make them more effective at improving rock fishing safety? (please indicate)

- [ ] Yes (go to question 26)
- [ ] No (go to question 27)
- [ ] Don’t know

(26) What improvements could be made to extension services (e.g. multilingual education officers, Fishcare and other volunteer programs) to make them more effective at improving rock fishing safety? (please describe)

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(27) In your opinion, what are the strengths of the use of extension services (e.g. multilingual education officers, Fishcare and other volunteer programs) to improve rock fishing safety? (please describe)

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(28) In your opinion, what are the limitations of the use of extension services (e.g. education officers, Fishcare and other volunteer programs) to improve rock fishing safety? (please describe)

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(29) In your opinion, how effective would the use of discounts or subsidies for the cost of life jackets be at improving rock fishing safety? (please indicate)

☐ Very effective
☐ Somewhat effective
☐ Neither effective or ineffective
☐ Somewhat ineffective
☐ Ineffective
(30) In your opinion, what are the strengths of the use of discounts or subsidies for the cost of life jackets to improve rock fishing safety? *(please describe)*

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(31) In your opinion, what are the limitations of the use of discounts or subsidies for the cost of life jackets to improve rock fishing safety? *(please describe)*

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(32) In your opinion, how effective would the use of Ambassadors to promote rock fishing safety in NSW be at improving rock fishing safety? *(please indicate)*

- [ ] Very effective
- [ ] Somewhat effective
- [ ] Neither effective or ineffective
- [ ] Somewhat ineffective
- [ ] Ineffective
(33) In your opinion, what would be the strengths of using Ambassadors to promote rock fishing safety in NSW? *(please describe)*

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(34) In your opinion, what would be the limitations of using Ambassadors to promote rock fishing safety in NSW? *(please describe)*

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B. Engineering initiatives

(35) In your opinion, how effective are the following engineering initiatives at improving rock fishing safety? (please indicate)

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<thead>
<tr>
<th>Initiative</th>
<th>Very effective</th>
<th>Somewhat effective</th>
<th>Neither effective or ineffective</th>
<th>Somewhat ineffective</th>
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<tbody>
<tr>
<td>Angel rings</td>
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<td>Silent sentries</td>
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<td>Anchor points</td>
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<td>Personal floatation devices (e.g. life jackets, emergency floatation devices, stormy rescue grenades)</td>
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<tr>
<td>Emergency communication beacons</td>
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<td>Emergency location markers</td>
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<td>Personal EPIRBs</td>
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<tr>
<td>Appropriate footwear</td>
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</table>

(36) In your opinion, are there any improvements that could be made to any of the engineering initiatives to make them more effective at improving rock fishing safety? (please indicate)

☐ Yes (go to question 37)
☐ No (go to question 38)
☐ Don’t know

(37) What improvements could be made to the engineering initiative(s) to make them more effective at improving rock fishing safety? (please describe)

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(38) In your opinion, what are the strengths of any of the engineering initiative(s) in improving rock fishing safety? *(please describe)*

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(39) In your opinion, what are the limitations of any of the engineering initiative(s) in improving rock fishing safety? *(please describe)*

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(40) Are there any other engineering initiative(s) that may improve rock fishing safety? *(please describe)*

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C. Enforcement initiatives

(41) In your opinion, how effective are the following enforcement initiatives at improving rock fishing safety? (please indicate)

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Very effective</th>
<th>Somewhat effective</th>
<th>Neither effective or ineffective</th>
<th>Somewhat ineffective</th>
<th>Ineffective</th>
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<tr>
<td>Restricting access to rock fishing sites</td>
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<tr>
<td>Compulsory wearing of personal floatation devices and/or other personal flotation equipment</td>
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(42) In your opinion, are there any improvements that could be made to any of the enforcement initiatives to make them more effective at improving rock fishing safety? (please indicate)

☐ Yes (go to question 43)
☐ No (go to question 44)
☐ Don’t know

(43) What improvements could be made to the enforcement initiative(s) to make them more effective at improving rock fishing safety? (please describe)

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(44) In your opinion, what are the strengths of any of the enforcement initiative(s) in improving rock fishing safety? *(please describe)*

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(45) In your opinion, what are the limitations of any of the enforcement initiative(s) in improving rock fishing safety? *(please describe)*

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D. Other initiatives

(46) In your opinion, how effective are the following other initiatives at improving rock fishing safety? *(please indicate)*

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Very effective</th>
<th>Somewhat effective</th>
<th>Neither effective or ineffective</th>
<th>Somewhat ineffective</th>
<th>Ineffective</th>
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<tbody>
<tr>
<td>Coastal risk audits</td>
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<td>Beachsafe hazard rating system</td>
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<td>Rock platform risk rating system</td>
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<tr>
<td>Coastal emergency rescue response system (eg. SLS NSW system)</td>
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<tr>
<td>Rock fishing incident monitoring program</td>
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</table>
(47) In your opinion, are there any improvements that could be made to any of these other initiatives to make them more effective at improving rock fishing safety? *(please indicate)*

☐ Yes (go to question 48)
☐ No (go to question 49)
☐ Don’t know

(48) What improvements could be made to the other initiative(s) to make them more effective at improving rock fishing safety? *(please describe)*

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(49) In your opinion, what are the strengths of any of the other initiative(s) in improving rock fishing safety? *(please describe)*

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(50) In your opinion, what are the limitations of any of the other initiative(s) in improving rock fishing safety? *(please describe)*

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(51) Are there any other methods and/or programs aimed at improving rock fishing safety that have not been mentioned that you would like to comment on? *(please describe)*

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(52) In your opinion, what are the 3 most successful initiatives that are used to improve rock fishing safety? *(please describe)*

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(53) In your opinion, what are the 3 least successful initiatives that are used to improve rock fishing safety? *(please describe)*

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(54) Lastly, what is your usual industry of employment? *(please tick)*

☐ Academic organisation

☐ Angler organisation

☐ Government organisation

☐ Manufacturer

☐ Rescue organisation

☐ Other *(specify in text)*_____________________________________________________

Thank you for your participation