

The Un-Explored Potential Role of Surfers in Reducing Drowning on New Zealand Beaches

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Abstract

Drowning is the third leading cause of injury-related death globally. The financial and social burden of drowning on society has become so significant that, in 2021, the United Nations General Assembly, backed by over 80 countries worldwide, adopted a resolution on drowning prevention for the first time in the organisation's 75-year history. Beaches and coastal environments are prominent locations for drowning, however research examining the causes and processes of drowning at beaches has been neglected, leading drowning to become an invisible disaster globally. A handful of studies conducted in Australia and Europe suggest surfers (as bystanders) might play a critical role in rescuing people from drowning and thus acknowledge surfers' rescue capabilities. However, research about the role of surfers in rescuing people from drowning remains scarce and no data has been gathered in New Zealand, leaving a knowledge gap surrounding rescues being conducted by surfers. Water safety organisations seek to broaden prevention strategies, as New Zealand's 10-year average coastal fatal drowning rate per capita is now 44% higher than Australia and rates of fatal coastal drowning continue to rise. This research aimed to provide original scientific data to quantify surfer rescues and identify the trends and characteristics associated with these. A quantitative, cross-sectional study was conducted, involving a questionnaire-based survey that was disseminated through the Surf Life Saving New Zealand and Surfing New Zealand social media networks. A total of 418 surfers took part in the survey. The survey provided data on rescuer and victim demographics, the respondent's rescues over their lifetime and their most recent rescue on New Zealand beaches. The results indicate that an average of 48 lives are saved annually by this group of surfers, with a total of 1,274 rescues conducted. The potential impact surfers can make in reducing coastal drowning is evident by the volume of rescues performed by this group. The sample population was only 0.28% of the estimated 145,000 surfers in New Zealand. If only 1% of New Zealand's surfers were currently conducting one lifesaving rescue per year, the prevention of the economic and social outcomes of drowning on New Zealand beaches would be immeasurable. Prominent male representation amongst rescuers was evident, however, no significant difference was witnessed between gender, regarding rescue frequency or confidence. There was no association found between having undergone rescue training and an increased frequency of

rescues. Conversely, associations were found between increased years of surfing experience and frequency of rescue, as well as participating in formal rescue training. Rip currents clearly emerged as the leading hazard associated with rescue and were often coupled with poor swimming skills and lack of hazard awareness. Rescues were most frequently performed outside of patrolled areas and times and there were clear associations between where surfers conduct most of their rescues and their home break. Results from this study identified an experienced population of surfers that possess knowledge and ability, contrary to that of the statistical primary drowning victim or bystander rescuer. This study is pioneering work in New Zealand and calls for more attention towards the important role surfers play in coastal drowning prevention. Their role has long been unrecognized and/or invisible. This research begins to fill an important gap as it highlights surfer's role in drowning prevention, by providing a quantification of the rescues they performed on New Zealand beaches. This work has strong implications for disaster risk reduction policies and practice, including developing drowning prevention and water safety strategies that cater for surfers' skills, knowledge and resources. It calls for a shift of approach in drowning prevention toward building upon local capacities, where historically drowning prevention focused exclusively on lifeguards in patrol areas.

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Attestation of Authorship

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.”

_____	<u>20th January 2023</u>
Signature	Date:

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Glossary of Terms

Adult – For this report, adults refer to a person 16 years of age and over.

AVIR – Aquatic Victim instead of rescuer syndrome.

Beach – A wave-deposited accumulation of sediment usually sand but ranging in size up to boulders deposited between the upper tidal limit and the offshore area where waves first start breaking.

Beach Fatal Drowning – Where the location of the fatality occurs on a surf beach, calm water beach or rocky foreshore and the cause of death involves drowning or immersion.

Bystander – Any member of the public, be they family, friend, or stranger, attempting to rescue someone in distress

Coastal – Tidal waters (estuary, harbour, marina, and river/ harbour bar); ocean up to 1km offshore; or inland up to five times the width of the inlet/river.

Drowning – The process of experiencing respiratory impairment from submersion/immersion in liquid; outcomes are classified as death, morbidity, and no morbidity.

Fatal Drowning Rate – A comparative rate of drowning (as the cause of death) to the size of the population in a given area.

Non-fatal Drowning – A subset of drowning, the process of experiencing respiratory impairment from submersion/ immersion in liquid, where the outcome is classified as morbidity and no morbidity.

Patrol Flags – Red/yellow horizontally divided flags which are set after performing a risk assessment to determine the most suitable area for swimming. The flags identify a zone for swimming and bodyboarding within a patrolled location.

Patrolled Location – A location supervised by a Surf Lifeguard service.

Rescue – Where a person requires immediate help to return to shore (or place of safety) and who without intervention would have suffered distress, injury, or drowning.

Surf Beach – An area of land with sand, gravel or pebbles that contains a foreshore and surf zone. Surf beaches include low energy and exposed coasts.

Surf Lifeguard – An individual who undertakes patrols at a beach. As a minimum requirement they are qualified in surf rescue and basic lifeguard support.

Surf Lifeguard Service – A coordinated group that exists to provide aquatic safety services to the public. This includes Volunteer Surf Life Saving Clubs, Contract Surf Lifeguards, RWCs, IRB's, ATV's and 4WD units.

Surf Life Saving New Zealand – The leading beach and coastal safety, drowning prevention and rescue authority in New Zealand. The purpose of the organisation is to reduce injury and drowning on our beaches with a vision of zero preventable drownings.

Water Safety New Zealand – Water Safety New Zealand works with water safety sector organisations, Individuals, and the public to reduce the incidence of drowning and injury in New Zealand.

List of Abbreviations

Abbreviation	Meaning
ACC	Accident Compensation Corporation
AUT	Auckland University of Technology
AUTEC	Auckland University of Technology Ethics Committee
AVIR	Aquatic Victim Instead of Rescuer
BOP	Bay of Plenty
CDEM	Civil Defence Emergency Management
CPR	Cardiopulmonary Resuscitation
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
NEMA	National Emergency Management Agency
NID	National Incident Database
NZ	New Zealand
Pop.	Population
SLSNZ	Surf Life Saving New Zealand
UK	United Kingdom
UNISDR	The United Nations International Strategy for Disaster Reduction
VOSL	Value of a Statistical life
VSLY	Value of Statistical Life Year
WHO	World Health Organization
3R	Relax and float, Raise your hand and Ride the rip

Chapter 1 – Introduction

1.1. Chapter Introduction

Each year, 236,000 people die from drowning worldwide (World Health Organization, 2021). This equates to 27 drownings every hour. Any body of water where drowning occurs contributes to this statistic, including but not limited to coastal beaches, rivers, lakes, and pools. However, World Health Organization (WHO) recognises the ubiquitous hazards particularly associated with beaches and coastal areas and lists beaches as a leading high-risk location (World Health Organization, 2014). Unlike a pool or still water, beach hazards constantly evolve with tidal changes, wind velocity and direction, wave size and character, as well as beach user activity (Brewster et al., 2019; Short & Hogan, 1994). These factors have highlighted a distinct lack of knowledge and skill amongst many beach users, as well as, the potential bystander rescuers that may come to their aid, once people find themselves in distress (Petrass & Blitvich, 2018; Pitman et al., 2021).

Drowning consistently reports as the third leading cause of injury-related death globally, after road injuries and falls (Franklin et al., 2020). Research examining the causes and process of drowning, as well as bystander rescue, has been neglected, leading drowning to become an invisible disaster globally (World Health Organization, 2014). The issue has become so severe that, in 2021, the United Nations General Assembly, backed by over 80 countries worldwide, adopted a resolution on drowning prevention. This is the first time in the organisation's 75-year history it has acknowledged the magnitude of drowning as a global issue (Water Safety New Zealand, 2021).

Similar to non-drowning related disasters, drowning is a complex social issue, one where certain populations, dependant on ethnicity, age, gender, and socioeconomic standing, show greater vulnerability to drowning (Denny et al., 2019; Willcox-Pidgeon et al., 2020). This is reflected in WHO's statistics, which illustrate that drowning in low- and middle-income countries is over three times higher than high income countries. There are few broad prevention strategies that effectively target drowning (World Health Organization, 2014), meaning many countries have not witnessed reductions in drowning rates over time and some countries have seen an increase in recent years.

New Zealand is one such country. Beach usage is embedded in the country's culture. New Zealand's coastline is approximately 15,000 kilometres in length, the 9th longest of any country in the world (Coasts – Te Ara Encyclopaedia of New Zealand, 2005). Beaches represent a prominent location for fatal drownings and have higher estimated drowning mortality than other natural waterways (Koon et al., 2021). For example, 22% of fatal drownings in New Zealand between 2012-2021 occurred at surf beaches (Water Safety New Zealand, 2022). Surf Life Saving New Zealand (SLSNZ) records indicate that between May 2020 and April 2021, over 12 million individual visitations to the coast occurred in New Zealand (Surf Life Saving New Zealand, 2021). Short and Hogan (1994) suggest as beach usage increases, so do levels of public risk. This was shown by 10% more recorded visitations to the outdoors (including beaches) in New Zealand in 2021, compared to the same period in 2022¹ (Department of Conservation, 2022). Consequently, it became the worst summer period for coastal drowning in six years and concluded with a 180% increase in fatal coastal drownings on the previous five-year average, the worst coastal fatal drowning record since 1996 (Radio New Zealand, 2022; Water Safety New Zealand, 2022). This average annual fatality frequency is greater than the collective fatalities through all natural-hazard-related disasters in New Zealand over the past decade (Ministry for Culture and Heritage, 2020).

While organisations such as Water Safety New Zealand and SLSNZ battle to reduce this number through public education and initiatives such as the 3R campaign (**R**elax and float, **R**aise your hand and **R**ide the rip) to raise awareness of rip currents, the number continues to rise. New Zealand's 10-year average coastal fatal drowning rate per capita (per 100,000 Pop.) is now 44% higher than Australia (Surf Life Saving New Zealand, 2021).

In addition to the many fatal drownings that occur each year, significantly more rescues are performed by both formal and informal rescuers. A Brazilian study indicated that for every fatal drowning incident, five successful rescues were performed (Barcala-Furelos et al., 2021). SLSNZ averages over 1,100 recorded rescues annually and 113,631 preventative actions² (Surf Life Saving New Zealand, 2021). Attard et al. (2015) suggest bystanders may perform just as many rescues in Australia each year as surf lifeguards. In New Zealand, data

¹ Department of Conservation figures taken from February 2021 and February 2022.

² Preventative action is defined as "Direct action taken to reduce or eliminate the probability of a specific rescue, first aid or other reportable incident from occurring" (Surf Life Saving New Zealand, 2021).

on bystander rescues is limited but it is estimated that 70% of bystander rescues occur outside of lifeguard patrolled areas and patrolled times (Surf Life Saving New Zealand, 2021). This statistic mirrors Uebelhoer et al.'s (2021) research findings that 73% of 136 coastal drowning deaths in Australia between July 2020 – June 2021, occurred under the same circumstances. For this reason, bystander rescues are increasingly recognised by organisations like WHO, Water Safety New Zealand and SLSNZ as often the only opportunity for rescue, outside of patrolled areas and times (World Health Organization, 2017; Water Safety New Zealand, 2020; Surf Life Saving New Zealand, 2021).

Research conducted in Australia and Europe suggests surfers (as bystanders) might play a critical role in rescuing people from drowning and there is a small but increasing amount of research and recognition, acknowledging surfer rescue capabilities (Attard et al., 2015; Brander et al., 2019; Lawes et al., 2020; Uebelhoer et al., 2021; Berg et al., 2021). Conversely, the potential role surfers play in reducing fatal coastal drownings has not been researched in New Zealand. Currently no data exists that quantifies or characterises the bystander rescues conducted by the surfing community. Considering New Zealand's recent and dramatic increase in fatal coastal drownings, it is imperative research is conducted, to remedy the existing deficit of data, pertaining to surfers conducting rescues. This research aims to gather original data from across New Zealand's surfing community about rescues they conduct as bystanders on coastal beaches. This research may help inform the policies and practices geared toward the prevention and reduction of drowning risk.

This chapter introduces the burden of drowning on New Zealand's population (Section 1.2). It will then draw a parallel between the burden of drowning and Disaster Risk Reduction (DRR) and Disaster Risk Management (DRM) concepts (Section 1.3). It will go on to address the human factors driving fatal coastal drowning risk in New Zealand (Section 1.4) and introduce 'Surfers', identifying why they may be contributing significantly to keeping coastal drownings from escalating (Section 1.5). The chapter then presents the research rationale, aim, and objectives (Section 1.6, 1.7). Finally, it concludes by outlining the dissertation's structure (Section 1.8).

1.2. The Burden of Drowning

Drowning is the third leading cause of unintentional injury death worldwide and one of the world's most preventable public health issues, killing approximately 236,000 people annually (World Health Organization, 2021). Drowning represents a significant, yet largely silent, burden that manifests predominantly in two forms: The first is the immense emotional and social toll on families, communities, and society as they cope with traumatic witnessing, resuscitation, death, body recovery and other factors associated with fatal and non-fatal drowning. The second is the significant financial cost associated with drowning (Moran & Stanley, 2013). The statistical value of a human life (VOSL) is conservatively estimated to be NZ\$4.42 million (Ministry of Transport, 2020). Water Safety New Zealand estimates the cost of drowning death and injury to New Zealand to be approximately \$4.79 billion over a 10-year period (Water Safety New Zealand, 2018).

There is a deficit of data that accurately examines the circumstances of coastal drowning. Scholars, practitioners, and policy makers claim it also hinders drowning prevention efforts targeting public education and drowning prevention strategies for 'would be' victims and rescuers (World Health Organization, 2014; Franklin & Pearn, 2011; David Szpilmana et al., 2014; Koon et al., 2021; World Health Organization, 2017; Carballo-Fazanes & Bierens, 2020; Surf Life Saving New Zealand, 2021). The size of the burden, both social and economical is likely to be significantly higher, as existing gaps in meaningful data, accompanied by escalating fatal drowning rates, indicate poor comprehension of the issue.

1.3. The Interaction Between Drowning and Disaster Risk Reduction

Water Safety NZ and SLSNZ, two key organisations involved in reducing drowning risk, spend significant funding and human resources on public information, prevention strategies and rescue capability. Nonetheless, several factors create barriers to the efficacy of these initiatives. It is unlikely the evolving physical hazards present at beach locations, such as rips and deep water, are the biggest contributing factor to drowning risk, despite literature that commonly totes these as causes for most fatal coastal drownings (Tellier et al., 2019; Castelle et al., 2018; Pitman et al., 2021). Like the widely suggested abandonment of the term "natural disaster", due to human influences creating risk around natural hazards, it is human factors that first and foremost create the risk of drowning at surf beaches. This paradigm is

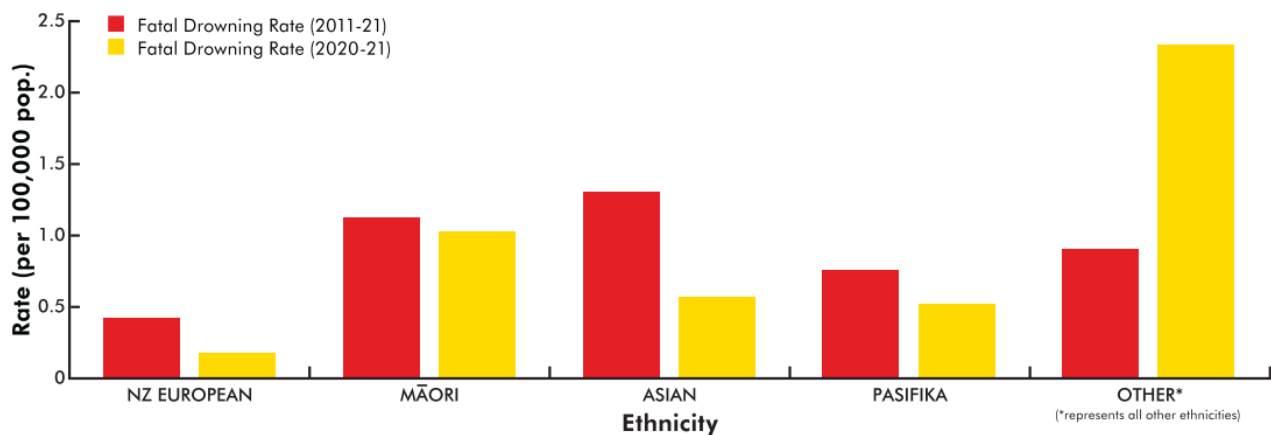
demonstrated by the common tendency that remains for media to attribute or blame coastal fatal drownings on non-human factors, such as accidents or freak waves, much like the villainisation of natural occurrences (such as a volcanic eruption) seen in disaster literature (Chmutina et al., 2021; Kelman, 2010).

One could argue drowning constitutes “Disaster” in New Zealand. The United Nations International Strategy for Disaster Reduction (UNISDR) (2009) states *“Disasters are often the combination of the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life... other negative effects on human physical, mental and social well-being, together with ... social and economic disruption.”* There can be no doubt that a vulnerable population, without capacity to cope, are exposed to hazards on New Zealand beaches. This is evidenced by the increasing burden on the New Zealand population, such as ballooning drowning statistics, increasing demand on rescue services and economic and social consequences, generated through near miss fatalities, and confirmed fatal drowning events (Surf Life Saving New Zealand, 2021). WHO suggests drowning be incorporated into DRM, as drowning prevention strategies share commonalities with other public health strategies (World Health Organization, 2014). However, the National Emergency Management Agency (NEMA) and Civil Defence Emergency Management (CDEM) make no mention of any public health strategies on their websites addressing drowning (National Emergency Management Agency, 2022; Auckland Emergency Management, 2022). This includes Auckland Emergency Management’s website, a region where from 2011-2021 had the highest number of fatal drownings (n=93) (Surf Life Saving New Zealand, 2021). This observation is not intended to highlight failures by organisations but to demonstrate drowning has not been recognised as a disaster or perhaps received the attention it deserves and remains silent in nature.

Fatal drownings are disproportionately higher amongst minority populations, including in higher income countries such as New Zealand (World Health Organization, 2014). Between 2020-2021, the New Zealand (NZ) European population showed a significantly lower fatal drowning average per 100,000 population (0.25 per 100,000 Pop.) than other ethnicities (Figure 1). All other recorded ethnicities, including Māori, Asian, Pasifika and “Other”, showed

rates at least double that of NZ European, with “Other”³ being at least 10 times higher than NZ European (2.34 per 100,000 Pop.).

Figure 1. 2011-21 (ten-year average) and year 2020-21: Beach and Coastal Fatal Drowning Rates (per 100,000 Pop.) by Ethnicity (n=357).



Note. From Surf Life Saving New Zealand (2021)

Socioeconomic status has been shown to affect vulnerability to drowning, as it does many other natural hazards (Rufat et al., 2015; Poumadère et al., 2005). Factors can include struggle with costs of swimming lessons or access to transport to and from lessons. This creates barriers to reducing vulnerability and increasing capacity, obtained from knowing basic water survival (Denny et al., 2019). Numerous social vulnerabilities disproportionately affect minorities’ risk, not only to drowning but other natural hazard related disasters. As a result, WHO suggests drowning is a preventable burden and prevention strategies should be woven into broader quality of life public health agendas. This concept is supported in the disaster literature, which commonly recognises that social and economic conditions not only create vulnerability to disaster but are also amplified when hazards occur (Hanson-Easey et al., 2018). Additionally, risk can and should be reduced by addressing vulnerability and increasing capacities (Rampengan et al., 2014; Wisner et al., 2012). It is only once these social factors are identified and addressed that effective prevention strategies can be customised and subsequently, drowning rates amongst poor and minority populations reduced.

³ “Other”, represents all other ethnicities.

1.4. An Introduction to Human Factors Driving Fatal Coastal Drowning Risk

The Sendai Framework for Disaster Risk Reduction recognises rapid urbanisation and growing population as risk drivers for disaster (UNISDR, 2015). The same drivers are present in the increasing risk of coastal drowning, exacerbated by growing demand for beach access within an inflating population and a desire for coastal property. This can be seen in Tauranga, one of the fastest growing regions in New Zealand, with a population growth rate consistent at 4% per annum (Tauranga City Council, 2018). Mass development is occurring closest to ocean access, giving rise to increased risk to public, as a wide demographic of ages, cultures, and languages, with potentially little or no awareness of local hazards, reside near and recreate at New Zealand's beaches (Willcox-Pidgeon et al., 2020).

Immigration is a significant driver of population growth within New Zealand. The current growth rate through immigration is estimated at 2.1%, higher than both Australia and Canada (The World Bank, 2022). The population inflated significantly in the last decade, with the number of people migrating to New Zealand peaking in 2020 at approximately 185,000 per annum (Stats.govt.nz, 2022). This number was prior to the COVID-19 pandemic and migrant numbers have since dropped (Stats.govt.nz, 2022). The Asian and Pacific Island populations are heavily represented in migrant numbers, and statistics show they often settle in coastal areas (Stats.govt.nz, 2022). Studies suggest that these groups may possess limited knowledge of New Zealand's coastal hazards and insufficient swimming skills (Venema et al., 2010). SLSNZ figures indicate that from 2011-2021, the Asian and Pacific populations were overrepresented in fatal coastal drowning (Surf Life Saving New Zealand, 2021). These figures speak to the inflated public risk as populations grow, without being accompanied by specific knowledge relating to natural hazards.

The result of a growing population and increased beach access is the formation of vulnerability. Moran's (2010) research highlights that 30% of Auckland beachgoers have experienced at least one life-threatening submersion experience. This may be due to Auckland's high immigrant population. However, research conducted nationally asserts nearly 3 in 10 New Zealanders cannot swim or float in the ocean for more than a few minutes (Surf Life Saving New Zealand, 2021) and less than half (46%) of New Zealand adults believe the beach is a hazardous environment. Conversely, 76% of New Zealand adults consider rip currents to be extremely or very dangerous. Despite this fact, Moran's (2014) study of young

adults (age 13-18 years) established that 44% could only recognise one or no surf hazards at the beach. This speaks to a common shortfall, not just amongst the immigrant population but New Zealanders in general, for appreciation of coastal hazards and limited personal capacity required to negotiate them.

In addition, complacency exists around lifesaving education and services. Surf lifeguards are widely recognised as the leading organisation for drowning prevention at beaches (Barcala-Furelos et al., 2021; Surf Life Saving New Zealand, 2021; Berg et al., 2021; Brander et al., 2019; Attard et al., 2015; Moran, 2014; Koon et al., 2021). Regardless of this recognition, Moran (2014) suggests that young adults knowingly position themselves away from lifeguard services to more isolated sections of the beach. It is well documented that most rescues and fatal drownings occur outside of patrolled areas (Brander et al., 2019; Attard et al., 2015; Surf Life Saving New Zealand, 2021). Lifeguards cannot provide coverage at all beaches and in the absence of lifeguard services, where significant hazards exist, public education by way of signage is often in place. However, Castelle et al.'s (2018) study found public information signage regarding beach hazards is often ignored or not seen, with only 20% of beach goers seeing the signage, even when placed in strategic locations. The frequent discount of lifeguard services and critical safety information, as suggested above, are likely factors increasing rescue and drowning rates.

Lack of knowledge and personal capacities are not limited to those in need of rescue, but also bystanders who assist others in peril. There is a common disparity between willingness to rescue and skills required to do so safely (Işın et al., 2021). Most bystander rescue attempts are conducted by lay-people with no training or knowledge of surf rescue techniques, or an acknowledgement of the risks involved (Barcala-Furelos et al., 2021). As a result, drowning of aquatic rescuers is common, particularly among adult males who may overestimate their own ability and are more likely to put themselves at risk to rescue others (Uebelhoer et al., 2021; Moran et al., 2016). This demonstrates a willing, yet underqualified, bystanding rescuer population. So much so, males as the primary drowning victim or secondary victim through attempting rescue, represent 87% of all fatal drownings in New Zealand (Surf Life Saving New Zealand, 2021), making males the highest risk group to be rescued and, also, to drown while attempting rescue.

One key driver of many bystander rescues is altruism, usually due to a personal connection to the drowning victim such as child, sibling, parent, friend etc. (Pearn & Franklin, 2018). This emotional bond is difficult for any public training or education to override and, as such, has led to Aquatic Victim Instead of Rescuer (AVIR) syndrome being commonplace, as the connection and inherent desire to help overwhelms any recognition of risk or capability assessment (Pearn & Franklin, 2018). The absence of personal capacities coupled with a presence of emotional connection, has proven to be an often-fatal combination and one clearly presenting challenges for water safety organisations, attempting to reduce fatal drownings.

Drowning shares many common characteristics with disaster, in that minority populations are most commonly falling victim. The numbers of the migrant population, with potentially insufficient knowledge of New Zealand specific beach hazards or swimming skills, are increasing. Furthermore, socioeconomic standing can create barriers to gaining skills that would equip children and adults with potential lifesaving capacities. These factors create conditions of vulnerability (Willcox-Pidgeon et al., 2020). When these vulnerable individuals are exposed to and imperilled by beach hazards, it is often a bystander who comes to their aid. The bystander is frequently overconfident in their ability and/or has personal connection to the person being rescued, making them act impulsively. This ultimately increases the fatal drowning statistics and socio-economic burden, not only amongst primary victims but often their rescuers suffer fatal consequences as well.

1.5. Recognising the Capacities of Surfers in Community-Based Response

One community group has emerged in recent years, through a small amount of literature, who present as a skilled and knowledgeable, informal, rescue response. Surfers, particularly those with higher levels of experience, possess the skills and knowledge required to safely conduct rescues (Attard et al., 2015). Surfers possess detailed knowledge of beach hazards, especially at local breaks. Hazards such as rip currents, contributing to 11% of drowning deaths at beaches between 2011 and 2020, can easily be identified by surfers and are often utilised to access waves further out, by paddling with less resistance through the surf zone (Surf Life Saving New Zealand, 2021; Short & Hogan, 1994). Pitman et al.'s (2021) study in Muriwai, a high-energy surf beach with clearly defined rip currents, demonstrated only 22%

of respondents could identify a rip current in situ. However, 62% of that figure were surfers or body-boarders, demonstrating an increased comprehension of rip currents amongst surfers.

Given surfing is associated with increased wave height, and utilisation and familiarity with local hazards, experienced surfers have a level of comfort in that environment that many beach users do not (Pitman et al., 2021). As wave size increases, rip velocity increases and waves become more powerful (MacMahan et al., 2006). At this time, risk to beach users increases, along with the skill level required to safely be in the water. Evidence suggests moderate wave size (1-2 metre) is when most rescues occur (Attard et al., 2015), demonstrating a threshold for when risk exceeds vulnerable beach users' ability to remain safe in the water. Surfers, on the other hand, are attracted to the increasing wave size, as this provides more intense and longer rides. This familiarity and comfort with larger wave sizes separates surfers from the average beach user, that evidence suggests are at increased risk in these circumstances. In addition to experience and comfort with larger waves, surfers are equipped with a floatation device (i.e., a surfboard). Brander et al.'s (2019) study, examining fifty-three bystander drowning deaths in Australia, between 2004 and 2017, found none of the victims had a floatation device with them. SLSNZ data shows, nearly half of people conducting bystander rescues did not use floatation, often ending in tragedy (Surf Life Saving New Zealand, 2021) and further highlighting surfers qualities as bystander rescuers.

Surfers are often already in the water at the time members of the public have found themselves in distress ("Man Drowns at Mt Maunganui", Newshub, 2022) and have proven competent at identifying people requiring assistance and acting quickly. This is advantageous as the drowning process, from immersion to cardiac arrest, usually occurs between seconds to a few minutes (Barcala-Furelos et al., 2016; Tipton & Montgomery, 2022), leaving a small opportunity for a bystander to act. No official water safety organisations, such as surf lifeguards would typically be as proximate to a coastal drowning victim as surfers are, placing surfers in an ideal position to interject and disrupt drowning processes.

International research suggests surfers may offer an important community-based resource in reducing coastal drowning, though it is not without risk. Surfers, particularly with lower levels of experience or ability, can often become the victim of a rescue (Castelle et al., 2018; Brewster et al., 2019). However, for experienced surfers, the risk of AVIR may be significantly

reduced as they typically possess the characteristics that reduce vulnerability to coastal drowning. Examples of characteristics include knowledge of local hazards, comfort in moderate plus size wave conditions, confident water ability, a floatation device and often no emotional connection to the victim. In addition, surfers are often surfing outside of flagged areas, as well as surfing out of patrolled times, i.e., dawn until dusk. Therefore, providing rescue ability in areas during times lifeguard services do not. The breadth of this coverage is enormous when one considers the time spent at numerous surf beaches globally by surfers and suggests surfers may be an ideal backstop in coastal drowning prevention.

The International Surf Association estimates the global surf population to be between 17 and 35 million (Brander et al., 2019). New Zealand's number of surfers is estimated to be 145,000 (Surfing New Zealand, 2022), with surfers visiting both patrolled and unpatrolled beaches, providing nationwide reach. In addition, previous research conducted overseas suggests surfers show receptiveness to receiving training in rescue and resuscitation, which elicits an opportunity to further increase the capacities within this group (Berg et al., 2021). This places surfers as potentially the most influential, informal group contributing to the reduction of coastal drownings across New Zealand and highlights the necessity for research on this topic.

1.6. Research Rationale

WHO suggests all countries must take steps to implement drowning prevention strategies, which includes improving the data quality informing these strategies (World Health Organization, 2014). Bystanders currently represent the most effective solution in reducing fatal drownings outside of patrolled areas but also carry significant risk, as bystanders are often untrained, unfamiliar with hazards and act altruistically. Alternatively, surfers represent a nationwide, skilled group of rescuers that international research indicates can drastically affect the reduction of fatal coastal drowning statistics.

The data SLSNZ and WHO are calling for does not exist in New Zealand. This research takes steps towards this call, through identifying what contribution surfers are currently making to reduce New Zealand's fatal coastal drownings, as well as identifying the important characteristics of those rescues. This pioneering data may be utilised by organisations such as SLSNZ and Accident Compensation Corporation (ACC) to inform meaningful and effective community-based drowning prevention strategies. It further aligns with New Zealand's

Disaster Resilience Strategy and the Sendai Framework by taking a science-based approach to inform policy and to empower communities to become more resilient (MCDEM, 2019; UNISDR, 2015).

1.7. Research Aim and Objectives

This study aims to provide insight into surfer-conducted bystander rescues in New Zealand and to support water safety organisations with country specific data, in order to help guide and develop additional strategies in drowning prevention. In this context, the study seeks to answer the following research question: "What role do surfers, as informal rescuers, play in reducing drowning fatalities at beaches across Aotearoa New Zealand"?

This question is examined through three objectives:

1. Assess the contribution surfers make to reducing fatal drowning statistics at the beaches of New Zealand.
2. Examine the attributes and patterns that characterise aquatic bystander rescues conducted by surfers on New Zealand beaches.
3. Provide recommendations that inform policy and practice geared to the reduction of drowning fatalities in New Zealand.

1.8. Dissertation Structure

This dissertation is structured into a five-chapter format that presents four chapters in addition to the current (Introduction) chapter. The remaining chapters are described as follows:

Chapter 2 Literature Review: Presents and discusses the existing literature pertaining to the burden of coastal drowning, the social factors and hazards influencing coastal drowning and the existing Disaster Risk Reduction strategies in place. In addition, this chapter discusses the current role of bystander rescuers and the potential role of surfers within this group.

Chapter 3 Research Methods: Outlines the research methodology used during this research and what participant recruitment, data collection and analysis methods were used. This chapter also provides justification of these methods, as well as addresses the ethical considerations for this research.

Chapter 4 Findings: Presents the results of this research. A combination of descriptive statistics and statistical analysis are used for this purpose.

Chapter 5 Discussion and Conclusion: Relates findings from this research to existing literature and discusses the trends or anomalies associated with this comparison. This chapter also discusses the important implications this study may have on drowning prevention, before concluding by addressing the limitations of this study and recommendations for future research.

1.9. Chapter Summary

This chapter has provided context of the current burden of fatal coastal drowning on society and highlighted the contrasting abilities of public and surfers as bystander rescuers, both in New Zealand and internationally. It also presented the research rationale, which was largely centred around an absence of data pertaining to bystander rescues conducted by surfers on New Zealand beaches. This is despite the call from WHO and other water safety organisations that drowning prevention, like other DRR strategies, should be informed by accurate scientific data. The chapter continued to address the research aims and objectives for this study, before concluding with providing an outline of the dissertation structure.

Chapter 2. Literature Review

2.1. Chapter Introduction

World Health Organization (WHO) asserts drowning is a leading cause of preventable death globally and poor-quality drowning data contributes to the lack of drowning prevention research and effective mitigation (World Health Organization, 2014). It further states drowning prevention should be a multi-sectoral approach, requiring coordination and collaboration of multiple agencies and organisations, with tailored initiatives specific to countries and risk groups. While disaster research and media in New Zealand primarily focus on large-scale events such as the Canterbury Earthquakes (2011), Whakaari White Island eruption (2019) and West Coast Floods (2021/2022), drowning, a more covert and deadly disaster, is claiming lives at a rate greater than any other disaster in New Zealand. Drowning rates are disproportionately high amongst minority populations, such as children, poor and minority ethnic groups, which further suggests drowning is a social and preventable issue (World Health Organization, 2014). This preventable issue claims 236,000 lives globally and an average of 74 lives in New Zealand annually. In 2021, much of New Zealand was in COVID-19 lockdown for a significant period. Despite beach and coastal visitation being limited for a portion of the New Zealand population, it proved to be a particularly fatal year (World Health Organization, 2021; Water Safety New Zealand, 2022). Water Safety New Zealand suggests that increased drowning in recent years is a result of insufficient skill and knowledge amongst beach users and they are now encouraging New Zealand Government to increase research and investment in drowning prevention strategies, as would apply in other situations where death tolls are increasing (“Holiday Period Drowning Deaths”, Water Safety New Zealand, 2021).

In contrast, surfers have recently received a small amount of recognition, as a group who is sufficiently equipped with knowledge and skill and is an existing community resource that has unofficially been reducing potential drownings, through conducting bystander rescues (Attard et al., 2015; “Man Drowns at Mt Maunganui”, Newshub, 2022). WHO recognises bystander rescue as often the only form of assistance in the absence of lifeguards and encourages investment and training in this area (World Health Organization, 2017). Conversely, within New Zealand, the contribution surfers are making is currently unexplored, creating a

significant gap in knowledge and underutilisation regarding this potentially critical community resource.

This chapter reviews the existing literature, by first providing an overview of coastal drowning (Section 2.2), including the burden it casts on society (Section 2.3). It will then discuss the current proactive and reactive approaches to drowning prevention and rescue, as well as speaking to the social and physical factors creating risk and vulnerability amongst the population (Section 2.4). This section goes on to introduce the concept of bystander rescue and discusses why most bystander rescuers are at risk. Finally, the chapter highlights surfers as currently an under-researched but potentially skilled and effective community resource, conducting coastal aquatic rescues (Section 2.5).

2.2. An Overview of Drowning on Coastal Beaches

Drowning is defined as *“the process of experiencing respiratory impairment from submersion/immersion in liquid; outcomes are classified as death, morbidity and no morbidity”* (World Health Organization, 2022). Drowning is amongst the 10 leading causes of death of children and young people worldwide (World Health Organization, 2014). Considered a “preventable” injury, drowning is also rated as the fourth highest mortality rate, across both intentional and unintentional injury, within the Global Burden of Disease (Webber et al., 2014; Franklin et al., 2020). Estimation models from the Global Burden of Disease assert landlocked countries have lower drowning mortality, meaning countries with coastlines have higher risk of drowning (Koon et al., 2021). This led WHO to identify beaches and coastal areas as a high-risk drowning location (World Health Organization, 2021).

The natural playground beaches provide draws people to recreate on beaches globally and increases user exposure to coastal hazards, regardless of whether they are equipped with capacities to sufficiently manage their own safety (Castelle et al., 2018). Countries such as France, Australia, and New Zealand, which all have temperate climates with warm dry summers, consistently see an increase in mortality by drowning. It is further recognised that these weather conditions are a risk driver for drowning, as hot dry days generate a higher frequency of beach visitation (Tellier et al., 2019). This is demonstrated by data published from 2015, showing coastal drowning in France, Australia, and New Zealand, typically occurring during the summer months, accounted for 50.3%, 50.4% and 47.7% respectively of

total fatal drownings (Tellier et al., 2019; Royal Life Saving, 2015; Water Safety New Zealand, 2015). In New Zealand, 167 of 357 fatal drownings (47%) in the last 10 years (Figure 2), have occurred during December, January, and February, the warmest months of the year (Surf Life Saving New Zealand, 2021). Beachgoers are not only more likely to visit the beach during the warmer months but are also more likely to enter the water. New Zealand has 15,000 kilometres of coastline, with an estimated 12 million beach visitations annually (between May 2020 and April 2021). Warmer weather often drives numbers in volume to the coast, with potential increased exposure to coastal hazards (Surf Life Saving New Zealand, 2021).

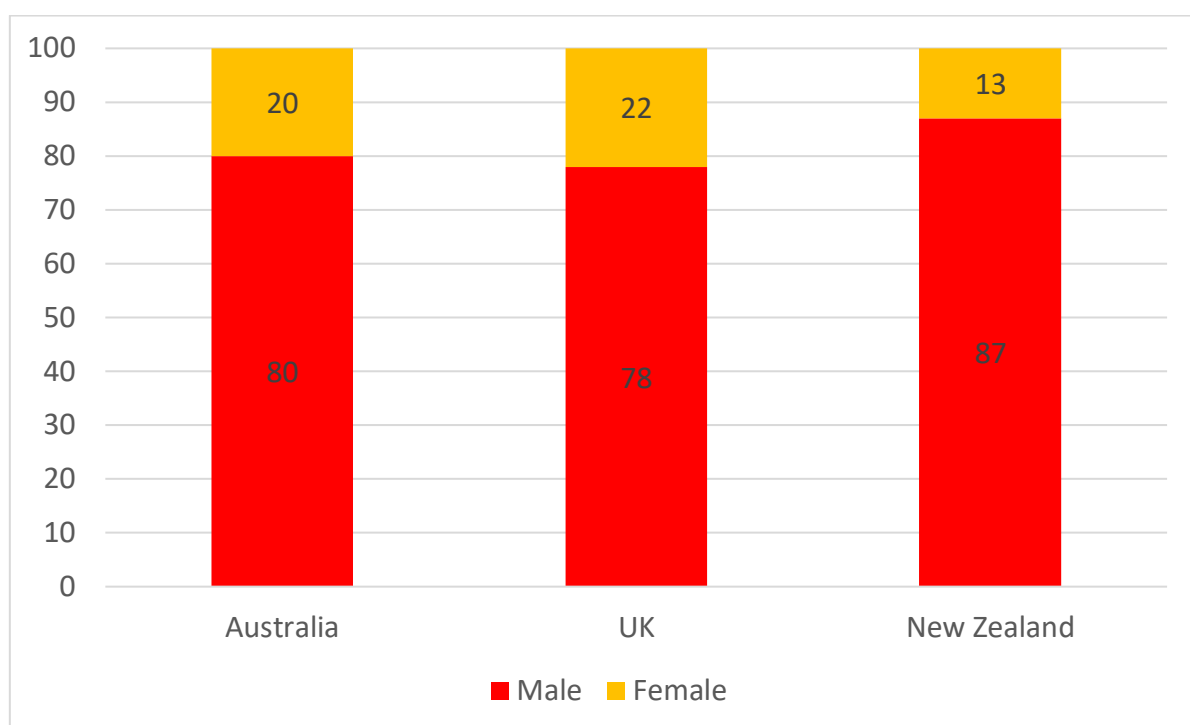
Figure 2. Map illustrating location of 357 beach and coastal fatal drownings.



Note. 10-year overview 2011-21. From Surf Life Saving New Zealand (2021).

The way in which beachgoers recreate at beaches somewhat determines the level of risk to which they are exposed. In an Australian study, 85.6% of surveyed beachgoers intended to go in the water (Brander et al., 2019). Interestingly, 62.9% of these classified themselves as infrequent swimmers. This aligns with Surf Life Saving New Zealand's (SLSNZ) 2021 report, which revealed 55% of rescues conducted by SLSNZ over the last 10 years have been of swimmers and waders and 22% of fatal drownings occurred within the same group (Surf Life Saving New Zealand, 2021). This highlights swimming as a higher risk activity, as opposed to board riding, as well as a shortfall in beach-user knowledge and swimming capability.

Figure 3. 2020-21: Beach and Coastal Fatal Drownings by Gender



Note. Males accounted for 80% (Australia), 78% (UK) and 87% (New Zealand) of fatal drownings, whereas females accounted for 20% (Australia), (UK) and 13% (New Zealand).

Males are recognised as being higher risk to fatal coastal drowning globally (Koon et al., 2021). This is evidenced by figures from Australia, the United Kingdom (UK) and New Zealand where males account for 80%, 78% and 87% respectively of drowning fatalities (Figure 3) (Royal Lifesaving Australia, 2022; National Water Safety Forum UK, 2020; Surf Life Saving New Zealand, 2021). Further to this, WHO states males have twice the mortality rate of females and largely attributes this to riskier behaviour while in and around water (World Health Organization, 2022). Moran et al. (2016) suggest males tend to overestimate their water

ability, which results in higher fatal drowning compared to females. Males are known to place less importance on being proximate to lifeguard services (Brander et al., 2019), which may be a significant contributing factor in Australia and New Zealand, as over 70% of fatal coastal drownings occur outside flagged swimming areas (Brander et al., 2019; Surf Life Saving New Zealand, 2021). These factors not only position males as more prone to requiring rescue from drowning but also falling victim whilst attempting rescue.

In Pearn and Franklin's (2018) study examining rescue altruism, of the 103 people who drowned (38% at beaches) while attempting to rescue another, 90% were male. This is mirrored in Moran et al.'s (2016) study in New Zealand, where 80% of 87 people who drowned while conducting rescue (54% at beaches and open water) between 1987 and 2014 were male. Işın et al.'s (2021) study of fatal drowning in Türkiye suggested, when compared to females, male bystander rescuers drowned almost nine times more frequently during rescue attempts. The phenomenon of male bystanders becoming the drowning victim while rescuing is unfortunately common, and males are currently the vastly prominent demographic increasing the drowning burden on society.

2.3. The Burden of Coastal Drowning

Drowning accounted for 2.5 million deaths globally over the past decade and in New Zealand represents the leading cause of recreational death (Water Safety New Zealand, 2021). Fatal and non-fatal drowning create a significant economic burden on society, but it is the emotional and social burden that is often the hardest to cope with. Research has shown most fatal drownings occur outside flagged swimming areas (Surf Life Saving New Zealand, 2021). A consequence of these circumstances is that fatal drowning victims, without a rescuer, often require body recovery. SLSNZ assisted in the recovery of 101 fatal drowning victims in the last 10 years (Surf Life Saving New Zealand, 2021). This process is not always expedient but usually occurs within 24 hours of the person going missing. Nonetheless, 9% of coastal fatal drowning victims in New Zealand go unrecovered (Webber et al., 2020). This process of both recovery or remaining unrecovered is known to exacerbate the stress and emotional response for family and loved ones (Webber et al., 2020).

When rescue does occur and circumstances dictate the necessity, timely resuscitation is widely recognised as a definitive life saving measure after submersion (World Health

Organization, 2017; Venema et al., 2010). However, resuscitation attempts are not always successful. In the event of being successfully removed from the water by a bystander or formal rescue response, an unsuccessful resuscitation can leave the rescuer with feelings of regret and guilt. This can be amplified by loved ones, often seeking someone or something to blame for the situation (Mathiesen et al., 2016). These effects can be long suffering and require professional treatment, further amplifying the social burden of drowning.

Fatal drowning causes a significant economic cost globally. The United States accounts for US\$273 million annually in drowning-related costs. Further, Australia and Canada's annual cost of drowning is US\$85.5 million and US\$173 million respectively (World Health Organization, 2021). This cost includes the Value of Statistical Life Year (VSLY), hospitalisation, emergency services costs and loss of productivity, accounting for each individual fatality (Barnsley et al., 2018). This cost of VSLY relates predominantly to fatal drowning and not costs incurred by the millions of non-fatal drownings, rescues and preventative actions that occur by both lifeguard services and bystanders each year. It is estimated for every fatal drowning that occurs, between one and four non-fatal rescues occur that require hospitalisation (Moran, 2010). Data from the US suggests for every fatal drowning, there is an average of 2.5 hospitalisations (Franklin et al., 2020). In New Zealand, Accident Compensation Corporation (ACC) spends in excess of \$72 million a year on water-related injuries. Additionally, there are on average 190 hospitalisations annually from drowning related incidents (Water Safety New Zealand, 2021). These hospitalisations present a significant burden, in that there are often long-term neurological deficits associated with extended submersion (6 minutes) and require ongoing, long-term care (Denny et al., 2019).

In addition to fatalities and hospitalisations, there are many rescues conducted where the victim does not require hospital care but does cause a significant cost to water safety organisations' time and resource. A Brazilian study of lifeguard services demonstrated, for every fatal drowning, there were five rescues conducted (Barcala-Furelos et al., 2021). In New Zealand, between 2011 and 2021, SLSNZ conducted 1,136,315 preventative actions, signifying the extent of the burden (Surf Life Saving New Zealand, 2021). This is indicative of the scale of the issue, when one considers lifeguards are only one group conducting aquatic rescues. The demand on resources, ranging from response services such as surf lifeguards, to hospitals and after death or rehabilitative care, all contribute to the economic burden. However, these

statistics do not capture the entire burden that can be difficult to quantify, particularly when rescues are conducted by the public and not formal lifeguard services and there is no formal record of their occurrence.

Overall, the true burden of drowning is difficult to gauge. Some data can be found within coronial databases and official channels, such as SLSNZ and Water Safety NZ reports. Nevertheless, little is known about often unreported rescues, preventative actions and even those hospitalised, where circumstances of injury are not reported in public health statistics (Moran, 2010). This suggests a high likelihood the burden of drowning on society is far greater than recognised or accounted for and requires more research to further understand the issue.

One area that requires significant attention pertains to the disproportionate effects of drowning on minority populations, with some groups of society carrying a greater burden. Within New Zealand, Māori saw a 29% increase in fatal drownings from 2019 to 2020 and an increase of 38% on the five-year average, whereas New Zealand Europeans saw a 9.25% decrease for the same period (Water Safety New Zealand, 2020). Drowning, as other natural-hazard related disasters, is strongly linked to social, economic and cultural factors (Wisner et al., 2012). As such, the disproportionate effect of drowning amongst Māori is an area that will require significant effort to identify and mitigate factors increasing drowning risk (Phillips, 2020).

Many countries have indeed been successful in reducing the burden of fatal drowning in recent years, through reducing risks and effective prevention strategies (Webber et al., 2014). However, the decline in fatal drowning does not seem consistent across all countries (Franklin et al., 2020). France has experienced a steady decline in fatal drowning in recent years, with a 26.5% decrease from 2018-2020. In contrast, New Zealand has seen an increase in the burden of fatal drowning over the past five years, now with a 44% higher drowning rate per 100,000 population than Australia (Surf Life Saving New Zealand, 2021), a country with very similar lifestyle and culture. This further highlights the absence of data relating to coastal drowning within New Zealand and true comprehension of the issue, compared to other countries seeing success in drowning reduction. The next section reviews different drowning prevention approaches.

2.4. Drowning Prevention

2.4.1. Physical and Behavioural Hazards Creating Vulnerability to Drowning

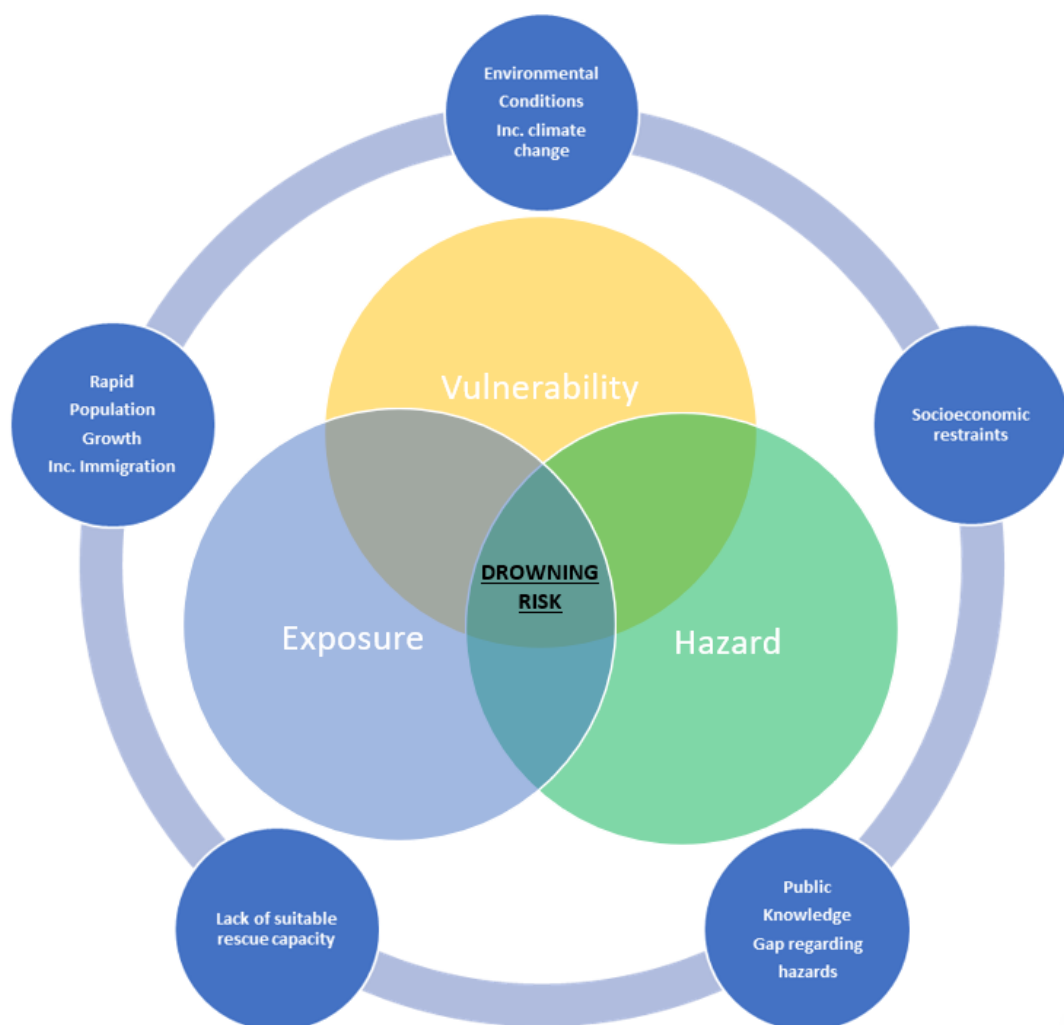
The physical characteristics of surf beaches and coastal areas constitute an inherently hazardous area for people to recreate (Short & Hogan, 1994). The social and economic outcomes of beaches' hazardous nature were discussed earlier in the burden of coastal drowning. Short and Hogan (1994) suggest there are four commonalities amongst surf beaches that expose public to risk of harm. The first is water depth, particularly greater than chest deep. Then variable surf topography, particularly bars, channels, and troughs and finally, breaking waves and surf zone currents (rips). A rip current is defined as *“strong and concentrated flows of water moving away from the shoreline that are driven by alongshore variability in wave breaking and energy dissipation”* (Brewster et al., 2019, p.389). While there is abundant research, data, and consensus that rip currents are responsible for the majority of fatal coastal drownings, they only become an issue when people enter a hazardous zone (Uebelhoer et al., 2021; Attard et al., 2015; Short & Hogan, 1994; Surf Life Saving New Zealand, 2021; Brewster et al., 2019; Tellier et al., 2019), thus, reinforcing drowning as a social issue.

Drowning is the combination of exposure to a hazard, coupled with a vulnerable population. Figure 4 illustrates this point. This framework can be utilised to understand drowning, as it shows the intersection of vulnerability, hazard, and exposure, all influenced by surrounding social and environmental dynamics. A population is not vulnerable unless there is exposure to a hazard. Alternatively, risk is reduced, even eliminated, when a population is not vulnerable. Vulnerability, hazard, and exposure are and can be influenced by social and environmental factors. Examples of this may include poorer families' lack of access to swimming lessons (socioeconomic) and increasing powerful weather systems, brought about by climate change, bringing larger swells to shore (environmental).

Reducing exposure to the hazard (beach) is unlikely, as beach usage is culturally embedded in many countries' lifestyle, including New Zealand, as shown by the 12 million beach visitations annually (Surf Life Saving New Zealand, 2021). Consequently, drowning risk can be reduced by minimising vulnerability and increasing community capacity, which aligns drowning with the same 'social development' trends as seen in disaster risk reduction (DRR) strategies globally (O'Keefe et al., 1976; Wisner et al., 2012; UNISDR, 2015; MCDEM, 2019). An example

of reducing vulnerability could be achieved by engaging minority communities. For example, half of all drownings in Auckland are Asian and Pasifika people who demonstrate a lack of knowledge relating to New Zealand waters (Basagre, 2022). Vulnerability could be reduced through engaging ethnic community leaders to co-develop, not only learn to swim, but hazard recognition and beach safety programmes that span youth through to adult demographics (Franklin & Pearn, 2011). Adults, also being an important group, whose role is often to teach and supervise children in aquatic environments (Willcox-Pidgeon et al., 2020). Filling this knowledge gap would go some way in the reduction of vulnerability, through better decision-making during beach visitation. In addition, the acquisition of skills, while amongst fellow community, builds greater social capital, which has proven valuable in reducing vulnerability to disaster (Aldrich & Meyer, 2015).

Figure 4. Relationship of Hazard, Exposure and Vulnerability as it relates to coastal drowning.



Note. Author's own, AUT.

Denny et al. (2019) assert certain populations are at increased risk of fatal drowning due to their skill level, behaviours, or lack of familiarity with an environment. The reality of this is seen in SLSNZ figures that show nearly 30% of New Zealanders cannot swim or float in the ocean for more than a few minutes and only 9% of adults could swim further than 50m in the ocean (Surf Life Saving New Zealand, 2021). This obviously becomes problematic when caught in rip currents, as rips typically flow seaward, beyond breaking waves and into deeper waters (Short & Hogan, 1994), often resulting in perilous situations. However, the drowning continuum can be interrupted at any time from education before a person gets to the beach, through to effective rescue (Denny et al., 2019). WHO (2022) recognises most drownings are preventable and calls for greater research into the specifics of drowning incidents to drive detailed and nuanced prevention strategies that ultimately alter a beach goer's behaviour.

Insufficient water ability does not rest on primary drowning victims alone but also those who come to their aid. Franklin and Pearn, (2011) state *"the basic paradigm of aquatic lifesaving is to effect rescue without placing oneself at risk"* (p.9). Most beach drownings occur in the absence of lifeguards (Surf Life Saving New Zealand, 2021). Consequently, when no formal response is available, bystanders are frequently putting themselves at risk during rescue, often with no knowledge of rescue techniques or use of suitable equipment (Brander et al., 2019; Barcala-Furelos et al., 2021). Recurrently compounding this dilemma is familiarity to the victim and it is recognised to significantly elevate risk during rescue, demonstrated by the numerous drownings that occur through rescue altruism (Pearn & Franklin, 2018). This has now been dubbed Aquatic Victim Instead of Rescuer syndrome (AVIR) and has become common. Research examining rescue altruism found 67% of the 103 people that died in Australia trying to rescue a drowning victim were direct relatives to the person they were trying to save. This provides evidence of the effect relationship has on bystander rescues and the risks one will ignore or fail to acknowledge when in the moment (Pearn & Franklin, 2018). It is reasonable to assume that when presented with the reality of a loved one drowning immediately in front of them, most parents, caregivers, siblings etc. would enter the water to assist during a drowning emergency. This impulsive behaviour nullifies any thought of risk to themselves or *actual* ability to conduct the rescue safely, thus conflicting with Franklin and Pearn's (2011) paradigm.

It is stated that increasing public awareness of risks will ultimately reduce fatal drowning incidents (Attard et al., 2015). SLSNZ currently promotes the 3R's Rip Survival Plan to increase awareness and knowledge on what to do if caught in a rip (Surf Life Saving New Zealand, 2021). Conversely, Pitman et al.'s (2021) research conducted at Muriwai Beach in Auckland, demonstrated 78% of people were not able to identify a rip current. Neither could they self rescue from rips, demonstrating a lack of ability. Of the respondents who could identify the rip current, 62% were surfers or body boarders. Moran's (2014) study found one quarter of surveyed students could identify only one surf hazard when asked to list as many as they could. Overall, these studies suggest a lack of understanding and knowledge of beach hazards, as well as personal and community capacities. Additional research and collaboration across multiple agencies would be required to define what will influence a change in beach goer behaviour, ultimately creating greater avoidance of hazardous situations and an improvement in education and training on self rescue.

Short and Hogan (1994) state *"as beach usage increases, so too will the level of public risk"* (p. 197). In recent years, New Zealand's population and demand for coastal property has trended upward. Returning to Figure 4's concept of drowning risks resulting from exposure to a hazard intersecting with a vulnerable population, it becomes apparent why increasing rates of coastal drowning in New Zealand are experienced. The vulnerable population exposed to the hazard typically possess poor swimming ability, lack of coastal hazard knowledge and, as evidence suggests, are frequently male. SLSNZ data suggests that regular and mass exposure to beach hazards is occurring, completing the intersect of hazard, vulnerability and exposure, and ultimately a risk of drowning. Realisation of this risk has led SLSNZ to say *"enough is enough"* and has called for greater evidence-based approaches and public sector collaboration to reduce drowning rates. However, any prevention initiatives will face significant barriers as frequent and mass beach visitation is unlikely to subside. This suggests education and advancement of water safety skills are required long before public visit the beach.

Bystanders have a critical role in providing information to agencies such as SLSNZ and Water Safety NZ. This role may better provide understanding surrounding circumstances of coastal drowning and increase the efficacy of drowning prevention strategies through evidence-based approaches. Further, this understanding will focus efforts on reducing vulnerability and

creating greater capacity amongst beach goers and rescuers. The absence of data and public engagement surrounding this topic results in a prevalent “top-down” approach for drowning prevention amongst water safety organisations, whereby public are passive receivers of information. The result appears to be a failure to ascertain a true understanding of a complex social issue. This further aligns drowning with disaster risk management (DRM) of other natural hazard related disasters, where mitigation strategies have proven ineffective due to top-down approaches (Scolobig et al., 2015). Bystander rescuers, such as surfers, could be a catalyst for opening dialogue between public and water safety organisations, utilising local knowledge to build initiatives from the community-level up. The next section speaks further to the role of bystanders in rescuing drowning victims.

2.4.2. The Current Role of The Bystanding Rescuer

A bystander is described as *“any member of the public, be they family, friend or stranger, attempting to rescue someone in distress”* (Brander et al., 2019, p.2). There is limited published research on bystander aquatic rescues and a deficit in quality data relating to drowning prevention and bystander rescue capabilities (World Health Organization, 2014; Brander et al., 2019). However, the literature suggests bystander rescues account for a significant portion of rescues conducted on coastal waterways (Attard et al., 2015). It is nonetheless difficult to gauge true numbers of such rescues as these often go unreported (Lawes et al., 2020). Attard et al. (2015) provide an indication of the frequency of bystander rescues, suggesting surfers, as only one representative group of bystanders conducting rescues, may perform as many rescues annually as lifeguards.

Rescue is not without risk and would-be rescuers regularly fall victim to AVIR syndrome while attempting to save others (Moran, 2014; Franklin et al., 2019; Pearn & Franklin, 2018). Several factors are identified that put would-be bystander rescuers at risk during a rescue situation. Sex, age, relationship to the person rescued (i.e., parent-child) and lack of buoyancy aid regularly contribute to fatal rescue attempts (Brander et al., 2019; Lawes et al., 2020). An overestimation of swimming ability and lack of training/experience in rescue and resuscitation, led to the deaths of 81 people during attempted aquatic rescues in New Zealand between 1980 and 2012. Australia experiences on average five bystander rescue deaths annually (Moran & Stanley, 2013; Franklin et al., 2019). Consequently, WHO identified

training of bystanders in “safe” rescue and resuscitation techniques as a critical intervention to reducing fatal drowning and the frequency of AVIR (World Health Organization, 2017).

It is widely agreed lifeguard services play a critical role in reducing drowning deaths and extended provision would further aid in reductions (Koon et al., 2021; Barcala-Furelos et al., 2021; Pitman et al., 2021). However, there are geographical and spatial limitations on lifeguard services and the financial and logistical practicality of full coverage, is not realistic. Earlier evidence in section 2.3, clearly indicated most fatal coastal drownings are distant to lifeguard services, leaving the only opportunity for rescue of a drowning victim to bystanders. The role bystanders play in preventing drowning outside of patrolled areas and times is critical and seen as one of the most important factors in drowning survival (Denny et al., 2019; World Health Organization, 2017; Surf Life Saving New Zealand, 2021).

Connolly and Connolly (2012) describe the process of drowning through what they term the C-Zones framework, where drowning victim’s progress through seven stages: comfort, concern, crisis, critical, cardiopulmonary resuscitation, coma, and conclusion. This continuum may be interrupted at any stage and evidence suggests early and effective rescue may halt the drowning process through avoidance of water aspiration, respiratory distress and need for resuscitation (Barcala-Furelos et al., 2016). Studies also conclude, early and effective resuscitation (when required) increases chances of survival significantly, particularly when resuscitation starts prior to emergency services arrival (World Health Organization, 2017; Venema et al., 2010). Surfers' proximity to coastal drowning victims places them in a position to interrupt the continuum early and when required, commence resuscitation before emergency services arrival. This highlights the importance of public training and education being made available, for all to participate, that teaches and maintains skills in effective rescue and resuscitation.

There is common disjoint between willingness to perform rescue and skills necessary to do so safely (Işın et al., 2021). This is regardless of whether a person acts impulsively to save a loved one or saw someone in need and decided to assist. Despite a widely shared expert opinion that untrained bystanders should not enter the water to conduct aquatic rescue, figures show rescue attempts by untrained bystanders are frequent (Barcala-Furelos et al., 2021). Rescuer capability is often a factor in fatal AVIR occurrences. Moran and Stanley’s (2013) findings illustrated 59% of participants expressed doubt about their competency to perform a deep-

water rescue. Brander et al.'s (2019) research in Australia further supports this, in that findings indicated most people are not trained or experienced in water rescue. There is not only a gap in rescue skills but also in general swimming ability amongst bystanders. SLSNZ identified only 9% of New Zealanders can swim further than 50m in the ocean and over one quarter have never swum this distance (Surf Life Saving New Zealand, 2021). The lack of ocean swimming skills, coupled with no rescue ability, means bystanders are frequently putting themselves and the person being rescued at unnecessary risk.

The risk of aquatic coastal rescue is often exacerbated by the absence of any buoyancy aid during rescue. Lack of buoyancy aid has become possibly the most common contributing factor in AVIR. Data from Australia indicates as high as 97% of all bystander rescue fatalities from July 2004 to 30 June 2019, did not use a buoyancy aid (Lawes et al., 2020). In New Zealand, SLSNZ states a buoyancy aid was not used in 46% of the bystanders' rescues they have information pertaining to, and highlights yet another gap in public education and training in water safety.

According to the aforementioned reasons, WHO has encouraged the training of bystanders in "safe" rescue techniques as a critical intervention to reducing fatal drowning. Simultaneously, WHO recognises there is insufficient data to drive effective evidence-based strategies and that further research is required to aid in gaining a better understanding of the factors contributing to fatal drowning. To do so would not only reduce drowning incidence among primary victims but also AVIR amongst a typically unskilled bystander population.

2.4.3. Examining Public Drowning Prevention Strategies

Consensus amongst researchers and practitioners is that drowning prevention is largely centred around education and increased investment. Further, research is required to suitably establish and customise effective initiatives (World Health Organization, 2014; Brander et al., 2019; Pearn & Franklin, 2018; Attard et al., 2015; Moran, 2014; Franklin et al., 2019). Denny et al. (2019) assert multiple layers of protection are required in the prevention of drowning, as it is unlikely any one strategy will be successful in preventing drowning fatalities. This is witnessed in current rip awareness education in New Zealand where success of this strategy is questionable, as rip-centred fatal drownings continue to rise. WHO provides four strategies they state are integral to reducing fatal drownings, albeit not strictly specific to coastal drowning. These strategies include strengthening public awareness, promoting multisectoral

collaboration, developing a national water safety plan and advancing drowning prevention through data collection and well-designed studies. All these strategies have historically faced challenges, in that the way governments and organisations respond both to prevention and rescue of drowning people, has not always been guided by strong evidence, particularly in the case of bystander rescues (David Szpilmana et al., 2014). In New Zealand, research in the field of bystander rescues is extremely limited, making it difficult to establish and customise effective initiatives.

The Sendai Framework for Disaster Risk Reduction and New Zealand Disaster Resilience strategy align with WHO's strategy above, both promoting the use of science and research to inform effective prevention and response to disaster (UNISDR, 2015; MCDEM, 2019). WHO further promotes multi-sectoral collaboration in reducing drownings and likens qualities of drowning to other public health issues, such as DRM (World Health Organization, 2014). This multi-sectoral approach requires the engagement of government, non-governmental organisations, health sector, researchers, media, industry, and community. Although drowning prevention may not be these groups' primary goal, their agendas and activities may intersect, therefore providing the education and reach required to interrupt the drowning continuum, whilst fulfilling commitments to guiding documents.

Interrupting the drowning process can occur at any point and drowning prevention strategies should target every stage of the process before a potential drowning victim sets foot in the water. This starts during childhood where all children are given access not only to swimming lessons but water safety knowledge as well. This is important, given Moran's (2014) research that demonstrated basic swimming and rescue skills were lacking among the youth population of New Zealand. Yet not all children have equal access to swimming lessons due to social determinants, such as socioeconomic restraints (Denny et al, 2019). Other high-risk groups, such as migrants and minority populations, often have poor swimming ability and coastal hazard awareness, also resulting from lack of opportunity to access swimming and water safety training (Lawes et al., 2020). The DRM literature suggests there are strategic benefits to engaging community groups in DRR and building adaptive capacities, such as swimming and coastal hazard training from youth to adult, on an ongoing basis (Norris et al., 2008). This can provide benefits of not only reducing drowning risk but child development benefits of physical activity, socialisation, the learning of new skills and building social capital.

It has been suggested that increased awareness of coastal hazards and risks amongst public will reduce fatal drownings (Attard et al., 2015). This is not specific to primary drowning victims but includes those who come to their aid as bystanders. Training people from an early age in coastal hazard recognition and safe aquatic rescue technique, is likely to enhance decision-making abilities when confronted with potential rescue situations, as well as their rescue confidence and ability (Moran, 2014). As drowning represents such a significant global burden, Franklin et al. (2019) suggested training in this area should be refreshed regularly, to prevent skills perishing. In addition to hazard recognition and safe rescue skills, the importance of effective cardiopulmonary resuscitation (CPR) training cannot be overstated and is a skill that should be taught to youth. The New Zealand Resuscitation Council promote WHO's recommendation that two hours of CPR training occur annually for children from the age of 12 in all schools worldwide. Training youth and adults in coastal hazards, safe rescue and resuscitation would provide a further stop gap for interruption of the drowning continuum.

The above generational changes will take time to take effect. Conversely, strategies such as the deployment of surf lifeguards are current and providing enormous value. Within New Zealand, SLSNZ currently has 4500 volunteer lifeguards situated nationwide, all trained in coastal hazards, rescue, and resuscitation (Surf Lifesaving NZ - What We Do, 2021). The work SLSNZ conducts in the prevention and the reduction of fatal drowning is paramount and shown by the 11,364 lives saved by SLSNZ volunteers and staff in the past 10 years (Surf Life Saving New Zealand, 2021). However, SLSNZ data shows most rescues and drownings are occurring outside of patrolled areas and times, which highlights a critical gap in response capability.

The gap in response capability highlights a top-down approach to drowning prevention, where responsibility traditionally rests on the shoulders of organisations, rather than empowering public and recognising individual capacities (Scolobig et al., 2015). Furthermore, until prevention strategies such as childhood education in swimming, hazard awareness, and rescue take effect, significant attention will need to be paid to the "reactive" and top-down approach to drowning, acting as the endmost opportunity for drowning prevention. This is because SLSNZ cannot provide support at every beach in New Zealand, 24 hours a day and a significant portion of the public is still grossly underequipped with knowledge and skill and

often position themselves away from lifeguards (Moran, 2014). Prevention strategies currently, such as signage at beaches and public information, appear to have little effect on the rate of fatal coastal drowning in New Zealand. Stopping fatal coastal drowning requires effective preventative interventions, underwritten by a backstop of increased reactive capacity.

Australia has recognised through targeted research the significant effect surfers have on reducing fatal drownings and, as a result, has engaged with surfers to complete rescue and CPR courses, to improve informal rescue capacity and capability (Uebelhoer et al., 2021). One such initiative is Surfers Rescue 24/7, a course that teaches surfers rescue and resuscitation techniques (Surfers Rescue 24/7 - Surfing New Zealand, 2021). International research and anecdotal evidence guided Surfing NZ to become a provider of the Australian Surfers Rescue 24/7 training in New Zealand, having recognised that like Australia, surfers in New Zealand are likely contributing to the reduction of fatal coastal drownings. This approach goes some way to align with WHO's recommendations to firstly engage and equip communities with capacities and the capability to help themselves and others (World Health Organization, 2014). However, the intellectual property of the surfers rescue 24/7 course is owned by Surfing New South Wales and cannot be adapted or customised to suit local needs (Surfing NSW, 2022). This speaks further to the historic "top-down" and one-size-fits-all approach that has influenced and somewhat contradicted DRM strategy and policy.

2.5. The Unexplored Potential Role of Surfers in Reducing Drowning on Coastal Beaches

The surfing community has become a multi-billion-dollar industry, with an estimated growth rate of 12-16% per annum and an estimated surfing population of 17-35 million (Scarfe et al., 2009). Surfing NZ estimates 1 in 27 people surf in New Zealand, equating to approximately 145,000 people (Surfing New Zealand, 2021). Once seen as a fringe sport, researchers are now urging water safety officials to recognise and support surfers as a global network of rescuers who visit multiple beaches and locations, are in the water during peak hazard times and often surf away from lifeguard services and outside of patrol times.

The literature from Türkiye, France, and Australia, recognises surfers as a skilled community group, safely and successfully conducting aquatic rescues (Işın et al., 2021; Berg et al., 2021;

Attard et al., 2015). Of these surfers, those with higher levels of experience typically report having performed more rescues than their less experienced counterparts. Surfers often possess strong knowledge and skills regarding coastal hazards when compared to an average beach user and are better positioned to conduct aquatic rescues without putting themselves at risk (Berg et al., 2021; Attard et al., 2015). Studies conducted in Europe and Australia found surfers were 3 times more likely to report having rescued someone, had they undergone formal rescue and CPR training. Nonetheless, surfers conducting rescues is not without risk. Surfers represent a significant proportion of reported beach injuries and rescues and can also be imperilled by rip currents (Castelle et al., 2018; Surf Life Saving New Zealand, 2021; Brewster et al., 2019). However, Castelle et al.'s (2018) research suggests a large proportion of surfer injuries are beginners. Less experienced surfers are most often the ones requiring aid; further highlighting the acknowledgement required for the experienced surf community and the skills they possess.

Rip currents are identified as the most prominent beach hazard. Surf lifeguards establish flagged swimming areas in the safest areas on the beach, typically in the absence of rips. Surfing between the flags is prohibited and surfers often utilise rips to pass through the surf zone, using seaward current. This means surfers demonstrate a better understanding of rip currents than most beachgoers (Pitman et al., 2021; Scarfe et al., 2009). Attard et al. (2015) found 75% of rescues conducted by surfers were for people trapped in rip currents. This emphasises surfers' understanding and utilisation of the hazard that most commonly imperils other beach users and highlights the broad gap in knowledge between the two groups.

Before conducting a rescue, one must be able to recognise a person requiring assistance. This knowledge is critical as there are approximately 2 minutes to identify a drowning victim, with the entire drowning process, from immersion to cardiac arrest, usually occurring within seconds to a few minutes (Barcala-Furelos et al., 2016; Carballo-Fazanes & Bierens, 2020). One of the greatest challenges with identifying a person requiring aid is not only time but breaking common misconceptions surrounding behaviour of drowning victims. Studies conducted by Pia (1974) and Szpilmana et al. (2014) showed drowning victims rarely wave their arms or call for help, as automatic physiological responses prioritise breathing and treading water to keep the head above the surface, preventing water aspiration. Several studies showed surfers' ability to recognise drowning victims requiring help, even when the

victim themselves was not aware of their predicament (Attard et al., 2015; Berg et al., 2021). For example, Attard et al. (2015) demonstrated in Australia that 14% of people rescued by surfers were unaware of the danger they were in, speaking to the victim recognition surfers possess and ability to identify a mismatch between an incapable person and a hazardous environment.

Surfing also requires a high level of water confidence and fitness. It is not uncommon for surfers to stay out in the surf for times exceeding 3 hours (Surfing-Waves, 2007). Although surfers are not constantly swimming during this time, the motions of paddling and surfing provide a level of fitness suitable to conduct rescues in a surf environment. Surfboards provide floatation, generally absent during the majority of fatal AVIR incidents. Surfboards have been recognised through scientific studies as significantly reducing water rescue times and perceived effort by the rescuer (Barcala-Furelos et al., 2021). For instance, Barcala-Furelos et al.'s (2016) research concluded the use of rescue boards, which are not dissimilar to surfboards, significantly reduced rescue times (33%), as well as lactate build-up and fatigue on rescuers. This physical ability and use of an efficient rescue device (surfboard), once more places surfers as a potentially ideal community group, possessing local knowledge and capacity, clearly able to perform aquatic coastal rescues.

Increasingly, literature suggests surfers can play an important role in reducing fatal coastal drowning (Berg et al., 2021; Attard et al., 2015). However, there is to-date limited to no research available on the role of surfers in reducing drowning fatalities in New Zealand. The capability, quantity and geographical location of rescues being conducted by New Zealand's surf population remains unexplored, which consequently leads to the underutilisation of a seemingly ideal community resource.

2.6. Chapter Summary

This chapter reviewed the existing literature pertaining to fatal coastal drowning. It began by providing an overview of coastal drowning, drawing on literature from New Zealand and internationally. It then examined the social and economic burden drowning is placing on society, such as the estimated \$72 million ACC spends annually on water-related injuries. The chapter then explored the physical and social factors influencing drowning and prevention strategies, discussing victim and bystander perceptions and ability, as well as the importance

of training in key areas. This chapter highlighted a potential community resource and how they may be suitably equipped with the knowledge and skill to perform coastal aquatic rescues safely. Furthermore, the review of available literature has confirmed a significant knowledge gap within the body of research. There appears to be a complete absence of peer-reviewed, published data addressing the rescues surfers conduct as bystanders on New Zealand beaches. WHO promotes the use of science in disaster risk reduction and the absence of data has stifled water safety organisations' response to escalating coastal drowning statistics. Therefore, this research provides a pioneering initial foray into this topic, with the intent to provide a foundation to further enable future initiatives and ongoing research.

Chapter 3: Research Methods

3.1. Chapter Introduction

This research aims to explore the contribution surfers are making in the prevention of drowning on New Zealand's beaches, through conducting bystander rescues. To date, no published or peer-reviewed research has been identified that specifically relates to bystander rescues conducted by surfers on New Zealand beaches. This creates a shortfall in available data that water safety organisations could utilise to better understand, as well as build prevention strategies around, coastal drownings. Internationally, research has been conducted recognising surfers' rescue capabilities. However, for the most part, these conclusions were drawn from broader coastal drowning studies, not specifically related to surfers. A small body of work examining bystander rescue has focused on surfers, originating in Australia and there is ongoing research being conducted through the Global Surfer Survey (Global Surfer Survey — UNSW Beach Safety Research Group, 2022).

Motivated by research conducted in Australia, specifically that of Attard et al. (2015) and Brander et al. (2019), who examined the characteristics and qualities of aquatic bystander rescues, Surf Lifesaving New Zealand (SLSNZ) has recognised the research shortfall locally and sought New Zealand specific data relating to aquatic bystander rescue. SLSNZ has shown interest in research to be conducted that specifically relates to the role surfers play in aquatic coastal rescue and drowning prevention in New Zealand. Results of New Zealand specific research may align with Australian research, as New Zealand and Australian lifestyles bear similarities. However, this fact remains unknown and there are likely specific nuances to be identified that will reflect a uniquely New Zealand population. The data collected from this research will be the start of specific topic data collection and provide evidence to support water safety organisations, to customise drowning prevention strategies in New Zealand.

Baseline data accumulated during this research first provides an understanding of the current situation in New Zealand. This can be utilised to estimate the number of rescues being conducted by surfers, as well as to gain an understanding of the characteristics that define these rescues. This will be achieved through the research question "What role do surfers, as informal rescuers, have in reducing drowning fatalities at beaches across Aotearoa New Zealand"? This research question is examined through three objectives, which were

developed in consultation with SLSNZ and Surfing NZ, who are interested parties in these research outcomes. The research objectives were to: 1. Assess the contribution surfers make to reducing fatal drowning statistics at the beaches of New Zealand; 2. Examine the attributes and patterns that characterise aquatic bystander rescues conducted by surfers on New Zealand beaches and 3. Provide recommendations that inform policy and practice geared to the reduction of drowning fatalities in New Zealand.

This chapter starts by detailing the research methodology and methods used (Section 3.2), including the development of an online survey as the data-gathering instrument (Section 3.3). It then outlines the sample population and sampling method (Section 3.4), before addressing respondent recruitment (Section 3.5). Finally, the chapter explains the process of data collection (Section 3.6) and the way in which the data analysis was conducted (Section 3.7), before concluding with the research's ethical and cultural considerations (Section 3.8).

3.2. Research Methodology and Methods

A quantitative methodology, in the form of a descriptive, cross-sectional study, was adopted during this research. As previously discussed in Chapter 2, no published data currently exists on bystander rescues conducted by surfers in New Zealand. As with other cross-sectional studies, this research was not aimed at gaining an understanding of phenomena, determining causal factors, or confirming hypotheses, but to describe the existing distribution of variables amongst a certain group (Grimes & Schulz, 2002). Furthermore, descriptive, cross-sectional studies provide a foray into a new area of research and are often used as the foundation for advancing knowledge and more incisive research (Grimes & Schulz, 2002; Walker, 2005). This is poignant given the current absence of data relating to bystander rescues and a key factor in the use of a quantitative, cross-sectional methodology. Additionally, a cross-sectional approach to this research provides details of exposure and consequence characteristics within a given time, often referred to as a “snapshot” (Wang & Cheng, 2020). Cross sectional studies have proven beneficial in determining prevalence of disease and to describe features of a population (Wang & Cheng, 2020). However, applied to this research, it has been used to determine the characteristics of coastal rescues conducted by this sample population.

Cross-sectional studies are both inexpensive and time efficient compared to other types of research (Connelly, 2016; Wang & Cheng, 2020). This is largely due to portions of the

population, relevant to the research question, being chosen to participate and an absence of follow up with respondents after data has been gathered. There is no deliberate exposure or treatment of participants and therefore, few ethical considerations exist during this type of research (Wang & Cheng, 2020). Some disadvantages of using a cross-sectional method are it is difficult to establish inference and those who do not participate in the research may be different from those who did, thus creating bias (Connelly, 2016). However, due to advantages of the ability to gather data quickly and inexpensively on multiple variables that can then be utilised to establish descriptive statistics, associations and provide data that can form a baseline for research moving forward, a cross-sectional study was deemed the most suitable method for this research.

3.3. Data Gathering Instrument

Surveys are an efficient method to gather data on many different variables and can form a meaningful basis for ongoing research, by establishing what is happening currently within a population (Connelly, 2016). For this reason, an online survey was chosen as the most effective option for gathering data. Internet-based surveys provide enormous reach to those who it would be impractical to survey in person, particularly as more and more of the world live their lives online (Gosling & Mason, 2015). Coastal drowning is occurring all over New Zealand, as depicted in Figure 2, and accessing surfers nationwide to capture data would serve to be both an expensive and impractical exercise, whereas an online survey provides surfers from across New Zealand access to contribute, allows regional comparative analysis and in general, helps create a more complete picture of a national issue. In addition, a significant time constraint existed for this research and an online survey was able to provide an enhanced understanding of the topic, as well as address many variables, without increasing time or cost (Check & Schutt, 2011).

Previous research by Attard et al. (2015) and Brander et al. (2019) utilised surveys to address surfers and non-surfers as bystander rescuers. This forms the only study specifically in this field and the current basis for statistical comparison. Consultation was established early in the research with a leading researcher in this field, who currently oversees the Global Surfer Survey; a survey examining surfer-conducted bystander rescues and attitudes toward beach usage and environment. Attard et al. (2015) used surveys as a measuring tool, to gain an

understanding of the prevalence of surfer-conducted rescues and what contribution surfers were making in Australia to reducing fatal coastal drownings. Using an online survey, Attard et al. (2015) were able to capture data from all Australian states apart from Northern Territory. Had other data gathering instruments been used, logistical and financial restraints may have made the same coverage difficult to achieve.

Hague's (2006) principles of effective questionnaire design were used in the development of the survey used in this research. These included the steps below and implementation within this research is outlined in the remainder of this section:

Step 1 – Decide what information is required

Step 2 – Make a first draft of the questions

Step 3 – Refine the question phrasing

Step 4 – Develop the response format

Step 5 – Put the questions into an appropriate sequence

Step 6 – Finalise the layout of the questionnaire

Step 7 – Pre-test and revise

Each question was assessed to ensure it directly addressed the research objectives, as shown in Table 1.

Table 1: *Survey questions addressing research objectives.*

Objective 1. Assess the contribution surfers make to reducing fatal drowning statistics at the beaches of New Zealand.	Objective 2. Examine the attributes and patterns that characterize aquatic bystander rescues conducted by surfers on New Zealand beaches.	Objective 3. Provide recommendations that inform policy and practice geared to the reduction of drowning fatalities in New Zealand.
Part 1: Qualifying Q.3 & Q.11	Part 1: Q1-11	Part 1: N/A
Part 2: Q12-14	Part 2: Q.15-19	Part 2: N/A
Part 3: Q.20, Q.23, Q.32, Q.38	Part 3: Q.21-26, Q.27-37	Part 3: Q.39 and Data from all questions will contribute to this objective.

SLSNZ and Surfing NZ were consulted to review and provide feedback on survey content, as the results of this research may influence their drowning prevention strategies, as well as those who may fund those initiatives (i.e., Accident Compensation Corporation (ACC)). SLSNZ was familiar with Attard et al. (2015) and Brander et al.'s (2019) surveys and was eager to obtain New Zealand specific data addressing the same topics. As such, the content of the survey used in this research was structured largely around that of the Australian surveys. It was hoped it would provide sufficient data and reveal more in depth understanding of surfer bystander rescues in New Zealand, where historical evidence has largely been anecdotal. Additionally, Surfer Rescue 24/7 is a surfer rescue course facilitated by Surfing NZ and current evidence suggests surfers with formal training conduct more rescues than those without (Attard et al., 2015; Brander et al., 2019). Consequently, Surfing NZ and SLSNZ sought to understand how many of the surfers conducting rescues had undergone formal rescue training. This would provide somewhat of a national gauge of the validity of the courses.

Limitations and challenges of Attard et al. (2015) and Brander et al.'s (2019) work were noted and multiple draft questions for this survey were removed or altered as a result, to mitigate the same challenges being replicated. For example, Attard et al.'s (2015) advice for future research was to include asking respondents what the cause of the incident was, therefore this question was included in the survey.

After initial and ongoing consultation with SLSNZ, Surfing NZ and Robert Brander, a self-completed, anonymous survey, was developed using Qualtrics Software (Qualtrics XM // The Leading Experience Management Software, 2022). The questionnaire contained 39 questions. Most questions were in a format of a closed question. However, a number allowed respondents to choose *"all that apply"* or *"other"*, where they were given opportunity to supplement their answer or enter free text. The final question of the survey asked respondents *"In your opinion, what could be done to better support and equip surfers with the knowledge, training, equipment etc. to safely perform rescues at NZ beaches"*. A free text box was provided for respondents to optionally write any response they chose.

The survey began with three qualifying questions before leading into three defined sections. The qualifying questions were: 1. *Are you 16 years or older?* Previous research showed only a minimal population of under 16 years were conducting rescues (Attard et al., 2015) and ethical issues surrounding legal consent would have provided complications. 2. *Are you a*

Surfer? Only those people who considered themselves surfers were given the opportunity to complete the survey as this is the target demographic and subject of the research. What defines a “surfer” was included in the question⁴. 3. “*Have you ever rescued someone from the surf as a bystander?*”. Both the inclusion and exclusion of respondents answering this question provides value to the study. This allowed for descriptive statistics on what percentage of respondents who followed the survey link had conducted bystander rescues, versus those who had not. Those who had conducted a rescue continued into the main survey, to be asked of their experiences.

Part 1 asked for details about the respondent. For example: gender, age, local surf break and how many beaches they might visit annually. This data was gathered to understand the demographic of those conducting rescues. Part 2 gathered data on the respondent’s broader rescue experience. It spoke to the number of rescues conducted and the circumstances of the rescue i.e., location, rip related, gender of person rescued, age etc. Finally, Part 3 asked respondents to recall details of their most recent rescue and required more detail around this. The intention of this section was to uncover a deeper understanding of characteristics of the rescue, person rescued and outcomes of the situation. Examples include the relationship to the person they rescued, whether they conducted a risk assessment and if they think they saved the person’s life. All questions contained within these sections had a “forced” answer, meaning the respondent could not move forward in the survey unless they submitted an answer to the question. This allowed for thorough and complete analysis of the full cohort of respondents’ answers.

A codebook was developed (Appendix D: Researchers Codebook) to help define and provide consistent instruction on the identification and coding of variables (Pallant, 2003). This initially addressed categorical variables provided in the survey questions and was later used to define and record the codes generated for free text-based answers, where respondents chose to write a response. Once these variable answers were transformed to numeric values, they were able to be entered for analysis and statistical comparison.

⁴ A surfer being someone that uses a board or their body to ride waves toward the shore and includes: Shortboard, longboard, bodyboard, SUP, bodysurfing. Can also include windsurfing and kiteboard when riding waves in shore.

Table 2. Description of the survey, detailing thematic survey sections, answer type, example data sought and example questions.

Section(s)	Question Type	Data Description	Example Questions
Part 1 Rescuer demographics Q1-10	Closed response questions Tick box lists	Quantitative Age Gender Ethnicity Rescue training Surf experience Beach visitation	What is your gender? How old are you? How many years have you been surfing? How would you rate your confidence in the water?
Part 2 General Rescue Q11-18	Closed response questions Tick box lists Single/Multiple response Free text	Quantitative Location of rescues Quantity of rescues Presence of lifeguards Primary hazard Victim activity	Where have most of your rescues taken place? Have most of your rescues been on beaches with lifeguards or no lifeguards? How do you think most of these people got into trouble? What were most of these people doing when you rescued them?
Part 3 Most recent rescue Q19-25	Closed response questions Tick box lists	Quantitative When rescue occurred Wave height and conditions Time of day	How long ago did your most recent rescue occur? What was the wave height when the rescue took place? Were there lifeguards on duty patrolling the area? What were you doing at the time of rescue?
Part 4 Victim demographics and rescue details	Closed response questions Tick box lists Single/Multiple response Free text	Quantitative & Qualitative	What is the gender of the person you rescued? What was the ethnicity of the person you rescued? What was your relationship to the person at the time of the rescue? Did you conduct any kind of risk assessment before performing the rescue? Did you use any floatation devices to help you during the rescue? What condition was the person in after the rescue?

A pilot test of the survey was conducted to establish if there were any deficiencies or problem areas, which is an important phase of any research (Hassan et al., 2006). This pilot involved five surfing acquaintances who provided feedback on categorical variable options and survey flow. During the pilot period, test respondents took approximately 5-15 minutes to complete the survey. Recent research suggests the ideal time for an online survey is 10-15 minutes (Revilla & Höhne, 2020). The survey was sent to SLSNZ, Surfing NZ and Robert Brander for feedback. Feedback from this group included a suggestion to align scales of surfing regularity with other existing survey models, to allow for future comparative analysis. The scale was amended due to the benefit for comparative discussion. Descriptors were added to define terms such as “surfer”, to remove any ambiguity. Some questions were identified by pilot respondents as unnecessary and, on review, were unrelated to research objectives so were removed. At the conclusion of the pilot, the survey was finalised in Qualtrics and amendments published.

The survey URL link was promoted through SLSNZ and Surfing NZ social media channels. The use of an online survey promoted through social media allows for fast distribution and feedback from a large audience and evidence suggests often yield higher response rates (Benedict et al., 2019).

3.4. Sample Population and Sampling Method

The sample population for this research was New Zealand based surfers aged 16 years or older. Three inclusion criteria were stipulated for those wanting to participate in the survey.

These criteria were:

- To be a surfer – defined as *“A surfer being someone that uses a board or their body to ride waves toward the shore and includes: Shortboard, longboard, bodyboard, SUP, bodysurfing. Can also include windsurfing and kiteboard when riding waves in shore”*.
- Aged 16 years or older.
- Have rescued a person in the surf before.

Convenience sampling, a type of non-probability sampling, was used to target the surfing population who met the inclusion criteria. It is well recognised convenience sampling cannot be used to ‘generalise’ a population or to draw inference but can have high validity if findings

are deemed trustworthy (Etikan et al., 2016). In contrast to probability sampling, convenience sampling recognises there is not an equal opportunity for the entire population to participate, therefore creating bias (Braver & Curtis Bay, 1992). As the survey was promoted through SLSNZ and Surfing NZ social media, only the proportion of the estimated 145,000 surfers in New Zealand who followed the above organisations or were shared the survey link had an opportunity to participate. These potential respondents then chose to participate or not, creating self-selection bias. This single consideration alone meant an accurate representation of the New Zealand surfing population and assumptions of prevalence are potentially distorted (Heckman, 1990). However, the research circumstances must be taken into consideration and there was a limit on time and expense for this research. The common recognised advantages of convenience sampling are its quick implementation, low cost and ease of access to wide geographical disbursement of participants (Etikan et al., 2016). Additionally, not only would reaching 145,000 surfers be expensive and impractical, surveying a large population is often superfluous, as long as an adequate sample size is obtained (Hague, 2006). For these reasons, convenience sampling was deemed to be the most appropriate sampling method for this research.

A sample size calculator was initially used to determine an adequate sample size (Sample Size Calculator, Creative Research Systems, 2022). A 95% confidence level was determined, based on the New Zealand surfing population currently subscribed to SLSNZ or Surfing NZ social media ($n=68,600$). A confidence interval of 2.74 was defined, which determined that 1256 survey responses were required to obtain an adequate sample size. However, most statisticians agree that *“a good maximum sample size is usually 10% (of the population) as long as it does not exceed 1000”*. Additionally, *“sampling more than 1000 people won’t add much to the accuracy given the extra time and money it would cost”* (Tools4dev.org, 2022).

Early survey results showed that approximately 33% of respondents answered “yes” to the qualifying question “Have you ever rescued someone from the surf as a bystander? Answering yes allowed them to proceed to the main survey content, where the majority of data was obtained. It was conservatively estimated that after cleaning the data, 30% of the responses would remain for analysis. This would mean approximately 3300 people would need to click on the survey link to obtain 1000 useable responses and achieve an adequate sample size. Brander et al. (2019) obtained a sample of 243 participants and Attard et al. (2015), a sample

of 545 participants when conducting their research. The sample used in both these studies were from a significantly larger sampling population than the current study. Given this, it was unlikely that the sample size would be obtained in the survey time available.

Response rates to the survey slowed significantly after a few months, with only three to four surveys being submitted each week. Keeping the survey open until the sample size was obtained would have taken significantly more time than what was available for this research. As a result, it was decided the survey would be promoted and available until responses had been exhausted. As the number of responses after cleaning (418) was well below the determined sample size (1000), the results could not be used to describe prevalence or incidence or be considered truly representative of the population. However, as this study was the first of its kind in New Zealand, these results would likely provide insight and indications about the quantity and characteristics of surfer rescues in New Zealand.

3.5. Respondent Recruitment

Respondents were recruited by advertising the survey through Surfing NZ and SLSNZ, with the URL and an advertisement posted on their social media (Figure 5 & Figure 6). The potential reach included:

Table 3. *Social media reach for SLSNZ & SNZ*

<u>Organisation</u>	<u>Facebook</u>	<u>Instagram</u>	<u>Other</u>
SLSNZ	21,600	9,200	4,000 – Newsletter
Surfing NZ	22,000	15,800	30 board rider clubs

It was assumed most surfers are online, as information on surf reports and conditions are typically accessed this way. SLSNZ and Surfing NZ social media allowed easy access to a cohort of the surf population. Using established social media platforms for common interest groups of potential respondents allows quick and convenient access to large audiences (Benedict et al., 2019). The alternative would have been to attempt promotion of the survey through personal channels and rely on organic sharing and word of mouth. This would likely limit reach to a wide range of respondents. Notwithstanding, organic sharing was important in this research, as respondents were asked to share the link with fellow surfers.

The use of social media as a medium to recruit research respondents has become increasingly common (Kühne & Zindel, 2020). However, it is not without disadvantage, including the obvious bias toward a more internet savvy population, as well as hidden bias within the non-participating population (Benedict et al., 2019). This bias can be somewhat offset by tempering claims of validity and generalisability of results (Braver & Curtis Bay, 1992). It has also been suggested that the weight of bias, particularly surrounding that of internet-based surveys, is not as significant as once thought. Recent evidence shows no significant differences in representative population data, when compared between traditional research recruitment and Facebook-recruited participants (Kalimeri et al., 2019).

The survey advertisement (Figure 5) was used consistently across all platforms and offered the incentive of a \$1000 prize toward a custom-made surfboard. The use of incentives in surveys is widely recognised as having significant and positive effects on response and completion rate (Deutskens et al., 2004; Groce-Niehoff, 2002; Yu & Cooper, 1983). The potential disadvantage to providing incentives is motivation for respondents to falsify responses, thus creating opportunity to enter the prize draw. This was considered prior to promotion of this survey. Conversely, research suggests incentives do not have a detrimental effect on response quality and in some cases stimulate more complete answers and fewer incomplete surveys (Goeritz, 2004; Singer & Ye, 2013; Su et al., 2008). Therefore, the benefit of a larger cohort of responses, motivated by an incentive, was decided as the best approach and was approved by the AUT Ethics Committee.

Once respondents clicked on the URL link, they were taken to the survey homepage. An information sheet provided the respondent details on the research, before obtaining consent to complete the survey. The three inclusion criteria were present by way of qualifying questions. This was used to obtain the appropriate sample population; those who were surfers, 16+ years and have conducted a rescue before. Should a respondent answer “no” to any of the qualifying questions, they were redirected to the end of the survey. However, these incomplete answers were recorded, particularly those who had not rescued someone, as this provided valuable information for comparison on the percentage of surfers conducting rescues versus those who have not.

Only those respondents who fully completed the entire survey were allowed to enter the prize draw. Security settings were in place that allowed respondents a single entry to the

draw. These settings also prevented those who had answered “no” to a qualifying question from re-attempting the survey and falsifying answers, in order to enter the prize draw.

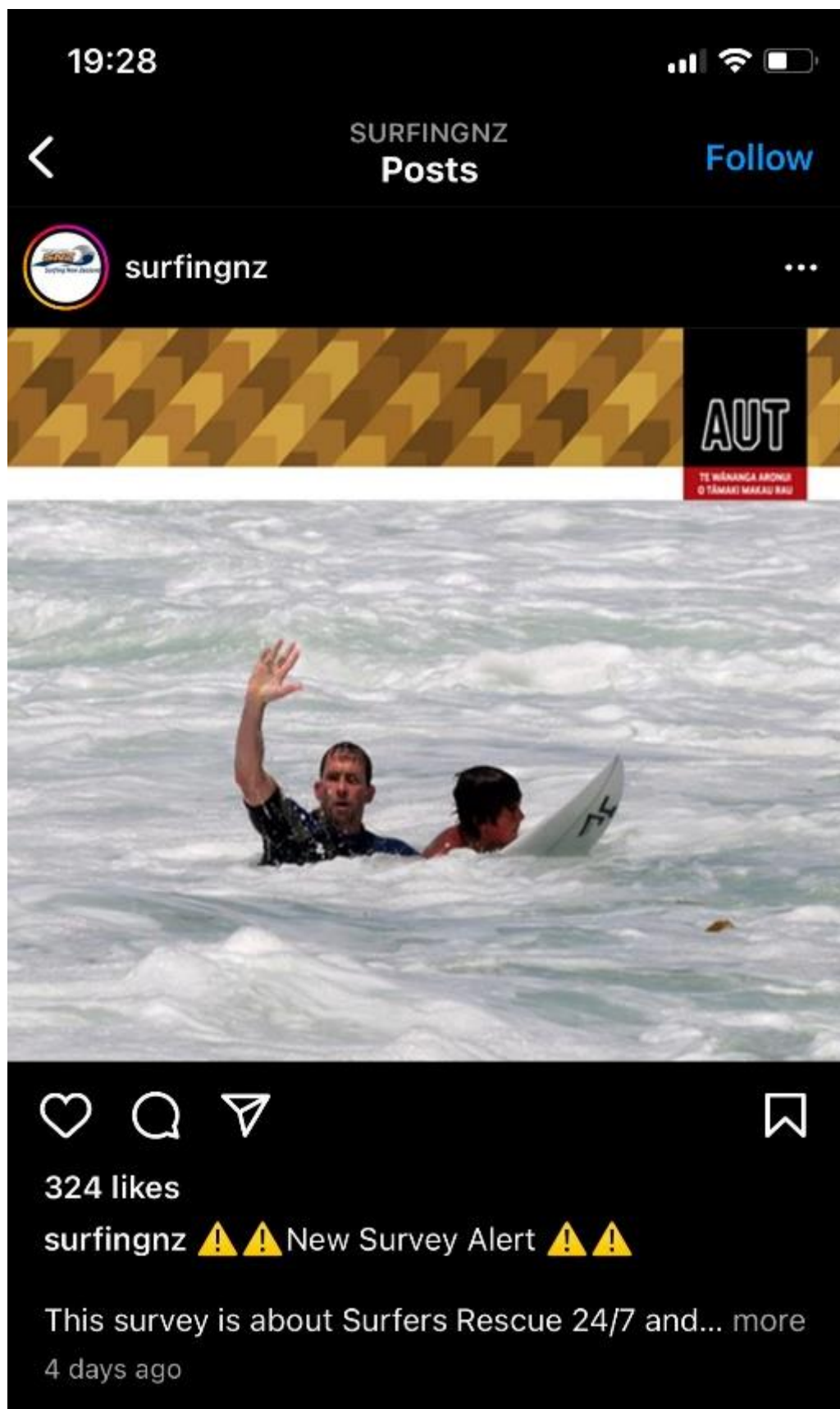
Promotion of the survey commenced on May 19th, 2022. This was delayed slightly as SLSNZ and Surfing NZ were conducting their own surveys, both nonrelated to surfer rescue. Therefore, survey release dates were managed accordingly, to not detract from one survey to the next, or alternatively create survey fatigue.

Figure 5. SLSNZ Facebook post



Note. Published to SLSNZ social media on 19th May 2022.

Figure 6. Surfing NZ Instagram post



Note. Published to Surfing NZ social media on 11th June 2022.

3.6. Data Collection

A survey URL link was generated through Qualtrics for the survey and paired with the advertisement shown in Figure 5. The survey opened on May 19th, 2022 and closed on the 25th of July 2022 and was distributed through SLSNZ and Surfing NZ Facebook and Instagram channels. Both SLSNZ and Surfing NZ used paid promotions for their posts that, when implemented, elevated survey responses considerably. Once the survey was promoted, it received further exposure organically, as viewers of the post “tagged” and “shared” with acquaintances they knew that had conducted rescues. Although creating bias, the organic sharing did increase the reach of the survey and ultimately, sample size. Surfing NZ shared the link with 30 board rider clubs across New Zealand, encouraging them to share the post on their social media.

Clicking on the URL link led the respondent to the Qualtrics survey homepage where they were provided the information sheet on the research. Respondents were required to answer the three qualifying questions before moving to the main body of the survey. All clicks on the survey link were recorded, as well as incomplete qualifying questions or surveys.

Data obtained from Qualtrics showed the average time for respondents to complete the survey was 13 minutes. This average was likely inflated, as indicated by a number of completion times that took up to 46 hours. Settings in the survey allowed respondents to leave the survey and come back to it, provided the survey was completed within one week. Should they not complete the survey within this time, their response was listed as incomplete.

At the conclusion of the survey, respondents were asked if they wanted to enter the draw to win \$1000 toward a custom surfboard. This option was only offered to those who had submitted a complete survey. The prize draw was set up as a separate survey and those who wished to enter the draw were taken to a new URL link to enter their details, including name, phone number and email. This allowed only those who chose to enter the draw to be completely separated from those who wished to remain anonymous and effectively, disassociating those entering the draw from their survey response. This meant no association could be established between survey responses and a name or contact details. Three hundred and eighty-seven people entered the draw for the surfboard. Only the primary researcher had

access to these details, and they were held in accordance with conditions stated in the Ethics application with AUTECH.

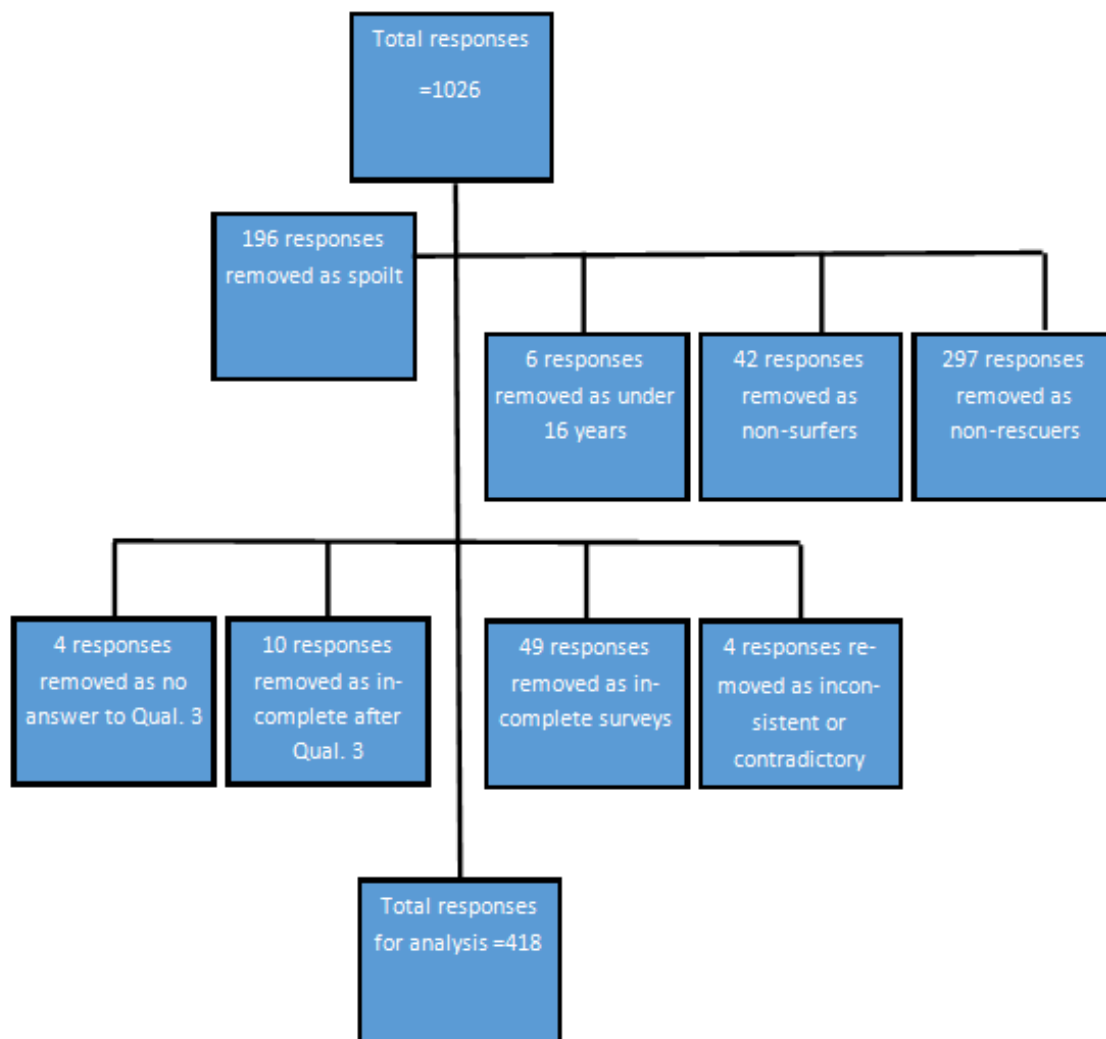
The survey closure date was determined once survey responses had stalled, and paid promotions had expired. A total of 1026 clicks on the URL link were recorded and the percentage of respondents answering the full survey was higher than forecast, leaving 418 samples for analysis. This confidence in sample size was validated by comparison with Brander et al.'s (2019) research that analysed 243 completed surveys and Attard et al.'s (2015), that had 1048 responses, that after cleaning left 545 samples for analysis. Australia has a much larger population (25,766,605 people on 31 December 2021) (Australian Bureau of Statistics, 2021) than New Zealand (5,127,100, on 31 March 2022) and considering this, the sample size obtained for this research seemed comparatively substantial.

Throughout the research, only the primary researcher had access to the survey and its results, which were secured and encrypted by Qualtrics software. At the conclusion of the survey, the data was downloaded to the primary researcher's personal computer and held securely, through single access and encrypted software. Some cleaning of the data, such as removing spoilt samples was conducted through Microsoft Excel, the remainder was uploaded for cleaning and analysis in IBM SPSS Statistics, Version 28.

3.7. Data Analysis

A total of 1026 people clicked on the survey URL and arrived on the survey page. The initial cleaning process is detailed in Figure 7 below. A total of 196 responses were removed as spoilt samples, in that no questions were answered once they arrived at the survey. Failure to meet inclusion criteria saw six samples removed as they were not 16 years or older and a further 42 who were not surfers. Two hundred and ninety-seven respondents stated they had not conducted a rescue as a bystander and four respondents answered the first two qualifying questions but not the third. Ten respondents answered "yes" to having conducted a rescue but did not continue the survey from this point. Forty-nine responses were removed as incomplete surveys, having not finished. A further four were removed as answers fell well outside of range or were contradictory to one another. Removing these samples is common practice in statistical analysis, as this can significantly distort results (Pallant, 2003). This left a final sample of 418 complete surveys for analysis.

Figure 7. Initial cleaning process of downloaded survey data.



On multiple survey questions, respondents were allowed to “select all that apply”, as well as enter free text, when the provided answer options did not include the right option for respondents’ circumstances. Examples of this include: *Where have most of your rescues taken place? What were most of these people doing when you rescued them? What were you doing at the time of rescue?* For SPSS to read the data accurately from Excel, additional variables had to be created to ensure all of the respondent’s answers were captured, as SPSS would only record the leading numeric during upload and forego the remaining answers. An example of this was the question, “*Where have most of your rescues taken place?*” Respondents could select multiple locations where they have rescued but SPSS would only acknowledge the

location listed first. Additionally, there were enough common themes where respondents had used text to enter similar answers, that new categories were created, and respondents' answers aligned with these categories as per the researcher's codebook. Any minority answers remained as "other". Some text answers were submitted that were very similar or identical to provided survey options. These answers were re-coded from "other" to the appropriate option.

Variables that required additional categories are as follows:

- *Rescuer Ethnicity* - Codes updated to include European/Other people
- *How the person came to be in trouble* – Codes updated to include: broken or lost equipment, boating incident, medical/injury, and intoxication.
- *What were most people doing at the time of rescue* - Codes updated to include: kayaking, boating and kai gathering.
- *What was the rescuer doing before the rescue* - Codes updated to include: sunbathing, walking, coming or going for a surf and training/coaching/volunteering.
- *Person rescued ethnicity* - Codes updated to include: European/Other people.

The final question of the survey asked respondents "*what could be done to better support and equip surfers with the knowledge, training, equipment etc. to safely perform rescues at NZ beaches*"? Respondent answers were captured through free text, where they could enter as much or as little information as they wanted. Of the 418 respondents, 333 free text answers were submitted. These answers were categorised, with some answers relevant to multiple categories. A list of key words was formed and recorded in the researcher's codebook, defining what categories each answer would fit into. Free text answers falling outside of a defined category were labelled as "other". The key words and categories are defined below in Table 4: Free text categories and key words

Qualtrics identified 24 responses as potentially duplicate. During the cleaning process, these responses were identified and compared, line by line, to ascertain if they were indeed duplicates. On all occasions, the answers carried some similarity in areas but were distinctly different in others and no two IP addresses were the same. For these reasons the 24 samples remained for analysis.

Each categorical variable was checked for errors to review the range of each. This triggered a review of three variables in particular: total bystander rescues, age of victim rescued, and age of victim most recently rescued. This line-by-line analysis identified 40 samples that first appeared inconsistent. After review, these samples were able to be amended or removed.

Once the cleaning process was complete the data was ready for statistical analysis. Frequency tables were generated for all survey questions, providing both frequency (n) and percentage (%). Chi-Square Test of Independence, odds ratios and Chi-Square Goodness of Fit Tests were used to test relationships between variables.

Table 4: *Free text categories and key words*

Category	Key words
Free training for surfers in Rescue awareness and techniques	Training, courses, teach
Promotion of training courses available for surfers	Promotion, publicise, market
Better self-awareness - Surfers and Public	Self-awareness, self-assessment, knowing ability
Surfing 101 - Foundational skills for surfers through Surf schools and board rider clubs	Foundation, basic skills, surfing rules, learning to surf
1st aid and CPR made available	1st aid, CPR, medical
Free swimming lessons and beach safety for public/ Early childhood education	Swimming, public education, childhood, youth, water safety
Surf rescue/AED equipment available at locations	Rescue equipment, tubes, floatation device, AED, communication, rescue rings
More lifeguard patrols/ hours patrolled	Patrol, Lifeguards, patrol hours, unpatrolled beach
Ongoing Surfers 24/7 courses	24/7, surfer specific rescue course
Better collaboration between surfers and SLSNZ	Collaboration, relationship, work with
Signage/localised Information at beaches	Signs, local information, QR code
Online/TV/printed training & Education	Social media, you tube, Instagram, Facebook, pamphlets, poster, TV ads
Other	All other free text that did not categorise

3.8. Ethics and Cultural Considerations

The Auckland University of Technology Ethics Committee (AUTEC) approved the research proposal on 4th May 2022, reference number 22/66 (Appendix H). Due to the anonymous and voluntary nature of the online survey, only minimal ethical issues were identified, and the research was deemed low risk. The lead researcher has been a surfer and surf lifeguard and is conversant with the culture of the surf community. This proved valuable while forging relationships with SLSNZ and Surfing NZ, as well as providing a depth of understanding of the subject matter. Community consultation on the project was consistent during development and throughout the research, facilitated through social acquaintances, SLSNZ, Surfing NZ and experienced researchers on the topic of bystander rescue.

SLSNZ and Surfing NZ were regularly consulted from early in the research process and recognition of their involvement was advertised on the promotion of the survey. Regular consultation continued through the research, with SLSNZ and Surfing NZ having not only provided funds for the incentive (a surfboard) but also having helped to inform survey content and research objectives. Copies of the finalised outcomes of this research will be provided to both agencies. These agencies may utilise the data to inform prevention strategies, seek funding for practitioners and prompt further examination.

3.9. Chapter Summary

This chapter addressed the methodology and methods used for this research. A quantitative, cross-sectional study was adopted and the data gathering instrument used was an online, voluntary, and anonymous questionnaire. Convenience sampling was used to recruit a sample of the New Zealand surf population. SLSNZ and Surfing NZ's social media platforms of Facebook and Instagram were used to promote the survey. These promotions contained a URL link to Qualtrics, where respondents could complete the online survey. Once promotion of the survey slowed and responses were exhausted, the survey was closed. The data was downloaded from Qualtrics for cleaning. This process involved removing spoilt and incomplete samples, checking for errors and re-coding. Once the cleaning process was complete, a sample size of 418 samples remained and were uploaded to SPSS for statistical analysis. All ethical considerations were considered and abided by through each step of the research.

Chapter 4: Findings

4.1. Chapter Introduction

This research aims to assess the contribution surfers make to reducing fatal drowning on New Zealand's beaches, examine the characteristics of aquatic bystander rescues conducted by surfers and provide recommendations that inform policy and practice, geared to the reduction of drowning fatalities in New Zealand. To achieve these aims, this chapter first analyses the demographics of surfers conducting rescues at New Zealand's beaches (Section 4.2), followed by examining the rescues that surfers have conducted over their lifetime to both quantify surfers' rescues and understand the demographics of drowning victims (Section 4.3). Then we explore the surfers most recent rescues in more detail, looking at the circumstances surrounding these rescues (Section 4.4). Furthermore, the chapter analyses the specific details of the rescue occurrence, hazard awareness and the rescuer/rescued reactions to the incident during response and post rescue (Section 4.5). Lastly, propositions to support the surf community to conduct aquatic rescues moving forward are examined (Section 4.6).

4.2. Respondent Details

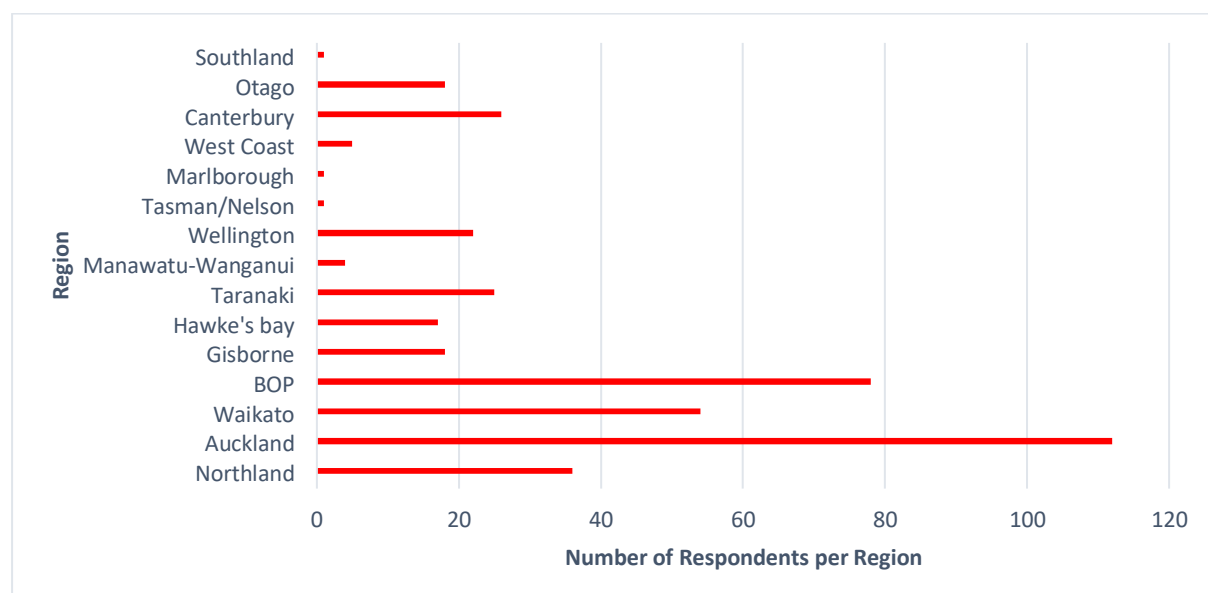
Most respondents were male (87.3%; n=365) with a similar age distribution. The most prominent age group was 40-49 (29.9% n=125), followed by 20-29, 30-39 and 50+, with all age categories being within 2% of each other (Table 5). New Zealand (NZ) European represented 81.3% (n=340) of respondents. The only other ethnicity reaching double digit percentages was Māori (11.2%; n=47). Collectively, 67% (n=280) of respondents reported their local surf break as north of Waikato/Bay of Plenty (Figure 8), which is similar to that of the New Zealand current population disbursement.

Seventy-three percent (n=305) of respondents were short board riders and almost half the respondents had 21+ years of experience (49.5%; n=207). It is unknown whether this is representative of the New Zealand surfer population. This is partially due to the method of data collection and the sample population being too small to be considered truly representative. Additionally, there is no published data on the topic in New Zealand where figures could be corroborated. The high level of experience was mirrored in self-rated water

confidence, with 84.9% (n=355) of respondents self-rating as “advanced” or “professional” ability (Table 5). Surfing regularity showed 42.8% (n=179) of respondent’s surf 1-2 times per week and 30.6% (n=128) 3-6 times per week. Further, 47.1% (n=197) of respondents will visit between 4 and 10 different beaches per year.

Seventy five percent (75.1%; n=314) of respondents had not completed any surfer specific rescue training. The remaining 24.9% (n=104) of respondents reported completing some form of rescue training. The survey did not capture exactly what training respondents had completed but in the free text comments, eight respondents included reference to the “*Surfer rescue 24/7*” course delivered by Surfing NZ.

Figure 8. Distribution of surfers’ “Local Break”.



Of the respondents who had rescued five or more people (n=126; 30%), 69% (n=87) had not undergone any rescue training, while the remaining 31% (n=39) had received rescue training of some description. Chi-Square Tests of Independence were performed to assess the relationship between having undergone rescue training and increased frequency of rescues, the relationship between age and completion of formal rescue training, and years surfing, and number of persons rescued. Results showed there was no statistically significant relationship between completion of rescue training and increased frequency of rescues, indicating no difference in likelihood within the sample population to perform a rescue, after having received rescue training. Analysis between age and completion of formal rescue training showed a statistically significant relationship between the two variables $\chi^2 (4, N = 418)$

= 20.421, $p = <.001$, suggesting surfers may be more willing to undertake rescue training as they get older. There was a moderately strong association between age and having undertaken rescue training (Cramer's $V=.221$). Furthermore, a statistically significant relationship was seen between the years of surfing experience and the number of persons rescued $X^2 (9, N = 418) = 44.93, p = .001$. However, this was expected, as increasing years of experience would also increase opportunities for exposure to rescue events.

Table 5. *Descriptive Statistics. Rescuer Demographics at the time of completing the survey.*

Characteristic	Frequency (n)	Percentage (%)
Gender		
Male	365	87.3
Female	51	12.2
Non-Binary	2	0.5
Age at the time of survey (years)		
16-19	34	8.1
20-29	89	21.3
30-39	83	19.9
40-49	125	29.9
50+	87	20.8
Ethnicity		
Māori	47	11.2
NZ/Euro	340	81.3
Pacific Island	3	0.7
Asian	4	1
European/Other people	24	5.7
Region of "Local" surf break?		
Northland	36	8.6
Auckland	112	26.8
Waikato	54	12.9
BOP	78	18.7
Gisborne	18	4.3
Hawke's Bay	17	4.1
Taranaki	25	6
Manawatu-Wanganui	4	1
Wellington	22	5.3
Tasman/Nelson	1	0.2
Marlborough	1	0.2
West Coast	5	1.2
Canterbury	26	6.2
Otago	18	4.3
Southland	1	0.2

Table 5. Continued. *Descriptive Statistics. Rescuer Demographics at the time of completing the survey.*

Characteristic	Frequency (n)	Percentage (%)
Surfing Technique		
Short board	305	73
Long board	86	20.6
Body board	5	1.2
SUP	10	2.4
Kite	4	1
Sail	2	0.5
Body surf	6	1.4
Surfing experience (years)		
< 1	3	0.7
1 to 5	45	10.8
6 to 10	63	15.1
11 to 20	100	23.9
21+	207	49.5
Self-rated water confidence		
Beginner	5	1.2
Intermediate	58	13.9
Advanced	232	55.5
Professional	123	29.4
Completion of rescue training		
No	314	75.1
Yes	104	24.9
Water recreation regularity		
Every day	13	3.1
3-6 times a week	128	30.6
1-2 times a week	179	42.8
1-3 times per month	78	18.7
3-11 times per year	17	4.1
1-2 times per year	2	0.5
Less often	1	0.2
Beach visitation (beaches visited per year)		
1 to 3	26	6.2
4 to 10	197	47.1
11 to 20	129	30.9
21+	66	15.8

Note. Sample size (N) was 418 completed surveys.

4.3. Bystander Rescue Details

Part Two of the survey asked the respondents about rescues they had conducted across their lifetime. These included questions relating to topics such as number of rescues completed, gender of the person they rescued and what the catalyst for the rescue was. Of the respondents that answered the question (n=776), *“Have you ever rescued someone from the surf as a bystander”*, 62% of the respondents stated they had. Of these rescues, the majority occurred north of Waikato/BOP (Figure 10), which almost directly reflects the origins of the majority of respondents’ local surf breaks (Figure 9). A Chi-Square Goodness of Fit Test was performed to determine whether the proportion of respondents’ home surf break was similar to locations where they conducted rescues. The resulting observed frequencies were inconsistent with the expected frequencies $\chi^2 (1, N = 364) = 105.538, p = <.001$, suggesting surfers from the sample population are more likely to conduct rescues at their home break.

Figure 9. Comparison of where respondents surf versus where they conduct most of their rescues.

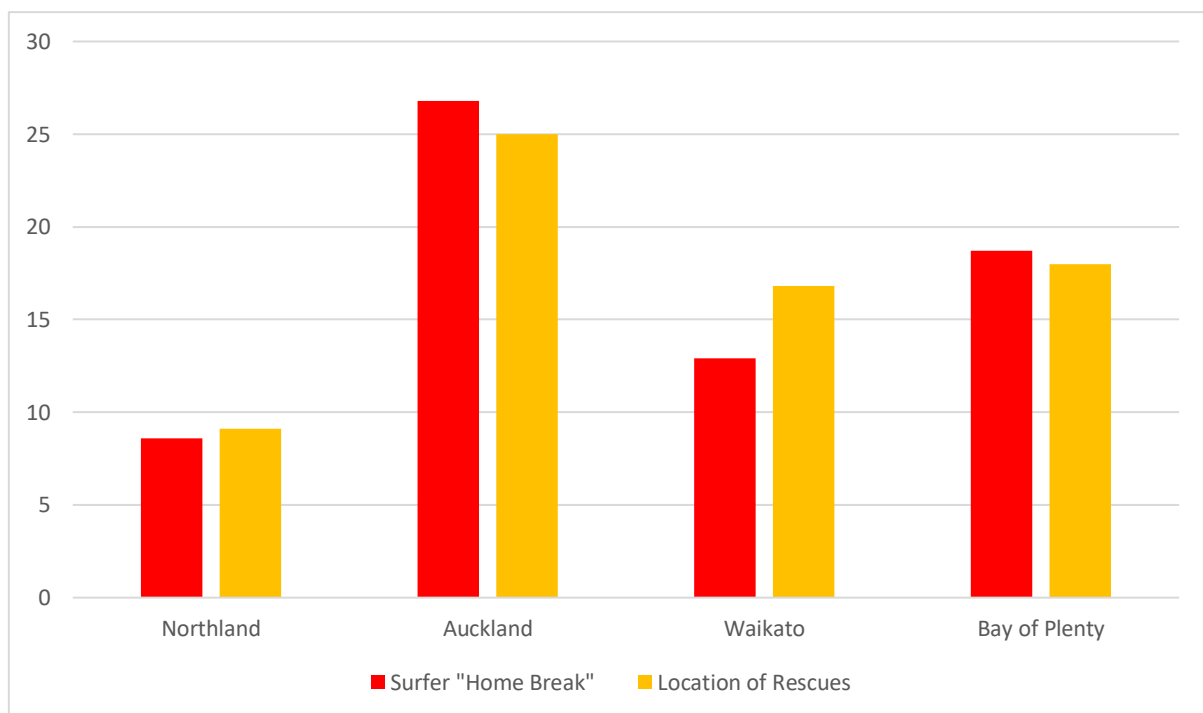
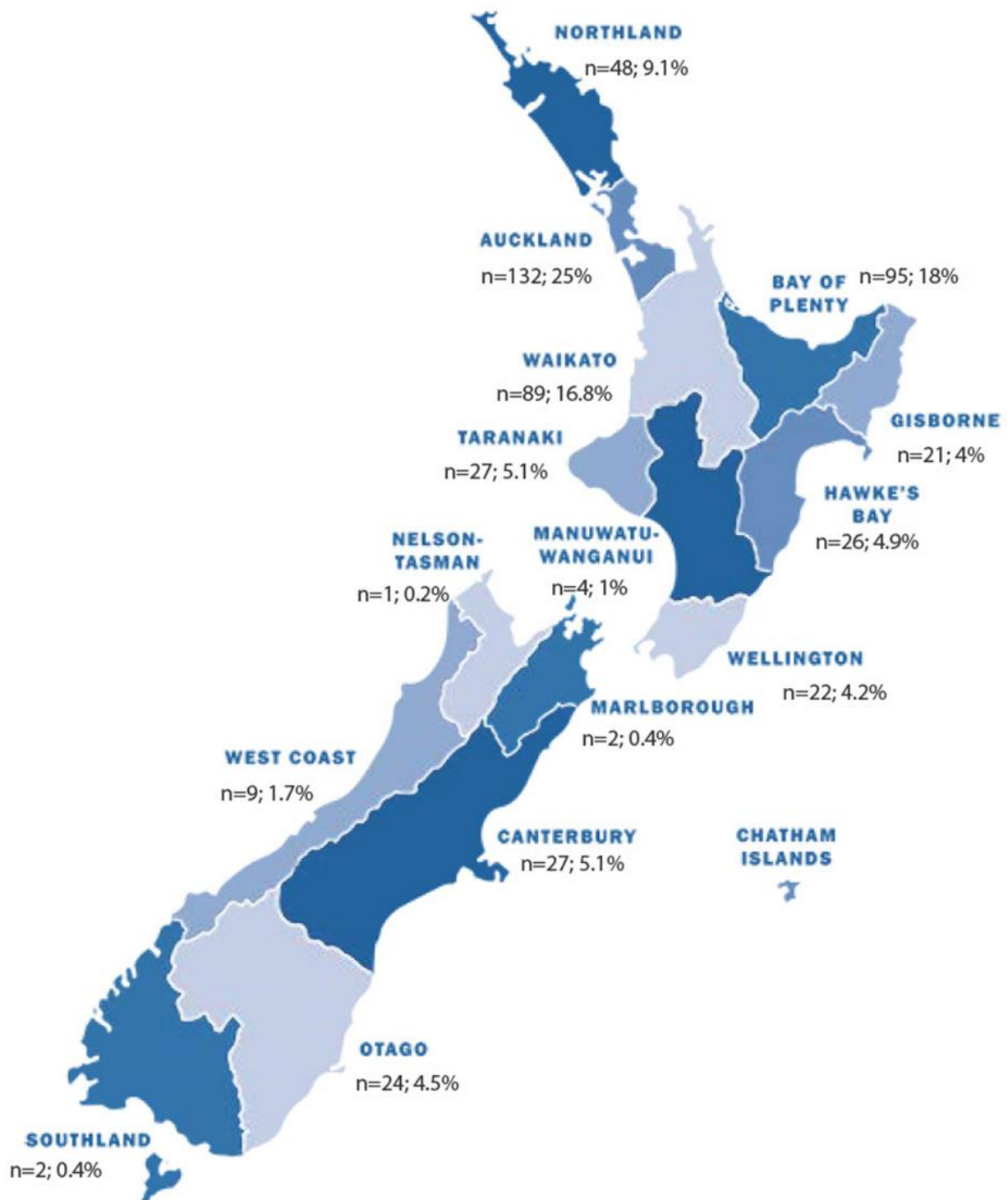


Figure 10. Regional comparison of location of rescues performed by respondents.



Note. Colour coding provides clear identification of region borders only.

The number of rescues respondents had conducted in their lifetime revealed a mean of three rescues per respondent ($M=3.05$, $SD=1.52$). A Chi-Square Test of Independence showed a statistically significant relationship between self-assessed advanced/professional surfers and increased frequency of rescue (rescuing 4 + people) $\chi^2 (1, N = 418) = 23.172, p = <001$. Further to this, the odds ratio showed that if respondents self-rated as advanced/professional, they were six times the odds to rescue 4+ people than someone who describes themselves as beginner/intermediate ($OR = 6.059$, 95% CI [2.687, 13.666]).

Comparison between means of the number of rescues conducted by gender revealed little difference between genders, with male and female both close to a mean of three rescues. Males and females most frequently reported having rescued 5+ people (males 30.7%; $n=112$, females 25.5%; $n=13$). Non-binary respondents only included two respondents, which was an insufficient number to draw conclusions relating to mean.

Table 6. *Descriptive Statistics. Detailing how many people respondents have rescued in their lifetime.*

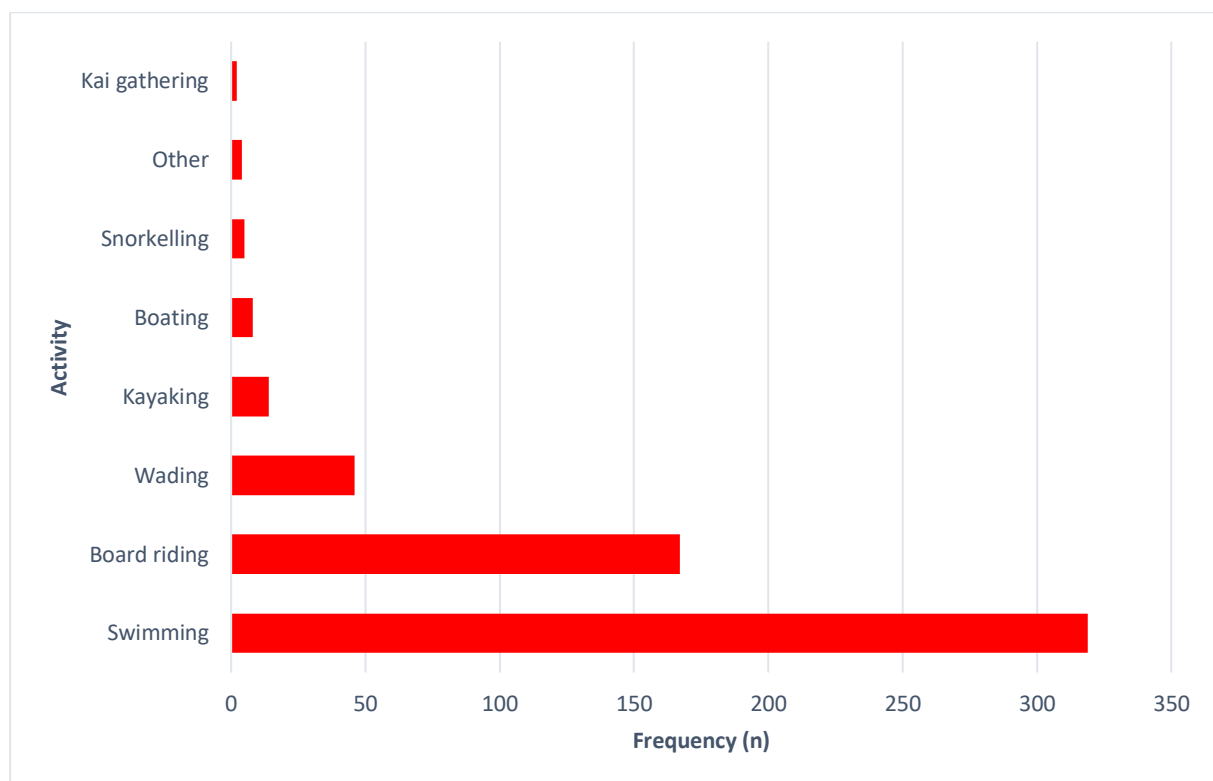
	1 Person	2 People	3 People	4 People	5+ People	Total Rescues (n)
Frequency (n)	81 (19.4%)	104 (24.9%)	73 (17.5%)	34 (8.1%)	126 (30.1%)	1274
Total Rescues (n)	81	208	219	136	630	
Average rescues per respondent (N=418)						3.04

Table 7. *Average number of rescues per gender*

	Male	Female	Non-Binary
Total respondents (n)	365	51	2
Collective Rescue Total (n)	1123	145	6
Average Rescues (M)	3.08	2.84	3
Std. Deviation	1.517	1.528	2.828

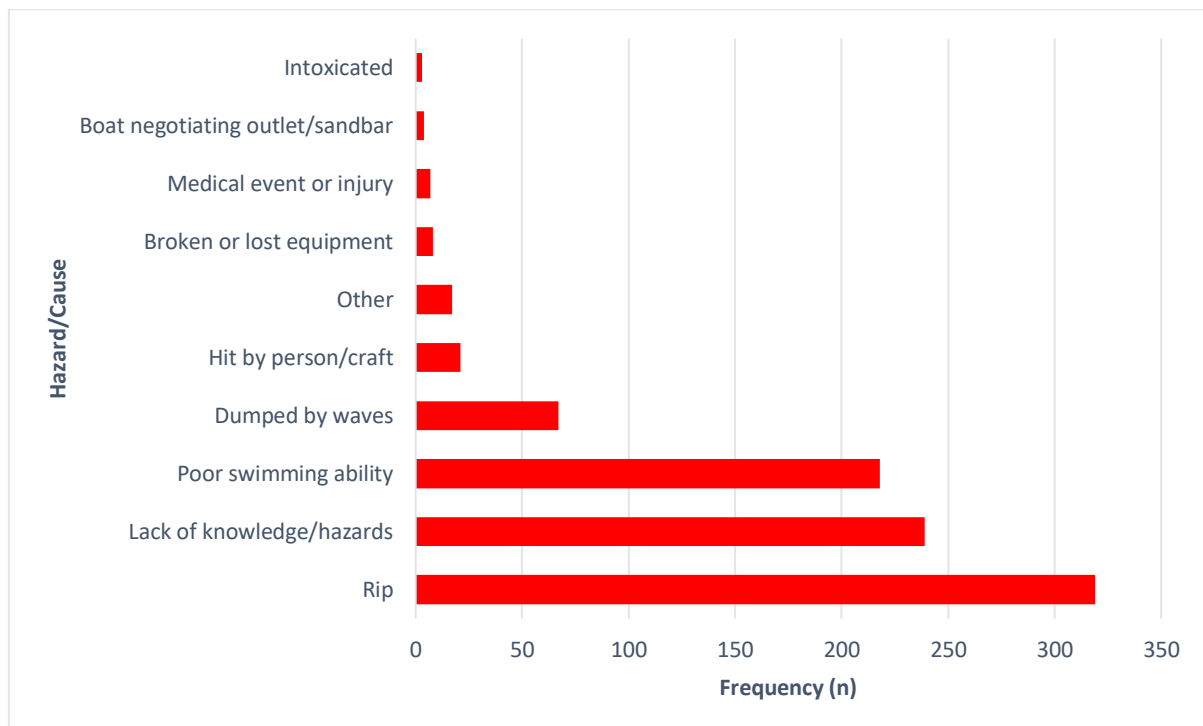
Lifeguards were present and on duty during 26.7% ($n=109$) of the rescue occurrences. In contrast, 73.3% ($n=299$) of rescues occurred either at a beach where there were no lifeguards (44.9%; $n=183$) or at a beach where lifeguards patrolled but were not on duty (28.4%; $n=116$). As expected, swimming was the prominent activity (Figure 11) performed by victims prior to rescue (56.5%, $n=319$) and aligns with Surf Life Saving New Zealand's (SLSNZ) suggestion that swimming is the highest risk aquatic activity.

Figure 11. *The activities people were doing at the time the rescue was conducted.*



The common causes initiating rescue were rip currents (35.33%; n=319), poor swimming ability (24.14%; n=218) and a lack of knowledge and hazards (26.47%; n=239). A Chi-Square Test of Independence found no statistically significant relationship between the prominent cause of rescue (rip and poor swimming ability) and whether the rescue occurred in a patrolled or unpatrolled area $\chi^2 (2, N = 408) = .861, p = .650$, suggesting the way in which people are becoming imperilled does not differ from patrolled to unpatrolled areas. Poor swimming ability and lack of knowledge were prominently paired as a catalyst for rescue. However, the remaining categories (Figure 12) demonstrate surfers from the sample population are conducting rescues under a multitude of circumstances, such as boating incidents and medical events. Drawing focus to rips more directly, as they are recognised as a leading hazard associated with drowning (Short & Hogan, 1994; Attard et al., 2015), nearly half (45.5%; n=190) of respondent's state between 75% and 100% of their rescues were related to rip currents.

Figure 12. *What the rescuer believed to be the cause of the rescue.*



Respondents were asked to report the gender of the person/s they had rescued, giving them options of male, female, or both male and female to select. Only 9% (n=36) of rescuers stated they have only rescued females. Fifty two percent (n=218) of rescuers say they have rescued both male and female. However, the gender comparison from rescuers' "most recent rescue", later in this section, highlights with more clarity the prominence of male rescue victims.

Figure 13. *Gender of persons rescued by surfers over the Rescuers lifetime.*

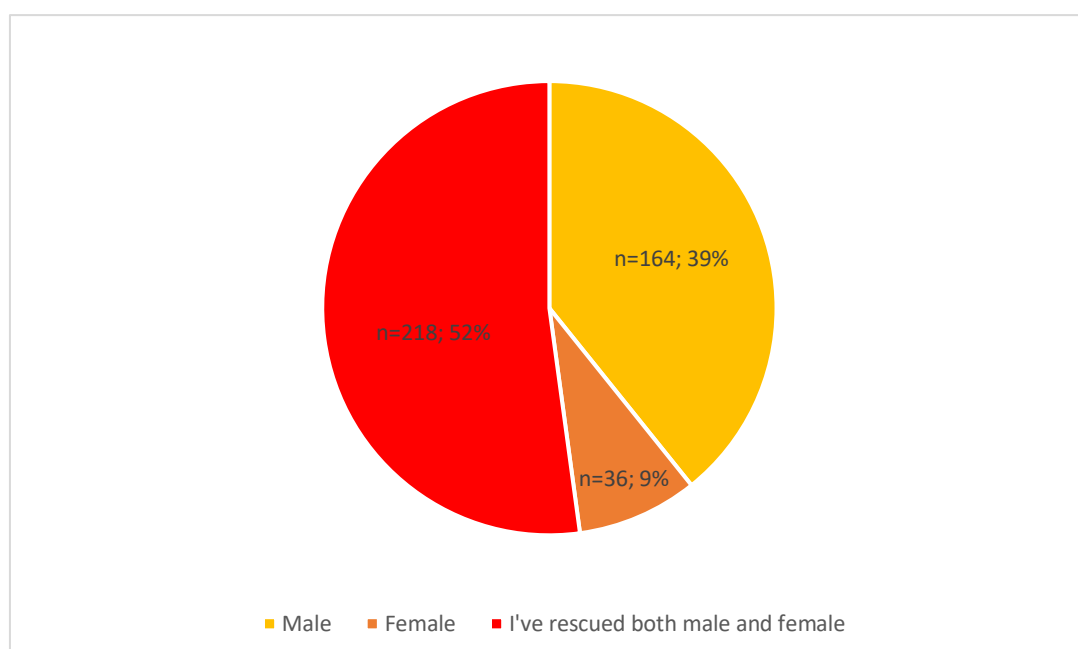
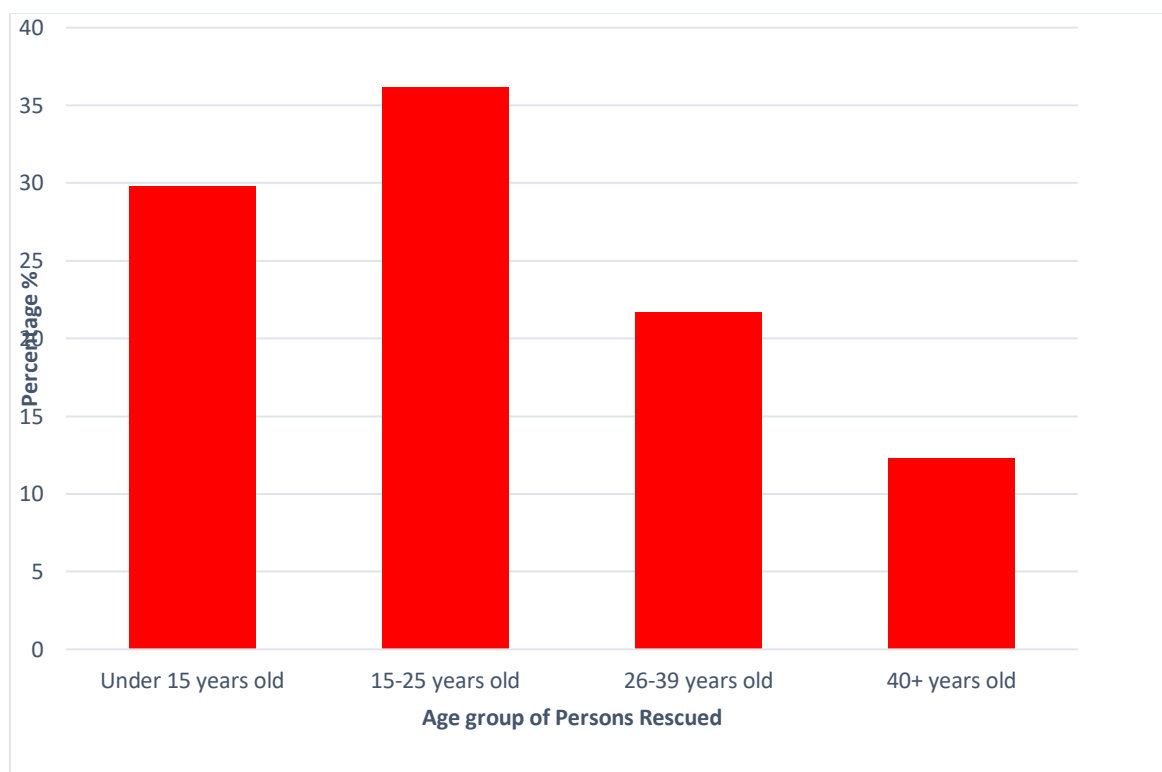


Figure 14 shows an increased frequency of rescues conducted for people aged between 15-25 years old. This aligns with earlier suggestions from Koon et al., (2021) and Moran, (2014) that this age, particularly amongst males, is a higher risk time in life due to more excessive risk taking and overconfidence. The number of persons rescued per age group peaks at 15-25 years (36.25%; n=643) and then significantly decreases in the remaining age groups, 26-39 and 40+ years. The total number of people rescued by the sample population was 1274. This number is derived from the 418 respondents' rescues performed over their surfing career.

Figure 14. *Approximate age of the person/s rescued.*

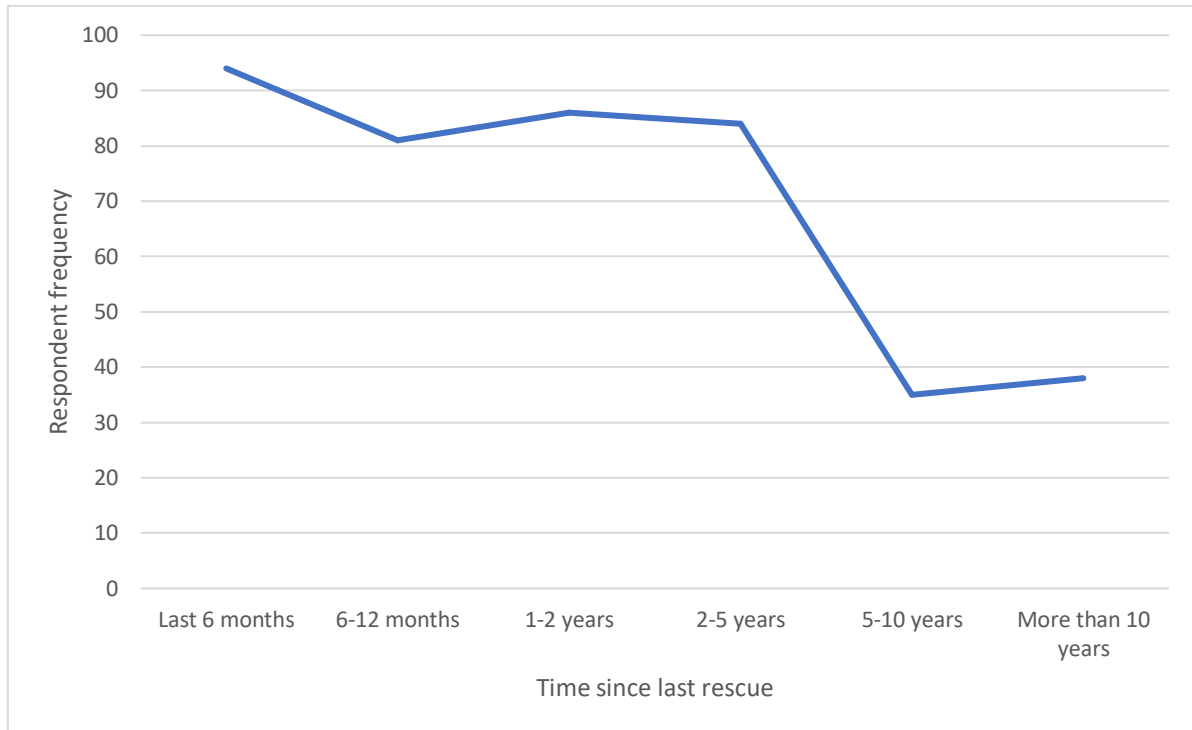


4.4. Recent Rescue Circumstances

In Part Three of the survey, respondents were asked about their most recent rescue and the circumstances within which it happened (Table 8). Over 82% of these rescues occurred in the past 5 years, with a similar distribution of approximately 20% per time period, from 6 months to 5 years (Figure 15). The highest proportion of recent rescues were conducted within the last 6 months (22.5%; n=94) and occurred during daylight hours. As the survey was opened May 19th, 2022, and closed on 25th July 2022, the last “6 months” the respondents referred to include the most recent New Zealand summer, December 2021 to February 2022, recognised as a peak time for coastal drowning. The most common hours for rescues were

between 12pm and 4 pm (43.8%; n=183). This time period is when the day is the hottest and when beach visitation is at its expected highest.

Figure 15. *Time since respondent's last rescue.*



Respondents were also asked about the environmental conditions at the time of the rescue. Moderate swell (2-4 foot) was the prominent wave size (62.4%; n=261) during rescue. The difference between smooth/glassy waves and choppy/messy was negligible, with 1.2% (n=5) difference between the two. A Chi-Square Goodness of Fit Test was performed to determine whether the proportion of rescues performed in choppy conditions was similar to those performed in smooth/glassy conditions and the observed frequencies were consistent with the expected frequencies $\chi^2 (1, N = 418) = .061, p = .806$. Therefore, rescues were no more likely to occur in choppy conditions compared to smooth/glassy conditions. For this analysis, flat conditions were omitted. A Chi-Square Test of Independence also showed no significant relationship between smooth/glassy and choppy/messy conditions and the rescuer requiring help to effect rescue $\chi^2 (2, N = 418) = 2.359, p = .307$. Therefore, surf conditions were not a factor thought to affect rescuers' requirement for assistance during rescue within this group.

Lifeguards were on duty at the beach for 14.1% (n=59) of the recent rescues conducted. The remainder (85.9%; n=350) of rescues occurred in the absence of lifeguards, with the most significant proportion (30.1%; n=126) occurring at a patrolled beach but outside of patrol

hours. A Chi-Square Goodness of Fit Test was performed to determine whether the proportion of rescues performed whilst in the presence of lifeguards was similar to rescues performed in the absence of lifeguards. Results showed the observed frequencies were inconsistent with the expected frequencies $\chi^2 (1, N = 409) = 207.04, p = <.001$. Therefore, rescues were more likely to occur in the absence of lifeguards. For this analysis, respondents that did not know if lifeguards were present during rescue were omitted.

When asked what activity the respondents were doing prior to the rescue, 75.4% (n=314) were surfing. Of the respondents who rescued people while lifeguards were on duty, 78% (n=46) of them were surfing at the time. This highlights the benefit of surfers being in the water and proximate to people needing to be rescued and offers a decreased response time compared to lifeguards, who typically patrol from the beach. Lastly, in this section, respondents were asked if someone assisted them with the rescue(s) they conducted. The data showed a relatively even distribution of assisted rescues (46.7%; n=195) versus unassisted rescues (53.3%; n=223). The type or level of assistance was not captured in the survey data. For example, there was no determination between ‘in water’ assistance, such as multiple victim scenarios, assistance in paddling a victim to shore, or ‘on shore’ assistance of first aid, CPR etc. A Chi-Square Test of Independence showed no statistically significant relationship between whether a rescuer required help to effect rescue and whether they were rescuing a male or female $\chi^2 (2, N = 418) = .020, p = .990$; suggesting gender of the person rescued did not affect the rescuer’s requirement for assistance during rescue.

Table 8. *Descriptive Statistics. Circumstances surrounding respondent’s most recent rescue.*

Characteristic	Frequency (n)	Percentage (%)
How long ago did your most recent rescue occur?		
Last 6 months	94	22.5
6-12 months	81	19.4
1-2 years	86	20.6
2-5 years	84	20.1
5-10 years	35	8.4
More than 10 years	38	9.1

Note: Sample size was 418 completed surveys.

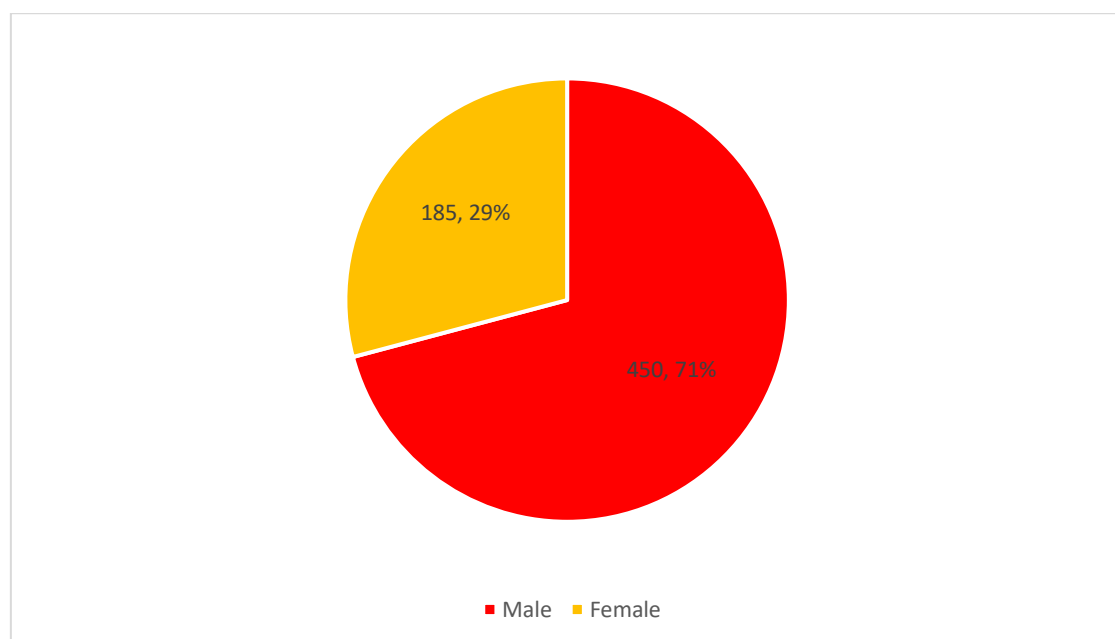
Table 8. Continued. *Descriptive Statistics. Circumstances surrounding respondent's most recent rescue.*

Characteristic	Frequency (n)	Percentage (%)
Approximately what time of day did the rescue occur?		
12-4am	11	2.6
4-8am	17	4.1
8am-12pm	94	22.5
12pm-4pm	183	43.8
4pm-8pm	106	25.4
8pm-12am	1	0.2
Unsure	6	1.4
What was the wave height when the rescue took place?		
Gentle	65	15.6
Moderate	261	62.4
Large	79	18.9
Massive	13	3.1
What were the surf conditions like when the rescue took place?		
Smooth and glassy	204	48.8
Choppy/messy	209	50
Flat	5	1.2
Were there lifeguards on duty patrolling the area?		
Yes	59	14.1
No, but there were lifeguards patrolling < 1km away	78	18.7
No, but there were lifeguards between 1 and 5km away	34	8.1
No, but there were lifeguards patrolling > 5km away	12	2.9
No, it was outside of patrolled hours	126	30.1
No	100	23.9
Don't know	9	2.2
What were you doing at the time of rescue?		
Surfing	315	75.4
Swimming	37	8.9
Sunbathing	13	13
Walking on the beach	10	2.4
Had come in, or were going surfing, or checking the surf	12	2.9
Training/coaching/working/volunteer	8	1.9
Other	22	5.3
Did other people help you with the rescue?		
No	223	53.3
Yes	195	46.7

4.5. Recent Rescue Details

In Part Four of the survey, respondents were asked for specific detail about the rescue they had conducted recently. Questions related to the person rescued, how the rescue was performed, risk assessment and the outcomes of the rescue. Males represented 71% (n=450) of the total number of persons rescued (n=638), during the respondents “most recent rescue”. Descriptive figures of the age groups rescued showed two particularly high-risk groups, one being people aged 10-19 years and the second people aged 20-29 years. Although there was a measurable frequency reported in different age categories, 10-19- and 20-29-year age groups collectively represented 58.9% of all rescues conducted (Figure 17). A Chi-Square Test of Independence was performed to assess the relationship between people in high-risk age groups⁵ and wave size at the time of rescue, as a means of exploring higher risk-taking behaviour. There was no statistically significant relationship between the two variables $\chi^2(3, N = 418) = 1.643, p = .650$, suggesting wave size was not necessarily the prominent factor increasing risk within this group. The majority of people rescued were NZ/European, representing 62.4% (n=239) of the rescued sample. Māori and Asian were the only other single ethnicities to exceed 5% representation, at 12.27% (n=47) and 11.23% (n=43) respectively.

Figure 16. Gender comparison of people rescued during “Most Recent Rescue”.



⁵ Descriptive figures demonstrated a higher frequency of rescuing people within the age 10-29 age bracket. For the purpose of this test, this was the “high risk” group and all other ages were collectively “low risk”.

Figure 17. Age group comparison of people rescued during “Most recent rescue”.

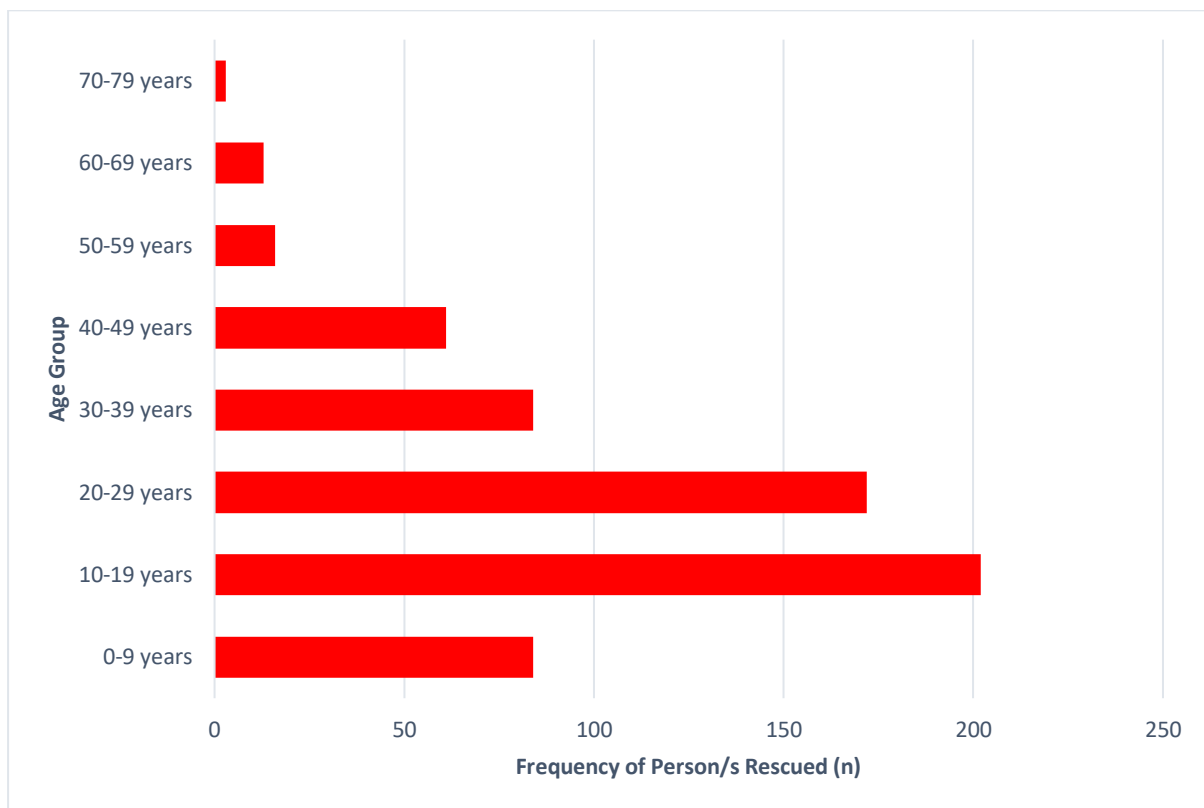
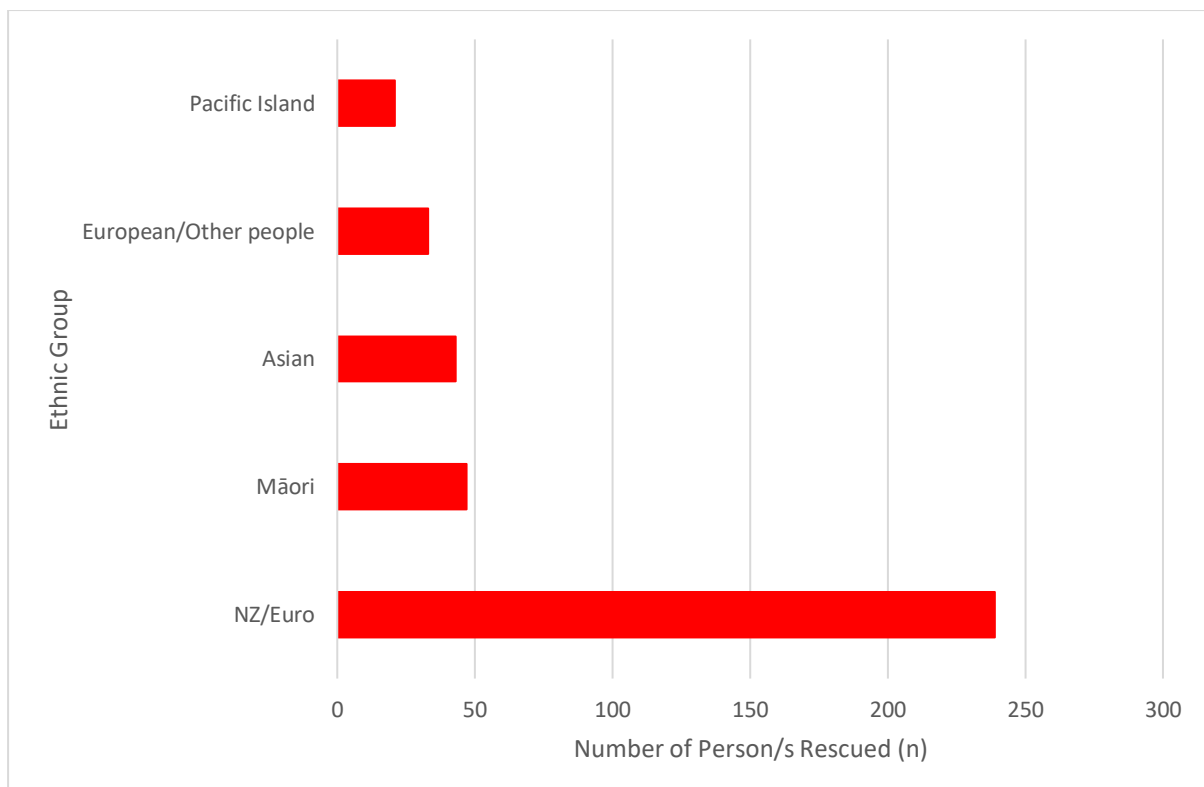


Figure 18. Rescued person ethnicity.



Overwhelmingly, a rescuer/stranger relationship was most prominent, with 91.4% (n=382) of rescuers not knowing the person they rescued. The only other relationships of note were those who rescued a sibling (1.4%; n=6), child (1%; n=4) or friend (5.3%; n=22). Respondents were asked if they had seen the situation as it developed; for example, a person entering a rip or dangerous conditions. Overall, 45% (n=188) said they had not seen the situation develop, while 55% (n=230) had. This suggests an ability amongst surfers to act preventatively, as well as to quickly assess a situation and respond rapidly. Preventative actions were not addressed in this research, only rescues.

Table 9. *Descriptive Statistics. Details the responses to questions that relate to the actual rescue taking place and the outcomes for both rescuer and person rescued.*

Characteristic	Frequency (n)	Percentage (%)
Did you see the situation as it developed?		
No	188	45
Yes	230	55
How Confident were you in your ability to rescue the person?		
Not at all confident	6	1.4
Somewhat confident	105	25.1
Completely confident	307	73.4
Did you conduct any kind of risk assessment before the rescue?		
Yes, I stopped and observed the situation quickly before going to rescue	84	20.1
Yes, I weighed the risks up as I made my way to the patient	114	27.3
No, I didn't need to because I knew the risks relevant to that location very well	169	40.4
No, it didn't even occur to me. I saw someone in trouble and just went and helped	51	12.2
Did you use a floatation device?		
No	67	16
Yes, a surfboard, SUP etc.	346	82.8
Yes, rope or line	1	0.2
Yes, other	4	1

Note: Sample size was 418 completed surveys.

Table 9. Continued. *Descriptive Statistics. Details the responses to questions that relate to the actual rescue taking place and the outcomes for both rescuer and person rescued.*

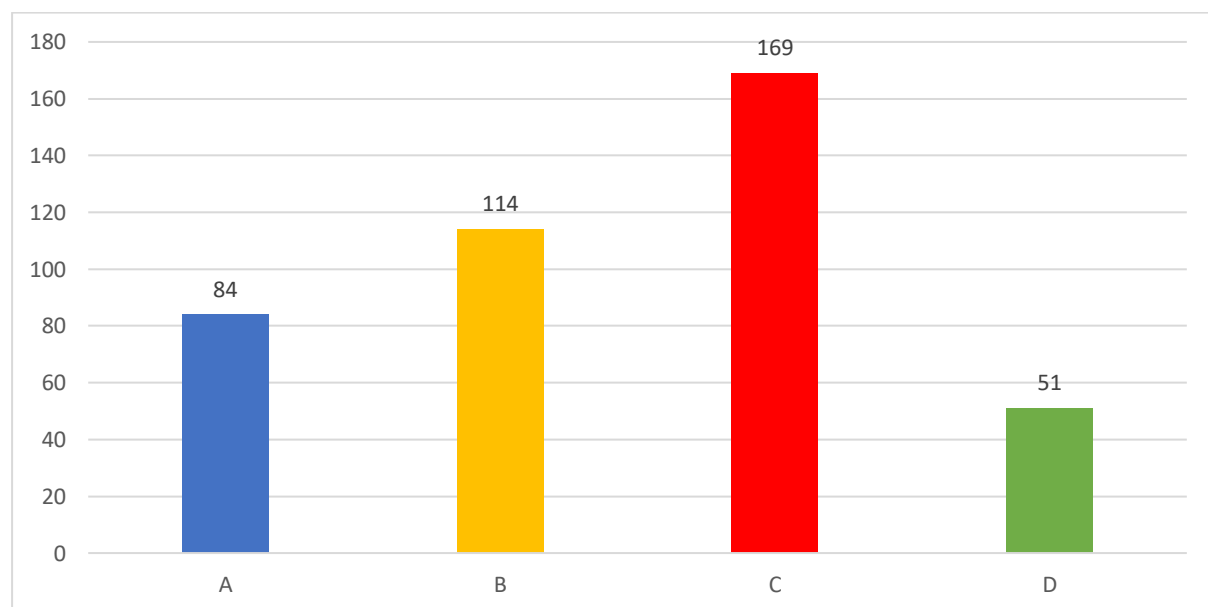
Characteristic	Frequency (n)	Percentage (%)
Did the person seem to know they were in trouble?		
Yes but calm	38	9.1
Yes but relieved	115	27.5
Yes but panicked	232	55.5
No, no idea	23	5.5
Unconscious	9	2.2
Can't remember	1	0.2
What condition was the person in after the rescue?		
Required CPR	11	2.6
Required first aid	15	3.6
Required ambulance	30	7.2
Ok, could walk away	361	86.4
Can't remember	1	0.2
How difficult for you was it to rescue the person?		
Easy	102	24.4
Relatively easy, some difficulty	209	50
Relatively difficult	91	21.8
Very difficult	16	3.8
How did the experience leave you feeling		
Happy to help	260	62.2
Relieved	98	23.4
Inconvenienced	6	1.4
Annoyed	32	7.7
Scared	4	1
Sad	6	1.4
Other	12	2.9
Do you think you saved the person's life?		
No	63	15.1
Yes	194	46.4
I don't know	161	38.5

When asked about confidence in their ability to conduct a rescue, 73.4% (n=307) of the respondents acknowledged they were confident. The remaining group of 25.1% (n=105) said they were somewhat confident and only 1.4% (n=6) said they were not confident. However, when asked how difficult the actual rescue was, three quarters of the surfers said they had some or a lot of difficulty (Table 9). An odds ratio test was conducted to determine if males

had a higher confidence level to rescue than females and no significant difference was found (OR = 0.69, 95% CI [0.95, 1.03]). This suggests males were no more confident to rescue than their female counterparts.

An element of rescue confidence is derived from the rescuer's perceived ability to manage risk. This is the consequence when people experience fear or a lack of ability to cope sufficiently in high stress situations, because their evaluation of the stressful occurrence exceeds their evaluation of personal resources to face that situation (Steimer, 2002). As such, the respondents were asked if they conducted a risk assessment before the rescue. Almost half of the respondents (47.4%; n=198) acknowledged that a risk assessment had been done either before acting or on their way to rescue the person. Surfers' knowledge about their local surf break and its hazards was somewhat reflected in the data, in that 40.4% of respondents (n=169) felt they did not need to conduct such an assessment, as they were familiar with the risks, relevant to their location. Acting on impulse (altruistically) and going to someone's aid without considering the risks was disclosed by a minority of respondents, at 12.2% (n=51).

Figure 19. Comparison between whether rescuers conducted a risk assessment or not prior to rescue.



Legend. A= Yes, I stopped and observed the situation quickly before going to rescue. B= Yes, I weighed the risks up as I made my way to the patient. C= No, I didn't need to. D= No, it didn't even occur to me.

The use of a buoyancy aid has been identified as a key element aiding successful rescue (Brander et al., 2019). Respondents used a buoyancy aid during their most recent rescue on 84% (n=351) of occasions. A surfboard was the most common item used (82.8%; n=346),

which is not surprising since 75.4% (n=314) of the rescues occurred while surfing. A Chi-Square Goodness of Fit Test was performed to determine whether the proportion of rescues conducted with the use of a buoyancy aid, versus those without, was similar (Rescues with buoyancy n=351: Rescues without buoyancy n=67). Results showed that the observed frequencies were inconsistent with the expected frequencies $\chi^2 (1, N = 418) = 192.95, p = <.001$. Therefore, surfers from within this sample are more likely to perform a rescue with the use of a buoyancy aid. Nonetheless, the survey results indicate a significant 16% (n=67) of rescues were conducted without any buoyancy aid and consequently suggests an element of rescues were conducted with a significantly inflated level of risk.

This research aimed to gain understanding of the outcomes of the rescues conducted by this sample population and to collect information on how both the persons rescued, and the rescuers were affected. When asked if they thought the person(s) rescued knew they were in trouble, 55% (n=232) of the respondents said the person(s) was both aware of the danger and were panicked. The second most common answer was 'aware but relieved to have been helped' (27.5%; n=115). However, even with most people being in a high emotional state, 86.4% (n=361) were able to walk away from the incident without any further treatment required. This may support existing research that asserts panic and other highly emotive responses are common escalating factors in aquatic rescue and drowning incidents (Tipton & Montgomery, 2022).

Of the people that did require further medical care, 7.2% (n=30) required an ambulance, 3.6% (n=15) required first aid and 2.6% (n=11) required cardiopulmonary resuscitation. Respondents were generally "happy to have helped" or felt "relieved" with the outcome, when asked how the rescue experience affected them (Table 9). This group collectively represented 85.6% (n=358) of the respondent population. Only a small percentage of respondents felt inconvenienced (1.4%; n=6) or annoyed (7.7%; n=32). When given an opportunity to comment, these groups raised frustrations with lifeguards, parents not adequately supervising children, people not knowing their limits and better access to training, amongst other issues.

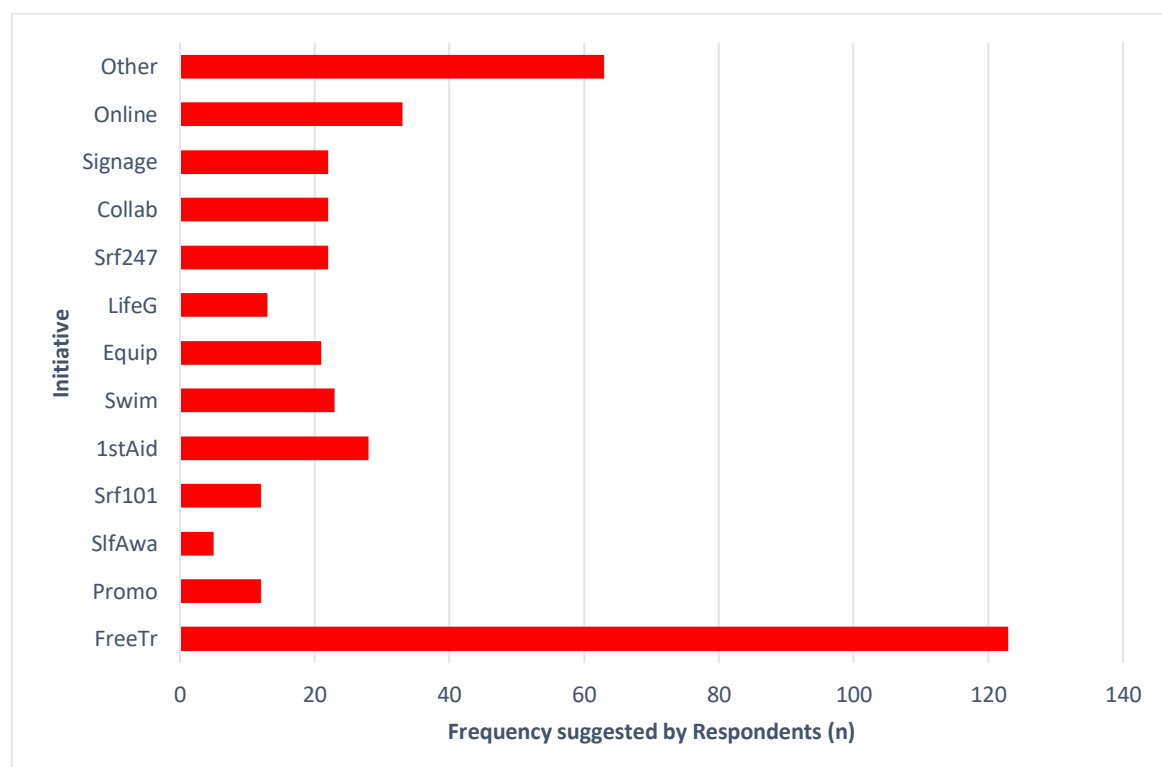
Finally, respondents were asked if they thought they had saved the person's life. Almost half, 46.4% (n=194) believed they had, while 38.5% (n=161) did not know and 15.1% (n=63) did not believe they had. When these statistics are applied to the total number of recent rescues

(n=638), this suggests 296 lives and an additional 245 possible lives may have been saved by this group of surfers through the rescues they conducted. This is of course a subjective assessment by the respondents, without means of verification. This question only related to the respondent's 'Most Recent Rescue', of which 83% occurred inside the last 5 years. The number of lives saved across all respondents' rescues in their lifetime is likely to be far greater.

4.6. Rescuer Opinions on Future Initiatives That Could Help Increase Surfer Rescuer Capacity

The final question of the survey asked respondents *“what could be done to better support and equip surfers with the knowledge, training, equipment etc., to safely perform rescues at NZ beaches”*? Respondent answers were captured through free text and further categorised for descriptive statistics. The dominant feedback from surfers was an increase in, or better availability to, rescue courses that would better equip surfers with appropriate rescue awareness and technique (n=123; 36.9%).

Figure 20. Respondent suggested initiatives to increase rescue capacity.



Legend. FreeTr - Free training for surfers in Rescue. Promo - Promotion of training courses available. SlfAwa - Better self-awareness - Surfers and Public. Srf101 - Surfing 101 - Foundational skills for surfers through Surf schools. 1stAid - 1st aid and CPR courses made available. Swim - Free swimming lessons and beach safety for public/ Early childhood education. Equip - Surf rescue/AED equipment available at locations. LifeG - More lifeguard patrols/ hours patrolled. Srf247 - Ongoing Surfers 24/7 courses. Collab - Better collaboration between surfers and SLSNZ. Signage - Signage/localised information at beaches. Online - Online/TV/printed training & education. Other - All other free text that could not be categorised.

4.7. Chapter Summary

This chapter presented the findings of the data analysis conducted on the results obtained from the questionnaire submitted by 418 surfers. Descriptive statistics summarised rescuer and victim demographics, as well as the circumstances, conditions, and outcomes of rescues. Further statistical analysis was conducted via odds ratios, Chi-Square Test of Independence and Chi-Square Goodness of Fit Test. These tests found an association between an increased years of surfing experience and the frequency of rescue. In addition, results suggested older surfers may have greater willingness to undertake formal rescue training. Further analysis identified areas where no association exists, such as rescues in varying surf conditions, or when rescuers required help to effect rescue. These factors may also be useful to inform drowning prevention initiatives. The next chapter discusses what relevance these results have in context to the existing literature and what implications they may have for drowning prevention and water rescue.

Chapter 5: Discussion

5.1. Chapter Introduction

Surfers have been identified, through international studies and anecdotal evidence, as a community group significantly contributing to reductions in fatal coastal drowning by conducting bystander rescues. This research aimed to explore this phenomenon in New Zealand, where scientific evidence is lacking. This research explored the demographic of 418 respondents and characteristics of the 1274 rescues they performed whilst predominantly out surfing. This research provided evidence of the value surfers may add to community coastal safety. It is hoped that the data from this research can go some way to supporting strategies that include surfers in recognised response capabilities and provide support for them to safely do so.

This chapter discusses the results of this study in relation to the research question and objectives, as well as how findings relate to existing literature. Trends and characteristics will be highlighted and discussed relating to rescuer demographics (Section 5.2), victim demographics (Section 5.3), bystander rescues (Section 5.4), rescue outcomes (Section 5.5) and the critical role surfers play in drowning prevention moving forward. It will conclude (Section 5.6) by revisiting aims and objectives, providing recommendation and insight into the study implications and how these may inform policy and practice relating to coastal drowning in New Zealand. Finally, the study limitations will be addressed before the chapter summary (Section 5.7).

5.2. The Importance of Identifying a ‘Rescuer’ Demographic Amongst Surfers

An objective of this research was to define the characteristics of surfer bystander rescues in New Zealand. A key element was to gain understanding as to ‘who’, from within the surf community, conducts bystander rescues. This is important to identify, particularly when future drowning prevention strategies may be geared toward the surf community. Identifying what groups are most receptive to training and capable in rescue, will enable water safety organisations to have a more targeted approach to building rescuer capacity.

Literature suggests more males conduct rescues when surfing (Attard et al., 2015). However, as a greater proportion of males participate in surfing, it is expected more males will conduct

rescues. Data from a 2005 National Surfer Survey showed an 86% male representative group and figures from Australia suggest males represent 81% of the surf population (Sport Research Group, 2005; Surfer Today, 2022). Data from this research is similar, with males representing 87.3% (n=365) of the sample.

It is unclear from the data collected, whether males were more likely to rescue, as asserted by Moran et al. (2016). Nonetheless, confidence level to rescue was questioned and revealed no significant difference between males and females (OR = 0.69, 95% CI [0.95, 1.03]), thus suggesting females were just as willing, or as confident, to conduct rescues as males. This finding is particularly interesting, given the physicality of aquatic rescue and statistically high probability of a male victim. For many women, the average size and weight of a male drowning victim would be significantly larger than themselves (Ministry of Health, 2021), making rescue more difficult without utilisation of proper technique and training.

A comparison of the average quantity of rescues conducted by male and female respondents in this research, revealed little difference between genders. Mean and median for both gender groups were approximately 3 rescues. Brander et al.'s (2019) study drew contrasting conclusions and found males performed twice as many rescues on average as female counterparts. Reasons for this disparity are unknown and consequences of using a self-reported survey are that verification is not possible. However, results do suggest, for a clearly male-dominated sport, women are contributing significantly to drowning prevention and significant efforts in future capability building initiatives should be made to ensure female representation.

Only 24.9% of respondents within the sample population had undergone formal rescue training. Yet all reported conducting a varying frequency of rescues. Absence of rescue training amongst bystander rescuers is not unusual and studies relating to bystander rescue (in all aquatic environments) are heavily skewed toward an untrained population (Attard et al., 2015; Franklin et al., 2019; Pearn & Franklin, 2018; Venema et al., 2010). Where this study does not align with previous research, particularly Attard et al. (2015) and Brander et al. (2019), is no association was found between having completed rescue training and an increased frequency of rescues. This begs the question of where the participants of this study accrued their knowledge and skills?

Firstly, age distribution within the group leant toward an older demographic, with 40–49-year-olds representing the highest proportion (29.9%), while respondents under 20-years-old represented the lowest (8.1%). This was to be expected as older surfers potentially would have been exposed to more opportunities to rescue. Secondly, most respondents have surfed for 21+ years, surf between one-six times per week, self-rate as advanced to professional in ability and visit between four and ten different beaches annually. Previous research suggests surfers' ability to perform aquatic rescues is intrinsically linked to years' surfing experience (Attard et al., 2015) and results from this study showed a statistically significant relationship between years surfing and number of rescues conducted ($\chi^2(9, N = 418) = 44.93, p = .001$).

This study did not address the value of surfer rescue training programmes, such as Surfer Rescue 24/7, or whether rescues would have been easier or more successful had specific rescue training been received. Surfers Rescue 24/7 is in its infancy in New Zealand and further research is sought to establish the efficacy of the course and its outcomes. There is broad consensus that an increasing knowledge of hazards, rescue technique and resuscitation training amongst bystanders will lead to less fatal drowning incidents (Koon et al., 2021; Moran, 2010; World Health Organization, 2017) and free text submissions from respondents in this study advocate for greater availability to specifically tailored rescue training for surfers. Conversely, Surfer Rescue 24/7 was adopted from Australia and implementing a programme with no consultation from the New Zealand surf community, or ability to alter content of the programme, may mean the content is not entirely suitable for a New Zealand context. This top-down approach and lack of public engagement has historically been common practice among Disaster Risk Management (DRM) organisations, where local knowledge has often been previously dismissed as insignificant or inferior (Gaillard & Mercer, 2012). Notwithstanding, local knowledge in this context has led to the prevention of numerous fatal drownings and clearly provides enormous value. As such, local knowledge being brought up by surfers to meet initiatives coming down from water safety organisations, may serve as more effective for ensuring training is suitable.

New Zealand European represented most of the rescuer sample (81.3%; $n=340$). Māori also had significant representation in this study (11.2%; $n=47$). These figures are similar to that of data collected in the national surfer survey conducted by New Zealand Sport Research Group in 2005 (NZ European 83%, Māori 14%) (Sport Research Group, 2005). Regardless of the

prominent NZ/European group within this study, future engagement of the surf community will require inclusion of multiple ethnicities, including Māori. Obligations under Te Tiriti o Waitangi and The National Resilience Strategy should ensure the participation of Māori in ongoing research, engagement, and co-design of drowning prevention initiatives (MCDEM, 2019; Ministry of Justice - New Zealand, 2001). However, Māori engagement in DRM is only now an emerging strategy, particularly after the Canterbury earthquakes where Māori demonstrated knowledge and customs that excelled during disaster response. Prior to this, evidence of genuine Māori engagement in DRM was limited (Kenney et al., 2015; King et al., 2007; Lambert, 2014; Lambert & Mark-Shadbolt, 2012; Phibbs et al., 2015). The familiarity, affinity and values local iwi have with the land, such as Kaitiakitanga (guardianship of the land), could play a critical role in hazard identification and awareness amongst public. This is particularly important since Māori are over-represented in fatal drowning statistics (SLSNZ, 2021). It is a topic that requires further research, as the factors influencing minority populations' susceptibility to drowning is not well explored (Willcox-Pidgeon et al., 2020).

The Sendai Framework for Disaster Risk Reduction and the National Resilience Strategy both advocate for empowering communities and recognising local knowledge and capacities when addressing natural hazards (MCDEM, 2019; UNISDR, 2015). Results from this study have shown the presence of surfers, some formally trained but most not, providing informal rescue coverage across multiple beaches and conducting numerous lifesaving rescues. This highlights that surfers have been overlooked as an integral community resource and provides an opportunity for water safety practitioners to access local knowledge and skills contained within the surf community.

5.3. Building on Fatal Coastal Drowning Victim Demographics Data

General trends of rescue and fatal drowning victim demographics have previously been identified in numerous studies and results from this research drew similar conclusions. This study sought to identify the trends and characteristics of surfer bystander rescue within the New Zealand context and explore whether any anomalies existed as reported by this particular group of surfers. The absence of any disparity between studies may still prove useful as Willcox-Pidgeon et al. (2020) suggest comparison and the maturity of drowning data between studies and countries, are valuable in identifying strengths, weaknesses, and

common factors in data collection and coding. Additionally, it enables sharing of successful interventions and strategies across countries with similar drowning burden and risk factors.

Males aged between 15-29 years old are the highest risk demographic in both rescue and drowning statistics (Attard et al., 2015; Brander et al., 2019; Surf Life Saving New Zealand, 2021). Results from this study indicated that 70% (n=450) of people rescued during respondents' recent rescues were male and almost 60% (58.9%; n=374) aged between 10-29 years old. These results closely resemble that of Surf Life Saving New Zealand (SLSNZ) and support Koon et al.'s (2021) suggestion that the highest risk factor to fatal drowning is to be male (Surf Life Saving New Zealand, 2021). New Zealand based research investigating the swimming, rescue abilities and attitudes toward coastal drowning draws the same conclusions this research alludes to (Moran, 2010, 2014; Moran & Ameratunga, 2008; Willcox-Pidgeon et al., 2018). That is, males, particularly 30 years or younger, likely lack an appreciation for coastal drowning risk and overestimate their abilities, resulting in the fatal drowning statistics we see in New Zealand and internationally. Disaster scholars have theorised this behaviour as 'optimistic bias' when it comes to self-assessing capacities in the face of hazards (Johnston et al., 1999; Weinstein & Klein, 1996). This highlights a focus area for water safety organisations to implement specific strategies relating to young males' drowning risk. This is nonetheless difficult, as there are many social complexities that feed, not only drowning risk, but a plethora of fatal statistics including drunk driving, fatal vehicle crashes and workplace accidents (Lilley et al., 2021; Office of the Auditor-General., 2013).

The lack of safe aquatic practice that young males typically demonstrate, particularly relating to personal capacities and risk appreciation, align with the World Health Organization's (WHO) causes of drowning (World Health Organization, 2014). A recent study by Rejman et al. (2020) tested the perceived versus real swimming skills of New Zealand youth, which highlighted an absence in suitable skill and ability to adapt to different circumstances, as is required in a coastal environment, as one moves through the surf zone. Proposed solutions to fatal drowning often prioritise public education, particularly learning to swim. However, it becomes apparent when reviewing existing research that education prioritising swimming skills is not enough to prevent fatal drowning. Additionally, swimming skill unilaterally needs to be taught with a suite of knowledge and practice addressing accurate self-assessment, hazard awareness, as well as rescue skills (Willcox-Pidgeon et al., 2020). This was seen in this

research, where respondents often stated poor swimming ability, lack of self-awareness and lack of knowledge pertaining to hazards were common contributing factors amongst people rescued. A change in attitude, knowledge, and skill, needs to be employed, not only by youth, but adults, whose role is often to supervise children in aquatic environments (Willcox-Pidgeon et al., 2020).

The ethnicity of people rescued by respondents is similar to that of the New Zealand population (Stats NZ, 2018). Sixty-two percent of people rescued were New Zealand European, while 12% were Māori and 11% were Asian. The significant New Zealand European representation in the rescue statistics is not surprising. Interestingly, Willcox-Pidgeon et al.'s (2018) recent study found New Zealand European students had less appreciation of drowning risk than non-European counterparts. However, the significant representation of Māori and Asian within this study speaks further to the well-recognised issue of inflated fatal drowning frequency amongst minority populations. SLSNZ data shows fatal drowning rates amongst these two groups are twice as high as New Zealand Europeans (Surf Life Saving New Zealand, 2021). WHO (2014) has suggested drowning, much like other disasters, are social issues, compounded by everyday challenges faced by minority groups. Results from this research support this suggestion, by demonstrating significant representation of minorities. This is not an isolated problem only seen in New Zealand but is also common internationally, particularly relating to Indigenous peoples (Willcox-Pidgeon et al., 2020).

Outside of minority populations, factors driving fatal drowning are commonly recognised as attitudes, behaviour, swimming ability and water safety knowledge. Furthermore, Willcox-Pidgeon et al. (2020) suggest additional and prominent factors exist for high-risk populations in the form of social determinants, specifically low socioeconomic status, and education. These social determinants are common amongst other natural hazard related disasters and broad public injury prevention strategies often fail to account for these determinants, which significantly affects broader health outcomes. There is little data available that relates specifically to drowning amongst minority populations, which requires investigation if prevention strategies addressing these groups are to be successful (Willcox-Pidgeon et al., 2020). These populations reside in New Zealand, where research such as this identifies significant minority representation but is unable to identify causal factors or social determinants. This will be an important area of research moving forward.

Of particular interest was the diverse range of circumstances respondents conducted rescues under. When planning the survey, assumptions were that most rescues would be contained to that of swimmers and board riders due to the nature and location of surfing activity. Results showed these activities were prominently the victim activities at the time of rescue. However, eight rescues were conducted where boats crossing sand bars or negotiating surf had become imperilled. This emphasises the adaptability and level of rescuer competence amongst the surf population in dealing with a situation that a formally trained service, such as Coastguard, would normally attend. The next section discusses the patterns and characteristics of the rescues conducted by respondents.

5.4. The Attributes and Patterns That Characterise Aquatic Bystander Rescues

The objectives of this research aimed to identify trends and characteristics of the aquatic coastal rescues that surfers conducted nationwide. Data obtained shows this group of surfers conducted 1274 rescues and potentially saved the lives of 296 people, which when summarised economically is a cost of over 1 billion dollars⁶ that would have been paid by New Zealand taxpayers. DRM is often met by political and organisational barriers that prioritise more immediate, familiar issues (Gaillard & Mercer, 2012; Imperiale & Vanclay, 2021). It is hoped financial figures such as the one above be utilised to motivate and raise awareness of a silent disaster and help better inform policy and practice relating to drowning prevention. This section further discusses the factors and trends pertaining to the rescues conducted by respondents in this study.

5.4.1. Rescue Locations

Respondents' "home break" and rescue locations almost mirrored each other, demonstrating surfers are typically performing rescues where the environment and associated hazards are most familiar to them. The density of rescues were contained to Auckland, Waikato, and Bay of Plenty, which aligns with SLSNZ's report identifying the same three regions as high density for coastal rescues (Surf Life Saving New Zealand, 2021). When one considers the familiarity a surfer of 21+ years' experience, surfing 1-6 times per week, would have with their local break and its associated hazards, it potentially positions surfers amongst the most

⁶ The current estimated value of a human life in New Zealand is \$4.42M (Ministry of Transport, 2020) x 296 lives saved = \$1,308,320,000

knowledgeable and skilled sources of surf rescue available. The importance of this community resource is amplified by the fact that 73% (n=299) of respondents reported the rescues they completed were either at unpatrolled beaches or outside patrolled hours. Fatal drownings mainly occur outside patrolled areas (Attard et al., 2015; Berg et al., 2021; Brander et al., 2019; Surf Life Saving New Zealand, 2021), which further highlights surfers as a primary, informal rescue response in the absence of lifeguard services. Importantly, the surf locations of the sample population align with the highest demand areas for rescue, which could fill a critical gap in water safety and response.

5.4.2. The Physical Hazards Increasing Rescue Incidence

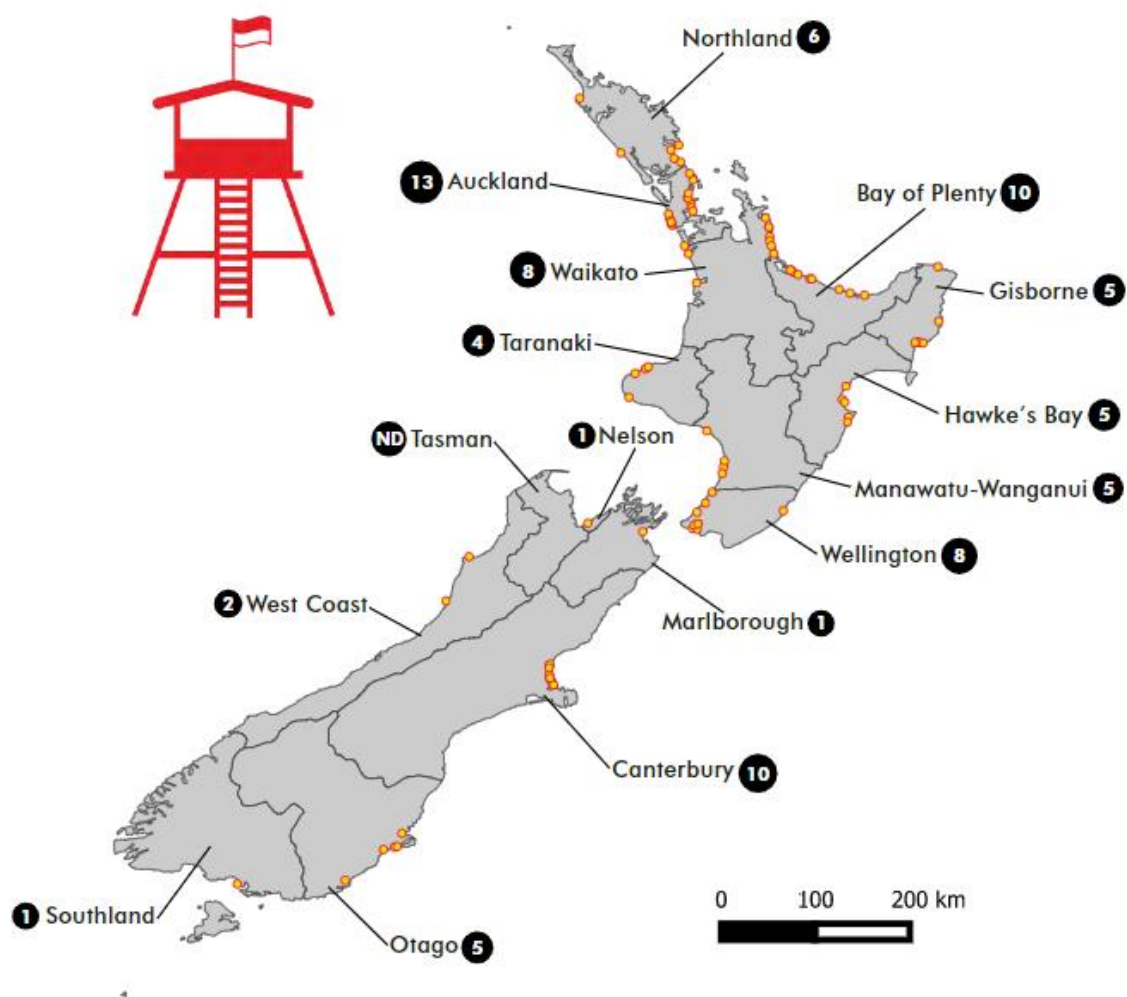
Moderate size waves (2-4 foot) were the prominent wave size at the time of rescue (62.4%; n=261). This wave size and the consequence it has on public is consistent with Attard et al.'s, (2015) study and represents an increased risk point for beach users, where conditions exceed knowledge and capability. Surfers are drawn to the increasing wave size that simultaneously strengthens rip currents (MacMahan et al., 2006; Wright & Short, 1984). Echoing existing research (Brander et al., 2019; Brewster et al., 2019; Cornell et al., 2021; Pitman et al., 2021; Short & Hogan, 1994; Surf Life Saving New Zealand, 2021), rip currents emerged as the main hazard associated with respondents' rescues, with 45.5% (n=190) of respondents stating 75-100% of rescues were rip current related. This research illustrates a point where experienced and capable surfers, drawn to larger waves, are intersecting with the public, who often lack understanding or appreciation of coastal risk (Denny et al., 2019; Moran, 2014; Petrass & Blitvich, 2018). This supports Attard et al.'s (2015) assertion of an association between serious rescue events and moderate wave size. The primary outcome of this result is surfers are largely present when public's risk is statistically at its highest. This presents a significant opportunity to place surfers as a backstop in drowning prevention. It additionally draws a useful association between increased public risk and potential rescue capacity, due to the likely increase of advanced surfers drawn to the growing wave size.

5.4.3. How Surfers Increase Community Capacity Through Geographical & Spatial Disbursement

The value of formal lifeguard services is undeniable but the financial and logistical practicality of providing full geographical and spatial coverage is unachievable. Figure 21 shows the area of New Zealand coastline versus the number of SLSNZ patrolled locations. The disparity in

coverage is clearly identifiable. The public demand for rescue at unpatrolled areas does not abate from patrolled areas and SLSNZ data shows 70% of known bystander rescues are conducted outside patrolled areas and times. These findings are comparable to the results from this research (84%; n=350) as well as several other studies that reach similar conclusions (Brander et al., 2019; Koon et al., 2021; Surf Life Saving New Zealand, 2021).

Figure 21. 2020-21: Surf Life Saving Patrol Locations per Region.



Source. Surf Life Saving New Zealand (2021)

In addition to high rescue demand in unpatrolled areas, time of day risk is identified. Results from this research are like that of SLSNZ, with approximately 45% of rescues occurring between 12pm and 4pm (Surf Life Saving New Zealand, 2021). As this is the hottest time of the day, beach visitation increases, and swimming is more likely. These factors, when paired with a moderate swell, increase beach user risk substantially. The high frequency of rescues

occurring outside of patrol areas and through an identified 'peak' period, demonstrate a potential gap in the efficacy of existing prevention strategies and an absence in response capability.

The group of surfers participating in this research appeared willing and able to fill some of this void, having rescued inside and outside of patrolled areas and times, at remote beaches with no services (including means of communication in some cases) and a wide geographical spread. In addition, on average, these surfers will visit the beach 1-6 times per week and may surf up to 3 hours at a time. This geographical and spatial disbursement of surfers is important, as top-down approaches that are common in DRM often create public reliance on official organisations to provide response during disaster (Scolobig et al., 2015). These official organisations are often absent from many beaches across New Zealand when rescue is required, thus leaving a significant response gap. Instead, there should be a focus on empowering communities and creating self-reliance, as suggested by the National Resilience Strategy (CDEM, 2019). Although, significant attention is required to reduce the vulnerability and increase capacities of drowning victims, more attention could be paid to enhancing the community capacities that already exist and have been demonstrated by respondents in this research. Respondents have recognised their role in surf rescue and sought training and collaboration with SLSNZ, to further equip themselves with rescue capability. SLSNZ concur and state *"the role bystander rescuers play in preventing drowning incidents cannot be underestimated"* (Surf Life Saving New Zealand, 2021, p.21).

5.4.4. The Importance of Rescuer Proximity

Most respondents were surfing when they encountered the victim (75.4%; n=315). This information is of critical importance, considering the drowning process from immersion to cardiac arrest can occur within seconds (Barcala-Furelos et al., 2016). Lifeguards typically observe the surf zone from elevated positions, which provides sufficient views of patrol areas. This may include a beach tower or clubhouse but is typically removed from the water. Research has tested the efficacy of lifeguard rescue equipment in a controlled simulation that saw lifeguards perform rescues of potential victims 100m offshore, using standard lifeguard equipment such as rescue tube and rescue board (Barcala-Furelos et al., 2016). The fastest rescues conducted used a rescue board in an average time of over three minutes. The average rescue board time to approach the victim, commencing at the water's edge, was 52 seconds.

It could be argued that surfers' response time is less, due to the proximity to the victim at the time of need. According to Morgan and Ozanne-Smith (2013), most surf rescues occur approximately 100m from shore. Surfers are often positioned outside (out back) of the broken waves, attempting to catch clean waves peeling through in organised sets (Scarfe et al., 2009). The rip currents that often imperil swimmers and other beach users are moving victims toward surfers, waiting beyond the broken waves. In addition, once a surfer has caught a wave, a rip will often be used to return out back, as the rip offers less resistance through the wave zone, bringing the experienced surfer into the path of an imperilled victim once more. As evidence demonstrated in this research and by others, particularly Attard et al. (2015), the interaction between surfers as rescuers and public as victims occurs frequently. The interaction is often offshore, involving rip currents as the leading hazard and likely due to the serendipitous crossing of paths, discussed above.

5.4.5. Demonstrating the Benefit of an Emotionally Disconnected Rescuer

Respondents rescued strangers over 91% of the time (n=382). The remaining 9% were relationships commonly seen in instances of rescue altruism, such as parent, friend, or partner. These instances often involve an impulsive, emotional response with little regard for rescue competency or risk (Pearn & Franklin, 2018). In addition, bystander rescues are shown to frequently be conducted without the use of a buoyancy aid, often due to the emotive response, and these rescue attempts commonly result in Aquatic Victim Instead of Rescuer Syndrome (AVIR) (Barcala-Furelos et al., 2021; Brander et al., 2019; Lawes et al., 2020; Surf Life Saving New Zealand, 2021). In addition to lack of association to the victim, the group of surfers surveyed in this study demonstrated traits contrary to most bystander rescue attempts. Almost 88% conducted a risk assessment or had a level of familiarity and comfort with the risks that an assessment was not necessary. Lastly, 84% used some form of buoyancy aid during the rescue, primarily a surfboard. This research further supports Attard et al.'s (2015) suggestion that experienced surfers conduct assessments of current conditions and hazards, as well as know their own limits. This combination of experience, lack of relationship to the victim, risk assessment and use of a buoyancy aid are all factors contributing to the abundance of successful rescues conducted by this group of surfers and likely many others.

5.4.6. Surfer Confidence in Performing Aquatic Rescues

Over 73% of rescuers felt confident in their ability to conduct the rescue. Despite respondents' high confidence level, they still faced difficulties during execution. Only 24% found the rescue to be easy, while the remaining 76% encountered varying levels of difficulty. This is not surprising when results showed surfers were often rescuing more than one person at a time ($M = 1.52$, $SD = 0.97$). This suggests surfers are regularly conducting mass rescues, which is when a number of people get into difficulty at the same time. Mass rescue is an exercise that usually requires specific training, a multitude of people and often Inflatable Rescue Boats (IRB). Lifeguards often receive formal recognition for their participation in mass rescue, whereas the performance of surfers in this area is widely unrecognised (Surf Lifesaving New Zealand, 2022). The physical nature of an aquatic rescue is unlikely to be referred to as "easy", demonstrated by the blood lactate and subjective Borg's scale effort perception observed in Barcala-Furelos et al.'s (2016) study. Nonetheless, with training, rescues are likely to become more efficient and less likely for the "difficulty" to manifest as risk to the rescuer. WHO promotes tailored strategies as part of drowning prevention initiatives (World Health Organization, 2017) and results from this study suggest that training in the management of multi-person rescue situations is implicit to ensure surfers are suitably supported and equipped with skill suitable to task.

5.5. Rescue Outcomes

Forty-six percent of respondents felt they had saved the person's life during their recent rescue. When comparison is drawn to the 55% of victims that were "panicked" and likely in the Crisis Major to Critical "C-zone" at the time of rescue, the respondent's assumption is likely accurate. Had rescue been delayed further, or no action taken at all, it is feasible the outcome of the situation would be fatal drowning. In an additional 38% of rescues, respondents were unsure if they saved the person's life. When one considers the extremely short timeframe between C-zones and an increasing inability to self-rescue, it is probable the lives of this group were indeed preserved.

When bystander rescues are conducted by surfers and the victim does not require medical attention, typically no record of the occurrence exists. This makes it extremely difficult to quantify the number of surfer rescues being conducted and means statistical data that could

be used to inform research and drowning prevention is lost. Results from this research highlighted this fact, as 86% (n=361) of people rescued were able to walk away without further treatment required. It is likely therefore, that surfers stabilised the victim before any water aspiration had occurred, which is a significant factor in determining drowning outcomes (Tipton & Montgomery, 2022). This figure speaks to the number of unreported surfer rescues that occur across New Zealand, as most rescues occur in the absence of any organisation that formally reports coastal rescue occurrences. This helps provide further understanding why surfer bystander rescues have largely remained unrecognised and unexplored and the lack of meaningful data available. The engagement of local people and utilisation of local resources is widely promoted in Disaster Risk Reduction (DRR) (Aitsi-Selmi et al., 2016; Cutter, 2018; UNISDR, 2015). This study demonstrates the quantity of meaningful scientific data that is not currently captured and raises an opportunity to create a system to record these occurrences moving forward.

For victims who did not walk away without treatment, 14% required medical attention, be it first aid, ambulance or, in 11 cases, CPR. Outcome for those who provided CPR was not obtained but results from this study did find, in some instances, the outcome was fatal. Given the critical timeframe victims are contained within when surfers typically interject, access to free training in CPR for surfers is paramount to increase bystander rescuer capacity and is an initiative widely recognised by water safety organisations (David Szpilmana et al., 2014; World Health Organization, 2017; Venema et al., 2010). Drowning survival significantly increases with effective and immediate CPR (Denny et al., 2019; Mathiesen et al., 2016; World Health Organization, 2017). The outcomes are not always positive and highlights another area where engagement and support of the surf community has been lacking. That is, in addition to the provision of free training in rescue and CPR, organisations should ensure services are available when outcomes are of a traumatic nature.

Several New Zealand studies have examined the self-rated water and rescue ability and recognition of coastal hazards amongst beach users (Moran, 2014; Moran & Ameratunga, 2008; Pitman et al., 2021; S. Willcox-Pidgeon et al., 2018). Common consensus was that the general public possess poor swimming ability, elevated self-reflection and inadequate hazard recognition. Conversely, with reference to Connolly and Connolly (2012) C-Zones Framework, that speaks to the stages of the drowning process, once a victim is presented with a perilous

situation, more autonomous behaviours take over from any ability or knowledge that was present. In this study, 92% (n=385) of drowning victims rescued by the sample population were aware of their peril and in various emotional states, ranging between “calm”, “relieved” and “panicked”. The most prominent emotion was panicked (55.5%; n=232), which suggests the victim had progressed past the stage of “concern” and into the stage of “Crisis Major”, possibly “Critical”. At this point, the drowning victim has realised they are likely beyond the point of self-help or may have one last attempt left, before moving into the “Critical Major” stage. From this point, they are unable to self-help and unconsciousness will soon follow. The transition between stages for a weak swimmer may be seconds. Surfers are often unaware of all stages of drowning, but this data suggests surfers intervened at a critical time in the victim’s drowning process, most likely saving them from a fatal outcome that feasibly would have come moments after.

5.6. Conclusion

5.6.1. Revisiting Aims and Objectives

This study set out to explore the contribution surfers were making in reducing coastal drowning statistics in New Zealand and to characterise the attributes and patterns surrounding these rescues. It is pioneering research into this topic in New Zealand and at the time the study was conducted, no other published or peer reviewed research on surfer conducted rescues in New Zealand was available. This study now provides baseline data that could be utilised to engage in further research in this area and to assist in informing policy and practice amongst water safety organisations. This section revisits the research aims and objectives and discusses whether they were achieved.

Assess the contribution surfers make to reducing fatal drowning statistics at the beaches of New Zealand.

The results of this study provide evidence of the significant contribution surfers make in the prevention of coastal drowning, demonstrated by the 245 lives saved in the five years preceding this study, as reported by the respondents. While it is not possible to utilise these figures to accurately estimate the total number of rescues conducted by surfers in any given year, it does indicate the size of the contribution surfers make in reducing the social and financial costs of fatal coastal drowning in New Zealand. As New Zealand’s 5-year average rate

of drowning has increased (Surf Life Saving New Zealand, 2021), so too has the regularity of surfer rescues, with most reported rescues occurring inside the last five years. The sample population was 418 surfers of an estimated population of 145,000 across New Zealand (Surfing New Zealand, 2022) and averaged 48.4 lives saved per year collectively.

The Ministry of Transport NZ has spent the last 20 years honing a calculation that estimates the value of a human life (Value of a Statistical Life - VOSL). Factors considered are the pain and suffering absorbed by unexpected death and costs absorbed by family and society, calculated at current economical rates. The current estimated value of a human life in New Zealand is \$4.42M (Ministry of Transport, 2020). Therefore, the findings of this study suggest these surfers' rescues alone may prevent a financial burden of approximately \$213M+ per year being absorbed by local economy. In addition, and more importantly, New Zealand's average fatal drownings across all water environments per annum is 74 and SLSNZ average 1923 rescues and assists⁷ annually. When one considers the sample surfer population (0.28% of the NZ surf population) are potentially saving on average 48.4 lives per year (2.5% of SLSNZ figure), this further supports the idea that surfers are having a significant impact on the reduction of fatal drowning statistics within New Zealand. Without these surfers, there would be 65% more fatalities linked to drowning every year and close to 120 fatalities annually. Applied in a broader context, if only 1% (n=1450) of New Zealand's surfers (145,000) were conducting one lifesaving rescue per year, it would currently be preventing an economic cost to New Zealand of over \$6.4 billion⁸.

Examine the attributes and patterns that characterize aquatic bystander rescues conducted by surfers on New Zealand beaches.

A connection between years surfing experience and increased rescues was confirmed during this study, and respondents' frequency and confidence to rescue was undeterred by training or gender. The victim demographic data obtained supported many existing findings, particularly relating to males aged 15-29 years being most at risk. Rips accompanied by poor swimming ability and lack of hazard awareness were the prominent cause of rescue and key

⁷ Rescue – Where a person requires immediate help to return to shore (or place of safety) and who without intervention would have suffered distress, injury or drowning.

Assist – Where a person requires assistance to return to shore but would most likely be able to get themselves out of danger if unaided.

⁸ Current estimated value of a human life \$4.42M x 1450 (1% of 145,000 surfers) = \$ 6,409,000,000

data relating to geographical and spatial disbursement of rescue occurrences was evident. The latter was possibly the most poignant, as it spoke to all three objectives. Data was obtained that goes some way to quantifying bystander rescues occurring outside of patrolled areas, during high-risk circumstances of moderate wave size and time of day. This highlights the contribution surfers are making in drowning prevention, by providing rescue coverage in the absence of formally trained rescue staff and should be instrumental in motivating effective change in policy and practice.

Provide recommendations that inform policy and practice geared to the reduction of drowning fatalities in New Zealand.

WHO (2017) promotes the empowerment of individuals and communities in reducing drowning risk. The data obtained during this research may prove valuable to informing those approaches. This research provided evidence of a community group effectively reducing fatal drowning, that has not been formally engaged to do so but stepped in when they saw a fellow member of the public in trouble. In addition, they display traits that are contrary to most other bystanders and are recognised as factors leading to successful rescue. Examples of this include self-awareness, hazard recognition, physical and water ability, and use of a buoyancy aid. In contrast, the victims rescued often displayed none of these traits and, although root causal factors of the victim's predicament were not determined in this study, both victim and rescuer demographic data could prove useful for water safety organisations.

Evidence strongly suggests the role of surfers has been dramatically overlooked in coastal drowning prevention, not only in New Zealand but internationally. This study provided foundational data that demonstrates surfers' important contribution to reducing fatal drowning, that could guide water safety organisations to further research and, most importantly, surf community engagement. As illustrated in this study, surfers are keen to tell their story and offer a wealth of information and experience pertaining to hazards, behaviour, and rescue within the beach environment. The importance of collaboration between stakeholders, including public, in DRM has been discussed at length in literature, with recognition that top-down approaches often fail to be effective due to lack of consultation with end users (Marshall & McGregor, 2016). There is potential to work more closely with surfers from the bottom up, to unlock opportunities around rescue and drowning prevention through risk communication. In turn, this may be used to tailor more nuanced drowning

prevention initiatives, including community response. It may also prove useful for other surfer bystander rescue studies, both domestic and international, where it may be utilised for comparative purposes.

5.6.2. Study Implications

This study has several important implications. The first and most important is the requirement for water safety organisations to open a dialogue with the surf community. The pitfalls of top-down approaches to DRM have been discussed earlier in this chapter. Through this research, a community group was identified as filling a void in coastal rescue, particularly in the absence of lifeguards. The social and economic benefit, as well as potential knowledge to be gained by engaging with surfers, is immeasurable. This study did not examine the social determinants of drowning victim circumstance and it is well recognised that drowning, amongst other natural hazard disasters, is a complex social issue. While slower burning victim prevention strategies can be implemented, surfers can play an immediate and effective role as a backstop for fatal drowning.

Secondly, results from this study begin filling a void of unknown detail surrounding surfer conducted rescues in New Zealand. The reliability of the data is somewhat validated by the alignment of results with previous research, reflecting a consistent picture across multiple countries. The benefit and potential of this is immense, when one considers the surf population not just domestically but internationally, and how much coastline this group provides coverage for.

Results from this research showed a willing population, experienced and capable in aquatic rescue, with the sample population alone saving the lives of 48.4 people per year. Data showed a relationship between increasing years of experience and the number of rescues conducted and most rescuers were advanced to expert in ability. Although rescue training was not identified as a significant influence on rescue quantity, it is undoubtedly important to further develop experienced surfers, as well as 'developing' surfers' rescue skillsets, to support and enable them to safely conduct rescues moving forward. Programmes such as Surfer Rescue 24/7 have proven their worth in Australia, where research did show a relationship between rescue training and increased rescue. It is possible that in New Zealand the course is still in its infancy and results of which are still to be observed. Nonetheless, the respondents spoke highly of the course in this research and a clear appetite for training was

demonstrated by the sample population. This leaves a compelling opportunity for water safety organisations to empower a community resource that has now been shown to have significant effect on the reduction of fatal drowning.

The results of this research can now provide data similar to that of SLSNZ, Water Safety NZ and Surfing NZ, for which prevention strategies can be built around. Prior to this research, there was no such data that related specifically to New Zealand. For this reason, SLSNZ and Surfing NZ were strong advocates and supporters for this research. At the time this research was conducted, SLSNZ were in the process of applying for funding to acquire resource to provide further support and training for surfers. The results of this research will be able to be utilised by these organisations to secure funding by providing evidence of surfers' rescue contribution, whereas previous applications would have been based on anecdotal evidence.

The results of this research provided evidence of the number of surfer rescues and the demographics of those conducting rescues. This allows for targeted initiatives to identify experienced surfers to be engaged as a local community resource. Suggestions came out of the free text comments that identify several ways in which this could happen, including local access to surf lifesaving clubs for out-of-hours calls, access to lifesaving equipment including means of communication at unpatrolled and isolated beaches, and QR codes at beach entrances to provide an up-to-date hazard report for that specific location. This research demonstrated surfers are not only invaluable resources in performing rescue but have a vested interest in prevention.

This research also provided data on the victim demographics and circumstances of the rescue. Although this data appears common amongst drowning research, it can also be useful to further guide water safety organisations in their strategies to prevent drowning early in the sequence. Rips are unarguably the most prominent hazard associated with coastal drowning. Early childhood swim training and coastal hazard awareness, such as rip recognition, are widely acknowledged as leading strategies in preventing public from putting themselves in treacherous situations. The data from this research provides somewhat of a gauge on the current position of public knowledge in relation to these factors. Rips, poor swimming ability and lack of local/hazard knowledge were clearly prominent factors present during rescues conducted by the sample population, suggesting there is still significant work to be done to review the efficacy of current strategies. Early childhood training in this area is vital and

currently not available for all children in New Zealand. The determining factors for this, be it social, economic, or other, will need to be examined further.

This research highlighted most surfer rescues conducted are not reported formally, leaving data up until this point to be anecdotal. This opens the door to an opportunity moving forward. The National Incident Database (NID) is an online database, currently overseen by the New Zealand Mountain Safety Council. The purpose of the NID is to record incidents that occur in the outdoors and allow organisations to see occurrences and statistics that may inform their practice. With no current means of reporting, a similar system to the NID could be established, through the support and promotion of SLSNZ and Surfing NZ, amongst other industry bodies. A simple online application could be used to report the location and circumstance of a surfer conducted rescue, as well as be a source, as many of the respondents requested, for online training and information. The success of such an initiative would provide high value data and go further to quantify rescues being conducted by the surf community. It is recognised this would require significant uptake to be meaningful. However, this research has shown the surf community to be an established and effective resource, worthy of investment.

Finally, the need for future research into this topic is paramount. This research merely provides a foundation for further work to build upon and gain greater understanding of this phenomena. It was suggested earlier, drowning is a silent burden that amounts to that of disaster, particularly in New Zealand where drowning fatalities exceed that of any natural hazard. Results from this research illustrate the size of this burden is far greater than accounted for and a comprehensive understanding of all factors contributing to the issue is far from complete.

5.6.3. Study Limitations and Challenges

While this study has provided some strong indicators of the benefits in utilising surfers in drowning prevention strategies, there were some limitations and challenges, primarily in the data collection. Firstly, the sample size gathered was not large enough to be considered truly representative of the New Zealand surfer population or be used to describe prevalence or incidence. Paid promotions were used for the survey, but response rates eventually slowed and the survey was closed as a result, leaving 418 responses (0.28% of the surfer population)

for analysis, well short of the 1000 required. However, the data gathered can provide useful insight into the quantity and characteristics of surfer rescues in New Zealand.

Second was the nature of an anonymous survey. There was an absence of ability to verify the information respondents were providing, particularly when no record of rescues is likely to exist. The survey was promoted through surfing social media channels using an incentive (\$1000 toward a custom surfboard) to entice surfers to participate in the survey. Although earlier evidence suggested incentives do have a positive effect on survey response and data, there is no way to rule out the possibility that respondents falsified information, in order to complete the survey and enter the prize draw. This is not unique to this research but synonymous with the use of incentives during data collection (Goeritz, 2004). Additionally, respondents may embellish surfing ability or frequency of rescues, to bolster sense of self-worth. However, it is likely the majority of falsified or exaggerated cases would be identified during the cleaning process, as there is a high likelihood of inconsistencies when compared across variables.

Although the online survey was an effective tool for gathering data quickly and from a wide geographical spread, it did create multiple biases, including self-selection, recall and implicit bias. The survey was solely promoted through online platforms, which meant that surfers without social media or means of accessing the online survey were unable to participate. Furthermore, the survey promotion specifically spoke about the “role surfers play by rescuing people in trouble in the surf”. This wording attracted those surfers who had conducted rescues, skewing the results of rescuer versus non-rescuer, as well as age group and experience. This was because the older and more experienced a surfer is, the higher the likelihood they have been exposed to multiple opportunities to rescue. Had demographic details been obtained from those who had not completed rescues, perhaps a more complete assessment of the surf population could have been obtained.

The survey asked respondents to recall detail of rescues from across their lifetime and most recently. This exposes the survey data to recall bias, as it is reasonable to assume that respondents’ memory of events will diminish over time. This does not make the results or data unreliable but is a considered factor. A study examining recall bias in epidemiological research found participants recall being 82% accurate when obtained inside of ten years of the event in question (Coughlin, 1990). Within this research, only 9.1% (n=38) of respondents’

recent rescues were longer than ten years ago and many of the results were able to be compared with other studies that drew similar, if not identical, conclusions. Nonetheless, the presence of significant identified and implicit bias does mean the results of this research cannot be generalised across the New Zealand surfing population, as they are not a true representation of the group.

Another challenge during this research pertained to limitation on the analysis that could be conducted, due to scales used during data collection. Most scales used to measure quantities in the survey were aligned with previous studies, to allow comparison of survey results. However, the scale used to measure the frequency of rescues conducted was altered from previous studies. Such a high frequency of rescues performed by the sample population was not anticipated and it was hoped greater sensitivity in data collection would be gained using a more precise measurement. At the time of analysis, the number of respondents who had rescued a lower number of people was too low to perform analysis, without violating assumptions of the test. As such, categories were collapsed to perform the test, which in turn meant a reduction in sensitivity. A second variable affected by scale was the division of males/females/I've rescued both males and females. As there was no quantity attached to this question, results suggested a more even distribution of females rescued versus males. Conversely, data from "most recent rescue", as well as abundant previous research, shows males are clearly the prominent gender represented in rescue and drowning statistics. Future research on this topic, using surveys or interviews, should go further to align scales of rescues conducted with that of research conducted by Attard et al. (2015) and Brander et al. (2019) and to review questions used in this survey to inform future work. This would provide more sensitivity to the rescue frequency data.

Finally, the aim of this research was to obtain baseline data that would somewhat quantify and characterise surfer rescues being conducted in New Zealand. There is an unlimited amount of information one could seek through the survey. However, the survey was kept at a length that could be completed in less than 20 minutes to retain respondents' attention and have them complete the full survey. A future improvement from this study would be to, a) define what a "rescue" and "help" is, and b) record detail pertaining to preventative actions. "Rescue" and "help" were not defined in this research and were left to the respondent's subjective opinion of what constituted a rescue or someone "helping" them with a rescue.

The variety of situations this could allude to is unlimited. As such, a question remains around whether a portion of the “rescues” conducted were preventative actions and what getting “help” with a rescue may have meant. As SLSNZ record and measure rescues versus preventative actions, the same could be considered amongst this group. Had this research examined rescues *and* preventative actions, evidence of surfer contributions to coastal drowning prevention would have been even more significant. Future research should closely examine these two circumstances, as it will likely reveal further opportunity for drowning prevention strategies.

5.7. Chapter Summary

This chapter revisited results from the study, comparing them to existing literature and the conclusions that can be drawn as a result. These conclusions spoke to the significant contribution the surf population are making in drowning prevention and the implication this has on water safety practice and ongoing research. It identified and provided evidence of the presence of an experienced, knowledgeable, and well-equipped population that have silently been saving lives across New Zealand.

The chapter reviewed the aims and objectives of this research and concluded, these had been met through the broad quantification of rescues conducted and the characteristics of the rescuers, victims and rescues defined. The strengths of the research were discussed, primarily relating to the pioneering results this study provided but also addressed the challenges that existed in the form of multiple bias and data gathering tools. The chapter then went on to address the implications of this study and how critical it is that surfers are engaged and empowered as a community resource moving forward. Finally, the chapter discussed and suggested opportunities that exist for further research to be conducted in this field. This will be critical to not only support surfers in their role as an informal rescue resource but to utilise their knowledge to inform policy and practice. This knowledge will be invaluable in identifying and mitigating the causal factors related to fatal coastal drowning.

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Appendix A: Social media advert

Appendix A includes the social media advert that was promoted through Surf Lifesaving NZ and Surfing NZ Facebook and Instagram pages.



Want to win a \$1000 toward a custom Anderson surfboard? Got 10-15 minutes spare? Are you a surfer?

If so, we'd like you to help us know more about surfers around New Zealand and the rescues they do, by spending 15 minutes or so filling out this important, anonymous survey. This research study is all about understanding who surfers are, how long they've been surfing, how often they surf and the role surfers play by rescuing people in trouble in the surf. We think surfers have a lot to offer to society and the results of this survey will help us tell their story.

Please spread the word and share this link!

https://aut.au1.qualtrics.com/jfe/form/SV_dmTnkhIrIM0E9My



Appendix B: Qualtrics online survey

New Zealand Surfer Rescue Survey

Welcome!

Want to win a \$1000 toward a custom Anderson surfboard? Got 10-15 minutes spare? Are you a surfer?

If so, we'd like you to help us know more about surfers around New Zealand and the rescues they do, by spending 15 minutes or so filling out this important, anonymous survey. This research study is all about understanding who surfers are, how long they've been surfing, how often they surf and the role surfers play by rescuing people in trouble in the surf. We think surfers have a lot to offer to society and the results of this survey will help us tell their story.

Please spread the word and share this link!

https://aut.au1.qualtrics.com/jfe/form/SV_dmTnkhIrIM0E9My
https://aut.au1.qualtrics.com/jfe/form/SV_dmTnkhIrIM0E9My

Participant Information Sheet

Date Information Sheet Produced: 4th May 2022

Project Title

Examining the role of surfers conducting bystander rescues at the beaches of New Zealand and the trends characterizing those rescues.

An Invitation

We would like you to help us know more about surfers around New Zealand by spending 10-15 minutes or so filling out this important, anonymous survey. We are very interested in the role surfers play by rescuing people in trouble in the surf. We think surfers have a lot to offer to society and the results of this survey will help us tell their story.

What is the purpose of this research?

Essentially, we are trying to determine the volume of rescues being conducted by surfers in New Zealand and the characteristics and qualities of these rescues. Such as, is there a demographic of surfer that is performing more rescues, where and when are the rescues happening and who is being rescued. The findings of this research may be used for academic publications and presentations.

This research is being conducted by Jamie Mead from AUT as part of requirements to attain a Masters in Disaster Risk Management and Development.

How was I identified and why am I being invited to participate in this research?

The invite to complete this survey was distributed initially by Surfing New Zealand and Surf Life Saving New Zealand. You may have even had a friend send or share the link with you. If you are 16 years or older and are a surfer, we would greatly appreciate you taking the time to complete the survey.

How do I agree to participate in this research?

Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. You may choose to complete the survey anonymously, whereby we will not require any personal information for you to complete the survey. You will be asked to confirm you are 16 years or older and that you consent to being a part of the research before commencing the survey.

What will happen in this research?

If you decide to take part in the research study, we will ask you to complete an online questionnaire. The questionnaire will ask you some basic demographic questions, questions about you and your surfing experience and any experience you have had with rescuing someone while surfing. It should take approximately 10-15 minutes to complete.

What are the discomforts and risks?

We don't expect the online questionnaire to cause you any harm or discomfort, however if you

experience feelings of distress as a result of participation in this study you should not participate. If you do participate and experience these feelings, you should withdraw from the research.

What are the benefits?

The potential benefit for participants is the prize of \$1000 toward a custom Anderson surfboard that will be offered to a randomly drawn participant. This prize was funded and provided jointly by Surf Life Saving New Zealand and Surfing NZ.

In addition, this survey hopefully draws attention to rescue programmes such as Surfer rescue 24/7. These types of courses equip surfers with life saving skills, that could potentially save the life of others in the water but also reduce risks to surfers while performing a rescue.

Surfers might benefit from this research via more recognition of their role in saving lives, and potentially enabling policy makers to better support them.

How will my privacy be protected?

The survey is anonymous. You do not have to provide any contact details to complete it. If you wish to enter the prize draw you will need to enter some basic contact information. This information is not associated with your survey and the researcher has no way of identifying participants. All information will be held in accordance with the Privacy Act 2020 and at the conclusion of the research, all personal details will be submitted to AUT for long term storage. Your details will not be shared with any other agency, other than the research group.

Who will see the results of this research?

A summary of the research findings will be made available for download by research participants. This will be made available through the Surf Life Saving NZ and Surfing NZ social media pages that you accessed the survey from.

The results of the survey will also be forwarded to Surf Lifesaving NZ and Surfing NZ for them to review and utilise in creating initiatives to better understand and promote the rescue capabilities of the surf community.

AUT faculty will have access to the full study for the purposes of marking and grading academic results and a published version made available to the wider public. No association to you, or your answers will be made public as any and all contact details are anonymous and confidential.

What are the costs of participating in this research?

The only cost is your time. The survey should take about 10-15 minutes to complete.

What do I do if I have concerns about this research? Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor Dr. Loic Le de
Email: loic.le.de@aut.ac.nz

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTECH, ethics@aut.ac.nz , (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Researcher Contact Details:

Jamie Mead

Email: XWR2677@aut.ac.nz

Project Supervisor Contact Details:

Dr. Loic Le de

Email: loic.le.de@aut.ac.nz

Melanie Moylan

Email: melanie.moylan@aut.ac.nz

**Approved by the Auckland University of Technology Ethics Committee on the 4th May 2022.
AUTECH Reference number 22/66.**

Consent For the purpose of this study:

A **surfer** is someone that uses a board or their body to ride waves toward the shore and includes: Shortboard, longboard, bodyboard, SUP, bodysurfing. Can also include windsurfing and kiteboard when riding waves in shore.

A **bystander rescuer** is someone, be that a member of the public, family or friend, who has seen or heard someone in the water, who needed help and rescuing, and has offered assistance.

Conditions of survey:

16 years of age or older.

Reside currently in New Zealand

Are a surfer

Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, whilst in the process of completion, your results will be automatically removed as an incomplete answer. However, if the survey is completed in full, removal of your data may not be possible as your answers are not identifiable to you. Completion of this survey will indicate participant consent.

I have read and understand the information detailed above.

☐ Yes - Start survey (1)

☐ I do not wish to participate in the survey (2)

Qualifying Questions

Are you 16 Years or older?

☐ Yes (1)

☐ No (2)

Are you a surfer?

A surfer being someone that uses a board or their body to ride waves toward the shore and includes: Shortboard, longboard, bodyboard, SUP, bodysurfing. Can also include windsurfing and kiteboard when riding waves in shore.

☐ No (1)

☐ Yes (2)

Have you ever rescued someone from the surf as a bystander?

☐ No (1)

☐ Yes (2)

Part 1: We would like to know a little bit about you...

Q1 What is your gender?

- ☐ Male (1)
- ☐ Female (2)
- ☐ Non-Binary/Other (3)
- ☐ Prefer not to say (4)

Q2 How old are you?

- ☐ 16 -19 years old (1)
- ☐ 20 - 29 years old (2)
- ☐ 30 - 39 years old (3)
- ☐ 40 - 49 years old (4)
- ☐ 50 + years old (5)

Q3 What ethnicity are you?

- ☐ Māori (1)
- ☐ NZ/European (2)
- ☐ Pacific Island (3)
- ☐ Asian (4)
- ☐ Middle Eastern / Latin American / African (5)
- ☐ Other (6) _____

Q4 Have you completed any surfer specific rescue training? For example Surfer Rescue 24/7

☐ No (1)

☐ Yes (2)

Q5 Do you identify mostly as a.....?

☐ Short board rider (1)

☐ Long board rider (2)

☐ Bodyboarder (3)

☐ Stand up paddle boarder (4)

☐ Kite surfer (5)

☐ Sail boarder (6)

☐ Body surfer (7)

Q6 How many years have you been surfing?

☐ Less than 1 year (1)

☐ 1 - 5 years (2)

☐ 6 - 10 years (3)

☐ 11 - 20 years (4)

☐ 21 years or more (5)

Q7 On average how often do you recreate in the water at a coastal beach in New Zealand? This includes: surfing of any kind, paddling, swimming.

- ☐ Every day (1)
- ☐ 3-6 times per week (2)
- ☐ 1-2 times per week (3)
- ☐ 1-3 times per month (4)
- ☐ 3-11 times per year (5)
- ☐ 1-2 times per year (6)
- ☐ Less often (7)

Q8 How would you rate your confidence in the water?

- ☐ Beginner - I am only comfortable being out in smaller wave conditions (Approx 1.5m or less). I am still learning to understand waves and currents. (1)
- ☐ Intermediate - I am comfortable being out in small to moderate surf (1.5m-Head height). I may use currents to get out the back when available. (2)
- ☐ Advanced - I am confident with or without a board in conditions up to and exceeding overhead waves. I have a comprehensive understanding of wave and current dynamics. (3)
- ☐ Professional - I have the skills, confidence and experience to be out in any surf conditions. I have competed and/or have water/rescue qualifications. (4)

Q9 What region is your "local" surf break?

- ☐ Northland (1)
- ☐ Auckland (2)
- ☐ Waikato (3)
- ☐ Bay of Plenty (4)

- ☐ Gisborne (5)
- ☐ Hawke's bay (6)
- ☐ Taranaki (7)
- ☐ Manawatu - Wanganui (8)
- ☐ Wellington (9)
- ☐ Tasman / Nelson (10)
- ☐ Marlborough (11)
- ☐ West Coast (12)
- ☐ Canterbury (13)
- ☐ Otago (14)
- ☐ Southland (15)

Q10 On average how many different beaches across New Zealand would you visit per year?

- ☐ 1 - 3 beaches (1)
- ☐ 4 -10 beaches (2)
- ☐ 11 - 20 beaches (3)
- ☐ 21+ beaches (4)

Part 2: We now want to know about your experience with rescues across your lifetime.

Q11 Where have most of your rescues taken place?

- ☐ Northland (1)
- ☐ Auckland (2)
- ☐ Waikato (3)
- ☐ Bay of Plenty (4)
- ☐ Gisborne (5)
- ☐ Hawke's Bay (6)
- ☐ Taranaki (7)
- ☐ Manawatu - Wanganui (8)
- ☐ Wellington (9)
- ☐ Tasman / Nelson (10)
- ☐ Marlborough (11)
- ☐ West Coast (12)
- ☐ Canterbury (13)
- ☐ Otago (14)
- ☐ Southland (15)

Q12 As a bystander, how many people do you estimate you have rescued at New Zealand beaches in your lifetime?

- ☐ 1 person (1)
- ☐ 2 people (2)
- ☐ 3 people (3)
- ☐ 4 people (4)
- ☐ 5 + people (5)

Q13 Have most of your rescues been on beaches with lifeguards or no lifeguards?

- ☐ Lifeguards (1)
- ☐ No Lifeguards (2)
- ☐ Before/After hours of patrol (3)
- ☐ Don't know (4)

Q14

How do you think most of these people got into trouble?

Select all that apply.

- ☐ Rip current (1)
- ☐ Dumped by waves (2)
- ☐ Hit by a person or watercraft (3)
- ☐ Poor swimming ability (4)
- ☐ Lack of local knowledge and hazards (5)
- ☐ Other (6) _____

Q15 What percentage of your rescues were rip current related?

- ☐ 0 - 25% (1)
- ☐ 25 - 50% (2)
- ☐ 50 - 75% (3)
- ☐ 75 - 100% (4)

Q16

What were most of these people doing when you rescued them?

Select all that apply.

- ☐ Swimming (1)
- ☐ Board riding (2)
- ☐ Snorkelling (3)
- ☐ Wading (4)
- ☐ Other (5) _____

Q17 What gender was the person/s you rescued?

- ☐ Male (1)
- ☐ Female (2)
- ☐ I've rescued both male and female (3)

Q18 How old was the person/s you rescued?

Under 15 years old : _____ (1)

16-25 years old : _____ (2)

26-39 years old : _____ (3)

40+ years old : _____ (6)

Total : _____

Part 3: These questions are asking you about your MOST RECENT rescue you have undertaken as a bystander (it may also be the only one you have ever done).

Q19 How long ago did your most recent rescue occur?

- ☐ Within the last 6 months (1)
- ☐ Between 6-12 months ago (2)
- ☐ Between 1-2 years ago (13 to 24 months) (3)
- ☐ Between 2-5 years ago (25 to 60 months) (4)
- ☐ Between 5-10 years ago (61 to 120 months) (5)
- ☐ More than 10 years ago (6)

Q20 What was the wave height when the rescue took place?

- ☐ Gentle swell (0-2 foot) (1)
- ☐ Moderate swell (2-4 foot) (2)
- ☐ Large swell (4-6 foot) (3)
- ☐ Massive swell (6+ foot) (4)

Q21 What were the surf conditions like when the rescue took place?

- ☐ Smooth and glassy waves (1)
- ☐ Choppy / messy waves (2)
- ☐ Flat (3)

Q22 Were there lifeguards on duty patrolling the area?

- ☐ Yes (1)
- ☐ No, but there were lifeguards patrolling less than 1km away (2)
- ☐ No, but there were lifeguards patrolling between 1 and 5km away (3)
- ☐ No, but there were lifeguards patrolling more than 5km away (4)
- ☐ No, it was outside of patrolled hours (5)
- ☐ No (6)
- ☐ Don't know (7)

Q23 Approximately, what time of day did the rescue occur?

- ☐ 12 am – 4 am (1)
- ☐ 4 am – 8 am (2)
- ☐ 8 am – 12 pm (3)
- ☐ 12 pm -4 pm (4)
- ☐ 4 pm – 8 pm (5)
- ☐ 8 pm -12 am (6)
- ☐ Unsure (7)

Q24 What were you doing at the time of rescue?

- ☐ Surfing (1)
- ☐ Swimming (2)
- ☐ Other (3) _____
-

Q25 Did other people help you with the rescue?

- ☐ No (1)
- ☐ Yes (2)

Part 4: Please tell us a little bit about the person/s you rescued.

Q26 What is the gender of the person you rescued?

Male : _____ (1)

Female : _____ (2)

Non-binary / third gender : _____ (3)

Prefer not to say : _____ (4)

Total : _____

Q27 What was the approximate age of the person?

0-9 years : _____ (1)

10-19 years : _____ (2)

20-29 years : _____ (3)

30-39 years : _____ (4)

40-49 years : _____ (5)

50-59 years : _____ (6)

60-69 years : _____ (7)

70-79 years : _____ (8)

80-84 years : _____ (9)

85+ years : _____ (10)

Total : _____

Q28 What was the ethnicity of the person you rescued?

- ☐ Maori (1)
- ☐ NZ/European (2)
- ☐ Pacific Island (3)
- ☐ Asian (4)
- ☐ Middle Eastern / Latin American / African (5)
- ☐ Other (6) _____
- ☐ Don't Know (7)

Q29 What was your relationship to the person at the time of the rescue?

- ☐ Stranger (1)
- ☐ Parent (2)
- ☐ Brother/ Sister (3)
- ☐ Child (4)
- ☐ Grandchild (5)
- ☐ Grandparent (6)
- ☐ Aunt/ Uncle (7)
- ☐ Cousin (8)
- ☐ Spouse/ Partner (9)
- ☐ Friend (10)

Q30 Did you see the situation as it developed? For example: the person entering a rip where they shouldn't have.

☐ No (1)

☐ Yes (2)

Q31 When you came to be involved in the rescue how confident were you in your ability to rescue the person?

☐ Not at all confident (1)

☐ Somewhat confident (2)

☐ Completely confident (3)

Q32 Did you conduct any kind of risk assessment before performing the rescue?

☐ Yes - I stopped and observed the situation quickly before going to rescue (1)

☐ Yes - I weighed the risks up as I made my way to the patient (2)

☐ No - I didn't need to because I knew the risks relevant to that location very well (3)

☐ No – it didn't even occur to me. I saw someone in trouble and just went and helped (4)

Q33 Did you use any floatation devices to help you during the rescue?

☐ No (1)

☐ Yes- A surfboard, bodyboard, SUP etc. (2)

☐ Yes- A life jacket (3)

☐ Yes- rope or line (4)

☐ Yes- Other (5) _____

Q34 Did the person seem to know they were in trouble and needed help when you got to them?
Please choose the most accurate statement.

- ☐ Yes, but they were calm (1)
- ☐ Yes, they were relieved (2)
- ☐ Yes, they were panicked (3)
- ☐ No, they had no idea (4)
- ☐ They were unconscious (5)
- ☐ I can't remember (6)
- ☐ Other (7) _____

Q35 What condition was the person in after the rescue?

- ☐ Required CPR (1)
- ☐ Required First Aid (2)
- ☐ Required an ambulance (3)
- ☐ Ok, could walk away (4)
- ☐ I can't remember (5)

Q36 How difficult was it for you to rescue the person/s?

- ☐ Easy, it was not difficult at all (1)
- ☐ Relatively easy but had a little bit of trouble (2)
- ☐ Relatively difficult (3)
- ☐ Very difficult, I really struggled (4)

Q37 How did the experience leave you feeling immediately after the rescue?

- ☐ Happy to have helped (1)
- ☐ Relieved (2)
- ☐ Inconvenienced (3)
- ☐ Annoyed (4)
- ☐ Scared (5)
- ☐ Sad (6)
- ☐ Other (7) _____

Q38 Do you think you saved the person's life?

- ☐ No (1)
- ☐ Yes (2)
- ☐ I don't know (3)

Q39 In your opinion, what could be done to better support and equip surfers with the knowledge, training, equipment etc. to safely perform rescues at NZ beaches?

Q41 Would you like to enter the draw to go into win a \$1000 toward a custom Anderson surfboard?

- ☐ Yes (1)
- ☐ No thanks (2)

End of Block: Prize Entry for Custom Surfboard valued at \$1000

Appendix C: Surfboard Raffle Entry

Surfboard raffle entry

Please enter your contact details to enter the draw

Name:

Email:

Mobile:

Block 1

Surfboard prize and funding provided by Surf Lifesaving New Zealand and Surfing NZ.



Powered by Qualtrics

Appendix D: Researchers Codebook

Variable	SPSS variable name (ID)	Coding instructions	Prior variable EXCLUSION criteria
Are you 16 Years or older?	Qual1	1. Yes 2. No	N/A
Are you a surfer?	Qual2	1. No 2. Yes	N/A
Have you ever rescued someone from the surf as a bystander?	Qual3	1. No 2. Yes	N/A
What is your gender?	RGen	1. Male 2. Female 3. Non-Binary/Other 4. Prefer not to say	N/A
How old are you?	RAge	1. 16 -19 years old 2. 20 - 29 years old 3. 30 - 39 years old 4. 40 - 49 years old 5. 50 + years old	N/A
What ethnicity are you?	REth	1. Māori 2. NZ/European 3. Pacific Island 4. Asian 5. Middle Eastern / Latin American / African 6. European 7. North American	“Other” any answer given as not a legitimate ethnicity removed from data

		8. South American 9. Australian 10. Other	
Have you completed any surfer specific rescue training? For example Surfer Rescue 24/7	RTrain	1 No 2 Yes	N/A
Do you identify mostly as a.....?	RBoard	1. Short board rider 2. Long board rider 3. Bodyboarder 4. Stand up paddle boarder 5. Kite surfer 6. Sail boarder 7. Body surfer	N/A
How many years have you been surfing?	RExp	1. Less than 1 year 2. 1 - 5 years 3. 6 - 10 years 4. 11 - 20 years 5. 21 years or more	N/A
On average how often do you recreate in the water at a coastal beach in New Zealand? This includes: surfing of any kind, paddling, swimming.	RVisits	1. Every day 2. 3-6 times per week 3. 1-2 times per week 4. 1-3 times per month 5. 3-11 times per year 6. 1-2 times per year	N/A

		7. Less often	
How would you rate your confidence in the water?	RAbility	1. Beginner 2. Intermediate 3. Advanced 4. Professional	N/A
What region is your "local" surf break?	RRegion	1. Northland 2. Auckland 3. Waikato 4. Bay of Plenty 5. Gisborne 6. Hawke's bay 7. Taranaki 8. Manawatu – Wanganui 9. Wellington 10. Tasman / Nelson 11. Marlborough 12. West Coast 13. Canterbury 14. Otago 15. Southland	N/A
On average how many different beaches across New Zealand would you visit per year?	BchVis	1. 1 - 3 beaches 2. 4 -10 beaches 3. 11 - 20 beaches 4. 21+ beaches	N/A

As a bystander, how many people do you estimate you have rescued at New Zealand beaches in your lifetime?	BysRes	1 person 2 people 3 people 4 people 5 + people	N/A
Where have most of your rescues taken place?	ResLoc1-15 North Auck Waik BOP Gisb Hawk Tara Mana Well Tasm Marl West Cant Otag Sout	1. Northland 2. Auckland 3. Waikato 4. Bay of Plenty 5. Gisborne 6. Hawke's Bay 7. Taranaki 8. Manawatu – Wanganui 9. Wellington 10. Tasman / Nelson 11. Marlborough 12. West Coast 13. Canterbury 14. Otago 15. Southland	N/A
Have most of your rescues been on beaches with lifeguards or no lifeguards?	LifeG	1. Lifeguards 2. No Lifeguards 3. Before/After hours of patrol 4. Don't know	N/A
How do you think most of	Trbl 1,2,3,4,5,6,7	1. Rip current	N/A

these people got into trouble? Select all that apply.		2. Dumped by waves 3. Hit by a person or watercraft 4. Poor swimming ability 5. Lack of local knowledge and hazards 6. Broken or lost equipment 7. Boat negotiating an outlet or sandbar 8. Medical event or injury 9. Intoxicated 10. Other	
What percentage of your rescues were rip current related?	Rips	1. 0 - 25% 2. 25 - 50% 3. 50 - 75% 4. 75 - 100%	N/A
What were most of these people doing when you rescued them? Select all that apply.	Pact1-8	1. Swimming 2. Board riding 3. Snorkelling 4. Wading 5. Kayaking 6. Boating 7. Kai Gathering 8. Other	N/A
What gender was the person/s you rescued?	PGen	1. Male 2. Female 3. I've rescued both male and female	N/A
How old was the person/s you rescued?	PAge	1. Under 15 years old 2. 16-25 years old	N/A

		3. 26-39 years old 4. 40+ years old	
How long ago did your most recent rescue occur?	LstRes	1. Within the last 6 months 2. Between 6-12 months ago 3. Between 1-2 years ago (13 to 24 months) 4. Between 2-5 years ago (25 to 60 months) 5. Between 5-10 years ago (61 to 120 months) 6. More than 10 years ago	N/A
What was the wave height when the rescue took place?	Waves	1. Gentle swell (0-2 foot) 2. Moderate swell (2-4 foot) 3. Large swell (4-6 foot) 4. Massive swell (6+ foot)	N/A
What were the surf conditions like when the rescue took place?	Surfcon	1. Smooth and glassy waves 2. Choppy / messy waves 3. Flat	N/A
Were there lifeguards on duty patrolling the area?	LfgOD	1. Yes 2. No, but there were lifeguards patrolling less than 1km away 3. No, but there were lifeguards patrolling between 1 and 5km away 4. No, but there were lifeguards patrolling more than 5km away 5. No, it was outside of patrolled hours 6. No 7. Don't know	N/A

Approximately, what time of day did the rescue occur?	Time	1. 12 am – 4 am 2. 4 am – 8 am 3. 8 am – 12 pm 4. 12 pm -4 pm 5. 4 pm – 8 pm 6. 8 pm -12 am 7. Unsure	N/A
What were you doing at the time of rescue?	RAct	1. Surfing 2. Swimming 3. Sunbathing 4. Walking on the beach 5. Had come in or were going surfing or checking surf 6. Training/coaching/working/volunteer 7. Other	N/A
Did other people help you with the rescue?	Asst	1. No 2. Yes	N/A
What is the gender of the person you rescued?	PGenM/F/N/NA	1. Male 0 2. Female 0 3. Non-binary / third gender 0 4. Prefer not to say 0	N N/A

What was the approximate age of the person?	PtAge2	1. 0-9 years 0 2. 10-19 years 0 3. 20-29 years 0 4. 30-39 years 0 5. 40-49 years 0 6. 50-59 years 0 7. 60-69 years 0 8. 70-79 years 0 9. 80-84 years 0 10. 85+ years 0	N/A
What was the ethnicity of the person you rescued?	PtEth2	1. Maori 2. NZ/European 3. Pacific Island 4. Asian 5. Middle Eastern / Latin American / African 6. European 7. Other 8. Don't Know	N/A
What was your relationship to the person at the time of the rescue?	RPRel	1. Stranger 2. Parent 3. Brother/ Sister 4. Child 5. Grandchild 6. Grandparent 7. Aunt/ Uncle	N/A

		8. Cousin 9. Spouse/ Partner 10. Friend	
Did you see the situation as it developed? For example: the person entering a rip where they shouldn't have.	SitDev	1. No 2. Yes	N/A
When you came to be involved in the rescue how confident were you in your ability to rescue the person?	RConf	1. Not at all confident 2. Somewhat confident 3. Completely confident	N/A
Did you conduct any kind of risk assessment before performing the rescue?	RskA	1. Yes - I stopped and observed the situation quickly before going to rescue 2. Yes - I weighed the risks up as I made my way to the patient 3. No - I didn't need to because I knew the risks relevant to that location very well 4. No – it didn't even occur to me. I saw someone in trouble and just went and helped	N/A
Did you use any floatation devices to help you during the rescue?	RFlo	1. No 2. Yes- A surfboard, bodyboard, SUP etc. 3. Yes- A life jacket 4. Yes- rope or line	N/A

		5. Yes- Other	
Did the person seem to know they were in trouble and needed help when you got to them? Please choose the most accurate statement.	PTrbl	1. Yes, but they were calm 2. Yes, they were relieved 3. Yes, they were panicked 4. No, they had no idea 5. They were unconscious 6. I can't remember 7. Other	N/A
What condition was the person in after the rescue?	PCon	1. Required CPR 2. Required First Aid 3. Required an ambulance 4. Ok, could walk away 5. I can't remember	N/A
How difficult was it for you to rescue the person/s?	RDiff	1. Easy, it was not difficult at all 2. Relatively easy but had a little bit of trouble 3. Relatively difficult 4. Very difficult, I really struggled	N/A
How did the experience leave you feeling immediately after the rescue?	RFeel	1. Happy to have helped 2. Relieved 3. Inconvenienced 4. Annoyed 5. Scared 6. Sad 7. Other	N/A
Do you think you saved the person's life?	PSave	1. No 2. Yes	N/A

		3. I don't know	
In your opinion, what could be done to better support and equip surfers with the knowledge, training, equipment etc. to safely perform rescues at NZ beaches?	FreeTr	Free training for surfers in Rescue awareness and techniques	Key inclusion words in coding Training, courses, teach
	Promo	Promotion of training courses available for surfers	Promotion, publicise, market
	SlfAwa	Better self-awareness - Surfers and Public	Self-awareness, self-assessment, knowing ability
	Srf101	Surfing 101 - Foundational skills for surfers through Surf schools and board rider clubs	Foundation, basic skills, surfing rules, learning to surf
	1stAid	1st aid and CPR courses made available	1st aid, CPR, medical
	Swim	Free swimming lessons and beach safety for public/ Early childhood education	Swimming, public education, childhood, youth, water safety
	Equip	Surf rescue/AED equipment available at locations	Rescue equipment, tubes, floatation device, AED, communication, rescue rings
	LifeG	More lifeguard patrols/ hours patrolled	Patrol, Lifeguards, patrol hours, unpatrolled beach
	Srf247	Ongoing Surfers 24/7 courses	24/7, surfer specific rescue course
	Collab	Better colab between surfers and SLSNZ	Collaboration, relationship, work with
	Signage	Signage/localised Information at beaches	Signs, local information, QR code
	Online	Online/TV/printed training & Education	Social media, you tube, instagram, facebook, pamphlets, poster, TV ads
	Other	All other free text that could not be categorised	All other free text that did not categorise

Appendix E: Complete Summary of Descriptive Results

Characteristic	Frequency (n)	Percentage (%)
Question 1.		
What is your gender?		
Male	365	87.3
Female	51	12.2
Non-Binary	2	0.5
Total	418	
Question 2		
How old are you?		
16-19	34	8.1
20-29	89	21.3
30-39	83	19.9
40-49	125	29.9
50+	87	20.8
Total	418	
Question 3		
What ethnicity are you?		
Maori	47	11.2
NZ/Euro	340	81.3
Pacific Island	3	0.7
Asian	4	1
European/Other people	24	5.7
Total	418	
Question 4		
Have you completed any surfer specific rescue training? For example, Surfer Rescue 24/7		
No	314	75.1
Yes	104	24.9
Total	418	

Characteristic	Frequency (n)	Percentage (%)
Question 5		
Do you identify mostly as a.....?		
Short board	305	73
Long board	86	20.6
Body board	5	1.2
SUP	10	2.4
Kite	4	1
Sail	2	0.5
Body surf	6	1.4
Total	418	
Question 6		
How many years have you been surfing?		
< 1	3	0.7
1 to 5	45	10.8
6 to 10	63	15.1
11 to 20	100	23.9
21+	207	49.5
Total	418	
Question 7		
On average how often do you recreate in the water at a coastal beach in New Zealand Zealand?		
Every day	13	3.1
3-6 times a week	128	30.6
1-2 times a week	179	42.8
1-3 times per month	78	18.7
3-11 times per year	17	4.1
1-2 times per year	2	0.5
Less often	1	0.2
Total	418	
Question 8		
How would you rate your confidence in the water?		
Beginner	5	1.2
Intermediate	58	13.9
Advanced	232	55.5
Professional	123	29.4
Total	418	

Characteristic	Frequency (n)	Percentage (%)
Question 9		
What region is your "local" surf break?		
Northland	36	8.6
Auckland	112	26.8
Waikato	54	12.9
BOP	78	18.7
Gisborne	18	4.3
Hawke's bay	17	4.1
Taranaki	25	6
Manawatu-Wanganui	4	1
Wellington	22	5.3
Tasman/Nelson	1	0.2
Marlborough	1	0.2
West Coast	5	1.2
Canterbury	26	6.2
Otago	18	4.3
Southland	1	0.2
Total	418	

Question 10

On average how many different beaches across New Zealand would you visit per year?

1 to 3	26	6.2
4 to 10	197	47.1
11 to 20	129	30.9
21+	66	15.8
Total	418	

Question 11

As a bystander, how many people do you estimate you have rescued at New Zealand beaches in your lifetime?

1 person	81	19.4
2 people	104	24.9
3 people	73	17.5
4 people	34	8.1
5+ people	126	30.1
Total	418	

Characteristic	Frequency (n)	Percentage (%)
Question 12		
Where have most of your rescues taken place?		
Northland	48	9.1
Auckland	132	25
Waikato	89	16.8
BOP	95	18
Gisborne	21	4
Hawke's bay	26	4.9
Taranaki	27	5.1
Manawatu-Wanganui	4	1
Wellington	22	4.2
Tasman/Nelson	1	0.2
Marlborough	2	0.4
West Coast	9	1.7
Canterbury	27	5.1
Otago	24	4.5
Southland	2	0.4
Total	529	
Question 13		
Have most of your rescues been on beaches with lifeguards or no lifeguards?		
Lifeguards	109	26.7
No lifeguards	183	44.9
Before/after hours	116	28.4
Total	408	
Question 14		
How do you think most of these people got into trouble?		
Rip	319	35.3
Dumped by waves	67	7.4
Hit by person/craft	21	2.3
Poor swimming ability	218	24.1
Lack of knowledge/hazards	239	26.5
Broken or lost equipment	8	0.9
Boat negotiating outlet/sandbar	4	0.4
Medical event or injury	7	0.8
Intoxicated	3	0.3
Other	17	1.9
Total	903	

Characteristic	Frequency (n)	Percentage (%)
Question 15		
What percentage of your rescues were Rip current related?		
0-25	64	15.3
25-50	68	16.3
50-75	96	23
75-100	190	45.5
Total	418	
Question 16		
What were most of these people doing when you rescued them?		
Swimming	319	56.5
Board riding	167	29.6
Snorkelling	5	0.9
Wading	46	8.1
Kayaking	14	2.5
Boating	8	1.4
Kai gathering	2	0.4
Other	4	0.7
Total	565	
Question 17		
What gender was the person/s you rescued?		
Male	164	39.2
Female	36	8.6
I've rescued both M and F	218	52.2
Total	418	
Question 18		
How old was the person/s you rescued?		
Under 15 years old	528	29.8
15-25 years old	643	36.2
26-39 years old	385	21.7
40+ years old	218	12.3
Total	1774	
Question 19		
How long ago did your most recent rescue occur?		
Last 6 months	94	22.5
6-12 months	81	19.4
1-2 years	86	20.6
2-5 years	84	20.1
5-10 years	35	8.4
More than 10 years	38	9.1
Total	418	

Characteristic	Frequency (n)	Percentage (%)
Question 20		
What was the wave height when the rescue took place?		
Gentle	65	15.6
Moderate	261	62.4
Large	79	18.9
Massive	13	3.1
Total	418	
Question 21		
What were the surf conditions like when the rescue took place?		
Smooth and glassy	204	48.8
Choppy/messy	209	50
Flat	5	1.2
Total	418	
Question 22		
Were there lifeguards on duty patrolling the area?		
Yes	59	14.1
No, but there were lifeguards patrolling < 1km away	78	18.7
No, but there were lifeguards between 1 and 5km away	34	8.1
No, but there were lifeguards patrolling > 5km away	12	2.9
No, it was outside of patrolled hours	126	30.1
No	100	23.9
Don't know	9	2.2
Total	418	
Question 23		
Approximately what time of day did the rescue occur?		
12-4am	11	2.6
4-8am	17	4.1
8am-12pm	94	22.5
12pm-4pm	183	43.8
4pm-8pm	106	25.4
8pm-12am	1	0.2
Unsure	6	1.4
Total	418	

Characteristic	Frequency (n)	Percentage (%)
Question 24		
What were you doing at the time of rescue?		
Surfing	315	75.4
Swimming	37	8.9
Sunbathing	13	13
Walking on the beach	10	2.4
Had come in, or were going surfing, or checking the surf	12	2.9
Training/coaching/working/volunteer	8	1.9
Other	22	5.3
Total	417	
Question 25		
Did other people help you with the rescue?		
No	223	53.3
Yes	195	46.7
Total	418	
Question 26		
What is the gender of the person you rescued?		
Male	450	70.5
Female	185	29
Prefer not to say	3	0.5
Total	638	
Question 27		
What was the approximate age of the person?		
0-9 years	84	13.2
10-19 years	202	31.8
20-29 years	172	27.1
30-39 years	84	13.2
40-49 years	61	9.6
50-59 years	16	2.5
60-69 years	13	2
70-79 years	3	0.5
Total	635	

Characteristic	Frequency (n)	Percentage (%)
Question 28		
What was the ethnicity of the person you rescued?		
Maori	47	12.3
NZ/Euro	239	62.4
Pacific Island	21	5.5
Asian	43	11.2
European/Other people	33	8.6
Total	383	
Question 29		
What was your relationship to the person at the time of the rescue?		
Stranger	382	91.4
Parent	2	0.5
Brother/sister	6	1.4
Child	4	1
Cousin	1	0.2
Spouse/partner	1	0.2
Friend	22	5.3
Total	418	
Question 30		
Did you see the situation as it developed?		
No	188	45
Yes	230	55
Total	418	
Question 31		
How Confident were you in your ability to rescue the person?		
Not at all confident	6	1.4
Somewhat confident	105	25.1
Completely confident	307	73.4
Total	418	

Characteristic	Frequency (n)	Percentage (%)
Question 32		
Did you conduct any kind of risk assessment before the rescue?		
Yes, I stopped and observed the situation quickly before going to rescue	84	20.1
Yes, I weighed the risks up as I made my way to the patient	114	27.3
No, I didn't need to because I knew the risks relevant to that location very well	169	40.4
No, it didn't even occur to me. I saw someone in trouble and just went and helped	51	12.2
Total	418	
Question 33		
Did you use a floatation device?		
No	67	16
Yes, a surfboard, SUP etc.	346	82.8
Yes, rope or line	1	0.2
Yes, other	4	1
Total	418	
Question 34		
Did the person seem to know they were in trouble?		
Yes but calm	38	9.1
Yes but relieved	115	27.5
Yes but panicked	232	55.5
No, no idea	23	5.5
Unconscious	9	2.2
Can't remember	1	0.2
Total	418	
Question 35		
What condition was the person in after the rescue?		
Required CPR	11	2.6
Required first aid	15	3.6
Required ambulance	30	7.2
Ok, could walk away	361	86.4
Can't remember	1	0.2
Total	418	

Characteristic	Frequency (n)	Percentage (%)
Question 36		
How difficult for you was it to rescue the person?		
Easy	102	24.4
Relatively easy, some difficulty	209	50
Relatively difficult	91	21.8
Very difficult	16	3.8
Total	418	
Question 37		
How did the experience leave you feeling		
Happy to help	260	62.2
Relieved	98	23.4
Inconvenienced	6	1.4
Annoyed	32	7.7
Scared	4	1
Sad	6	1.4
Other	12	2.9
Total	418	
Question 38		
Do you think you saved the persons life?		
No	63	15.1
Yes	194	46.4
I don't know	161	38.5
Total	418	

Appendix F: Free Text Comments

1	Teach the best way to get them back to the beach on a surfboard
2	I know there are courses but maybe getting the word out better
3	There's plenty of education out there now. People have to be aware of their own personal limitations in the conditions they go out in.
4	Educate surfers on techniques to help save someone
5	free training sessions, how to use boards as recur tools
6	Firstly, a basic education of surfing rules. People know rugby, soccer, hockey and netball rules to some basic extent but not many people who are new to the sport understand the drop in rule which would eliminate many collisions/ rescues because of this. Campaign to stop surfers going in alone, in big surf, learning how to use a rip current to their advantage. A general understanding of how to use their craft.. basically, a surfing 101.
7	life sustaining first aid training e.g CPR
8	Maybe do thru some clubs and freebies as an incentive
9	Free swimming lessons and beach safety
10	Run cpr courses
11	Surf Rescue Stations (With tubes) on rocks and near known permanent rips
12	Training
13	More training courses
14	More patrolling lifeguards/ towers
15	we had junior training, and it is a small bay so hard for life guards to see the swimmers
16	Surf school training, instead of just taking money. All they do is pump through and not inform of risks and dangers involved and the rules around surfing and water safety. Need more education. Constantly see people after a couple of lessons go out in conditions they can't comprehend.
17	Teach kids swimming and life saving
18	Training
19	The board riders training roll out seems appropriate. Experienced surfers have always performed rescues
20	Knowledge of what someone in trouble looks like, eg swimming ok but still going out and looking tired
21	specific surf lifesaving traing and first response training
22	Let them know they should help
23	More social media outreach
24	Better swimming ability and appreciation of how quick conditions can change
25	seminars
26	To support surfers would be if the public using the beach to respect it and not taking for granted that they can swim in a pool, that they safe in the ocean. I think because our country is surrounded by water that they should be teaching surf awareness to school students, train every kiwi kid to rokkie lifeguard level.
27	More training
28	Online training and technique video
29	More training courses from slsnz

30	Programmes such as Surfers Rescue 24/7 is awesome. Keep promoting it, get sponos on-board and give out incentives for participation... Also lifeguards are not on patrol enough all around the country. People swim until well past 7pm in summer, yet most LGs are done by 6! Rather than having massive amounts of guards on patrol, spread out the resource over a longer period of the day.
31	More education of the public so they don't get into trouble in the first place.
32	Funding to increase the following: guard numbers, training, equipment, hours of patrol
33	Better Relationship with local SLSC, offer free short courses to local surfers and board riders clubs, especially first aid CPR training. Evolving the local schools and surf schools who operate the beach most days. Surfers and Lifeguards have never had good relationships in the past, especially in places like Raglan where the majority of lifeguards come from Hamilton and have no idea about the local surfers and how much help they can offer.
34	More online forums and local courses at beaches
35	Short and easy to read technical guidance (e.g. A4/3 pdf)
36	More ads
37	Surfers are generally fine - it's beach goers that have no idea about rips and dangerous conditions that are the issue
38	Improved knowledge of self rescue in rips
39	I have been trained as lifeguard, and I know there is an initiative to train surfers, which is great but still will not reach too many (in my opinion). Would some instructional social media type videos incorporating some relevant fairly high profile surfers extend the reach, e.g a piece featuring Te kehu Kehu Butler showing how to position a semi conscious patient for best way t try and get to beach?
40	Training
41	Education
42	Difficult topic but critical. Techniques around using your surfboard for floatation while also reducing the risk of getting into trouble yourself would be a focus in my opinion. implementing that, perhaps be good for surf schools to have a safety formal safety course prior to starting surfing lessons.
43	Not too much. Most surfers will happily help and have a good understanding of the conditions. Sometimes its a rescue of learner surfers (low risk) but that seems to be part of learning process. Could be interesting for surfing organisations to run their own resuscitation training - but for all I know they may already
44	Awareness when surfing around others that they may not be all as confident as you
45	Lifeguards on the day monitoring the beach better. And more signage around hazards and risks involved with the different features. With multiple languages
46	Ensure that they know how to rescue someone with and without a surfboard. As the surfboard could easily end up breaking during a rescue or get swept from underneath them.
47	Always be actively keeping a watch out? Situational Awareness!
48	Surfers Rescue Course.
49	Lifeguards could stop being fat dickheads
50	More signs
51	Know how to get first aid for the patient after the rescue
52	More cpr and first aid training courses as surfer typically have the water skills

53	Surfers firstly should learn to swim competently, know how to use their board as a rescue and floatation device and if necessary, they swim to the beach whilst patient paddles their board.
54	Greater knowledge of what a drowning person looks like
55	Not a lot really, most experienced surfers have years of ocean and weather conditions knowledge and will perform a rescue within their limits, If any thing a PLB would help emergency services in remote locations, and a compulsory first aid course at high schools
56	Fun cartoon clip in ad breaks on multi media streams of how to use your board as a rescue floatation device.
57	Community based training, information app,
58	Work with Surf clubs, creating better relationships.
59	Offer surf life saving training courses for board rescues
60	Free rescue courses
61	Having a welcoming culture at surf clubs so surfers and clubbies can work together. Surfers know what to do in rescue. Surfers may not know the next step, eg cpr, first aid
62	Run training sessions
63	How to bring in semi conscious man bigger than me on my own in big surf, how to get him on his board from water
64	Surf rescue courses by surfing NZ and SLSNZ are a great initiative.
65	Regular training
66	Exposure and Training
67	Personal floatation devices for surgery
68	Signage
69	Share your experiences with others, Talk to clubbies, do first aid and cpr courses
70	Maybe more training
71	Floatation rings/devices and rope on the beaches in key areas
72	Workshop or training
73	Not sure. I did a short course to become a surf instructor which covered rescues.
74	More localised training or information at surfing events. Board riders events have a big catchment of local surfer attend so would provide a avenue for more info and education.
75	Formal training with Surf Lifesaving and Surfers
76	Training?
77	Surf rescue training
78	Most surfers I know are very competent and would be able to provide first response on a single drowning patient. Possibly offer cpr courses to surfers for once they've secured the patient and got them out of harms way
79	Surf Life Saving NZ needs to invite surfers to join clubs & get involved, put them thru courses & continue water education.
80	i dont think anything could be effectively implemented.
81	Some information online about best practice, with resources to follow up if someone wants to pursue further
82	CPR TRAINING, IMPORTANCE OF USING FLOATATION DEVICES
83	More respect towards surfers, we are continuously rescuing people on river bars etc but are treated like an annoyance.

84	Rescue training. Cpr
85	Two young children were in water at I patrolled time and parents were not paying attention to them at all.
86	you tube video instructions and courses to extend the learning and put it into practice
87	CPR training and how to get someone on a board
88	Access and promotion of free surf rescue training. Government funded through surf lifesaving clubs or surfing NZ.
89	Run more national water safety campaigns during peak TV hours when the higher risk demographic are watching TV. These could include how to spot a rip to help people be safer in the water
90	Training
91	Provide some basic training on how to get tired, panicked and unconscious patients onto surfboards and back to the beach quickly.
92	Basic first aid course would come in handy.
93	Keep running the surfers 24/7 training by slsnz
94	I did clubby training so I was more aware of risks. A good surfer could help a person in trouble without endangering themselves
95	Work along side life guards where they can.
96	Free or subsidised training
97	Rescue tubes on surf beaches
98	More training , more signage and education so people don't need rescuing
99	Put more training into board riders clubs for rescue
100	Video message or pamphlet on what to do in serious cases
101	Free training to at least look out for others
102	Run more education courses
103	lifeguard award maybe
104	I think people are heading into the water on days that they should not. I like how some beaches have the skill level for the days conditions, which is a little like the run rating on ski fields.
105	Free training or courses to upskill people
106	Dont know every situation will be different and generally we have a board which is probably the main thing we need
107	I should do some basic training. Even a short vid would be great.
108	Sign posted around the beach of how to spot rips/currents, as well as signs locating them throughout the day, as well as continuing to offer free workshops on water safety and rescue available to everyone.
109	Provide facilities for board riders clubs
110	SNZ & SLSNZ need to work on developing the Surf Rescue 247 module further. It's a great start but most surfers I know that have been involved in major rescues (such as the recent drowning / resus at Ahipara) come from some sort of surf lifesaving related background. The delivery of the Rescue 247 module is a great initiative. But is this refreshed annually ? And do the instructors have accreditation to deliver these modules? Or is it a revenue earning exercise for SNZ ?
111	Value being a good person not just a good surfer
112	Get rid of SLSNZ who think they are the gods of beach rescues
113	Really did all I could, have done first aid course and know CPR, better to pay lifeguards as a profession

114	Most competent surfers have what they need
115	Training. I'd been involved in surf lifesaving before I started surfing
116	More access to rescue courses
117	Surf forecasts including forecast of potential hazards. My latest rescue was with the rip taking the victim out around the rocks out of sight as the heavy fog was settling in. Surfers rescue training and community building by the surf community would be essential in surf towns so people feel comfortable enough to know there are people who are willing to help and that they feel comfortable enough to ask for help when needed.
118	The 24/7 courses are really good, enough knowledge to be super helpful in a rescue situation without overloading you with too much knowledge. I think some surfers might be reluctant to show up to the course so maybe a little handbook or info booklet could be useful to hand out at board riders events etc
119	Depends on the surfer as a lot of surfers would be good n trouble themselves if they lost there board. I've rescued a few of these over the years.
120	Better education for the swimming public on the dangers of particular beaches and rips. Surf industry provide info pamphlets etc re surf safety to all newbies that they sell boards too. Also surf school contacts
121	More knowledge on techniques
122	surfers rescue training course is fantastic. continue to make it easily available to all recreational surfers.
123	Maybe access to flotation devices on the beach
124	Surf lifesaving training
125	Don't raise your hand as lifeguards expect surfers to look after themselves Maybe get the lifeguards to actually look after random tourists who are surfing but not surfers
126	I think the Surfers 24/7 workshops are good and as many of those as possible would be good.
127	Surfboard rescue technique
128	More surfers rescue courses
129	Surfers will always be involved with rescues its a simple matter of numbers of experienced people that know the ocean and can see incidents evolving minutes before they do..surfers train themselves for this but knowing first aid is an area that would help
130	Rescue course
131	Could run free rescue courses at board riders clubs
132	Free first responders courses. Ie. What life guards do. But a day event with food and fun stuff etc. responsibility of surf clubs to run. But also for non officiated surfers to join.
133	Have more/better funding for lifeguards and coastguards. So they can be paid and actually patrolling the beach
134	More Surfer rescue training sessions
135	Conduct surf rescue as part of beginner learning at surf schools, involve board riders clubs and surf lifesaving together
136	How to bring an unconscious person to shore
137	More signs to tell swimmers that there are no life guards and to be careful. I work at a beach where there are no lifeguards and it's mainly a surf beach. Swimming can be dangerous if your not confident.
138	More available courses in beach rescues.

139	Signs at beaches explaining how each individual beach is
140	Have rescue information and numbers on signs to call if someone is struggling
141	Training for surfers, but also training for everyone who. Goes to the beach. Readily accessible flotation devices.
142	So situational, and most people will say they are ok when they are not
143	Surfers 24/7 training
144	To spread knowledge about surfing
145	Surfer specific rescue training should be better advertised
146	Potentially have a more strict requirement for who can actually be a clubby, this is only speaking from my experience in the coromandel over summer where I will leave the club name anonymous.
147	More swimming lessons for kids through school, and subsidized swimming across NZ. Too many people drown in NZ and very little is invested on swimming lessons. It's simple, everyone should learn to swim.
148	CPR training and rescue training involving use of a surfboard as assistance / aid etc
149	1
150	Training, incentivising becoming a lifeguard in some way
151	Specific drowning cpr and best technique to get in through big surf with a shortboard and A patient
152	Better teaching at younger age especially for pacific island and maori
153	Leash broke of their board, stranded out the back. So Equipment I'd say.
154	CPR and what to do if someone is attacked by a shark
155	More phone signal in isolated places
156	I believe it's less about surfer training and more a grass roots/knowing your abilities in the ocean. Most competent surfers will have the confidence and ability to help someone in the surf but if we can prevent others getting themselves into a dangerous position in the first place, that is the best step
157	Normally it's just on a whim and some will just have a natural instinct. Cant really prepare or equip for most random situations in the water
158	Swimming lessons and surf safety at school.
159	Free rescue training
160	Water safety education for non-surfers/new surfers. Free 1st aid, water rescue courses for experienced surfers.
161	Always said that the SLSC should be explaining how rips work in schools - this at least is beginning to happen....
162	It's up to the individual, to many surfers these days are not confident swimmers themselves
163	Not sure really. Maybe opt in courses?
164	A port Waikato board riders club
165	Free training clinics
166	Hold local surf rescue days
167	Not having people enter the water where rips are, so awareness. Signage etc.
168	More awareness, more courses offered for cheap/free
169	Perhaps videos about basics? I know there have been some free courses which are great, I just haven't attended any
170	Available education/knowledge. People should not be in a situation where they are unable to get themselves to shore.

171	Tips and tricks online
172	Local nights hosted to all surfers/Beach goes regarding training. Even high school curriculum adjustments
173	access to training, eg Surfers Rescue, SLSNZ Lifeguard award
174	Idk
175	Beach ettiquette and beach safety training for all NZers and signs at beaches e.g. wave priority, how to surf safely at busy spots
176	Maybe free training offered, even if it's online
177	Some kind of training
178	awareness campaign, refreshing life saving courses , emergency phone booth in poor signal locations. rip information at the location
179	Signs up at surf beaches. Eg keep your eyes open for people struggling.
180	Defib machines nearby and very visible
181	Free training sessions.
182	I feel there's a personal responsibility to know your limitations before entering the water
183	Better understanding
184	A QR code located at dangerous spots. This directs the QR code reader to a live updated knowledge centre or video of the local dangers. This could be hosted by local surf club and coastguard
185	Free courses at local area
186	Greater respect and understanding from the general public, as in acknowledgement that surfers particularly experienced and capable ones are confident and able in the water. Also understanding from the public of the potential dangers of the ocean.
187	Some training with the local surf clubs
188	Free water rescue course's???
189	Sessions that are happening now at surf clubs, more surf lifesaving in primary, intermediate and secondary schools
190	Unsure. surfers need to know more about the waves they're surfing, What they're braking on where the rips are, the weather forecast and tidal affects to the spot.... He was out of his depth.. literally
191	Education
192	Workshops with lifeguards
193	Training
194	Notice of known rip at the site
195	more lifegaurds at nz beaches, not just weekends
196	Not much
197	free training through surf life saving clubs
198	Most advanced surfer will Have the fitness and strength to perform a rescue, some form Of online or face to face education around dealing a rescue to help them understand what they may be faced with, by a panicked patient. That may just give them the confidence to use there ability as first on scene to complete the rescue
199	Surfing advertisements for a quick 3-4 step overview of safety precautions, as well as advertisements for safety courses
200	More available information on relevant courses
201	At my home spot the majority launch from the same point, I'd like a sign on and off the water board so we know who is out there when the light is setting

202	Courses on water safety and hazard identification. Also knowledge on you own capabilities.
203	Training
204	Letters or courses sent out and offered through board rider clubs
205	How to recognise someone in trouble
206	Rescue tube stations.
207	More training and education freely available.
208	Stop idiots using the beach.
209	How to better use there craft to assist in floating and/or returning somebody to shore
210	Free or funded courses for surfers who want to train as volunteer lifeguards. I live remotely. No beaches i surf at have lifeguards but on good surf days or sunny days there will be up to 200 surfers in the water and many swimmers with no flags and no lifeguards and an hours drive in aby direction to emergency services etc
211	Free seminars on techniques etc
212	Awareness
213	More education from an early age
214	Introducing surf rescue education at surf stores and surf lessons. Information boards at beaches with basic steps, equipment, DRS ABCs info. Media drive to promote surf safety courses.
215	Get them to recognise or see early that someone is in trouble
216	More of the surfers rescue programs. access to a paddle board at unpatrolled beaches
217	Training. Training. Training.....
218	More education on access to equipment and training. We had a first aid course specifically for water rescues in Raglan. The attendees received pin code for the surf club where the CPR device, telephone and other equipment is located.
219	Education via social media
220	Surf lifesaving skills bronze medal etc
221	Spread the life guards around the beaches
222	Rescue training at surf comps
223	Some videos on YouTube or similar to show some quick techniques in different situations
224	A defibrillator and more knowledge to surfers about looking out for everyone in the water
225	More signs in different languages and it to be taught throughout schools.
226	Maybe a crash course on rescuing using a surfboard, more knowledge of surf etiquette and conditions and hazards.
227	Most of the surfers in the water are confident enough to perform a rescue. I think a more prevalent surf school in dunedin could help new surfers to get the knowledge they lack. There's a lot of people trying to learn to surf without a teacher and i think that is the biggest issue down here.
228	Local board riders surf rescue classes. What's currently being done.
229	Trouble was pulling him in to shore on board safely with waves. Need possible way of getting Lifeguard attention if nearby
230	More surfers rescue courses. More connection with lifeguards.
231	Local board riders offering more frequent training sessions with basic rescue knowledge
232	Patrol longer hours in summer

233	Have more lifeguard towers
234	First aid training as sometimes the rescue is straight forward but if there is follow up first aid needed it could be difficult to perform.
235	Attend the surfers lifesaving seminar. Everything I learnt I was able to put into practice and stay calm.
236	The easiest way in which to pull someone into the beach if it's on a board or not
237	Knowledge of how to assist when in the moment and when to just monitor/ go for help. The mentality of asking for help not meaning you are a look to prevent the situation escalating
238	Education and knowledge of techniques
239	Make sure you go out with someone that can be helpful if there's is trouble
240	Make first aid courses and relative knowledge of how a beach works rips etc more accessible to the public and especially targeted toward the surfing community.
241	More free training like the awesome 24/7 surf rescue course :) that was great!
242	Not able to speculate
243	Lesson's
244	Signs so parents don't leave their kids u unattended in the water
245	First Aid Training; water science training; water rescue training- safe person concept
246	Free training sessions for local boarding clubs
247	Surf Rescue Courses
248	Look after equipment and know their limitations of fitness and experience
249	provide surfers with knowledge on how to handle people and get them back to the beach better when you have your surfboard. little videos up on social media could be a good idea
250	Experience in the water is the most important thing. I am a fully qualified lifeguard and have done a lot of training but I can attribute most of that to surfing experience
251	Have more information for the swimmers as Back Beach NP was no patrolled and the 2 asian people were quite a way out in a rip and calling for help and luckily for them I noticed. I am also a surf life saver and had to get off my surfboard and let 2 people hang onto the board while I kicked and stroked back to the beach.
252	To be fair a lot of surfers have developed good water skills and understand their ability it is however surfers with limited time in the water and thinking they can undertake activities that more experienced surfers are doing (and swimmers) who do not understand the conditions, risks and dynamics of the beach and enter the water at inappropriate locations i.e. into rips or fail to recognize lateral/ feeder rips without understanding how they work. With the emerging market of soft surf boards and their relatively low cost higher numbers of less experienced are undertaking surfing related activities without an appropriate knowledge base. It would be my view that for the soft board market that leg ropes be mandatory with board sales as well as training material (both written & electronic) on basic's of surfing, understanding wave action, surf conditions, rip's etc. and how to assist people in a range of situations.
253	A free course of sorts could be good. These events can be difficult to prepare for and often require rescuers to put themselves at risk to help others Are there any small self inflating pfds that could be on-hand at the beach that surfers could take out with them and don't have to go to shore to collect?
254	Water patrol

255	Perhaps informative courses aimed at surfers through the board rider clubs and maybe online forecast sites might be effective. It's a tough one, obviously a surfer's surfboard is the best tool at hand for rescues, I know it was what I used in the rescues I found myself in. Maybe big 10 ft mals stationed at points along trouble beaches .
256	Basic training
257	Training offered through their club if affiliated member, or offer surfers invitation to surf club training lessons
258	They are already pretty well placed – it'd be handy if more people knew flat water was a rip. I still see lots of people swimming in rips because it looks calmer
259	Basic rescue techniques information in surf shops and on signs at surf breaks
260	i was lucky to grow up in Australia and we did basic rescue at school . So their is a clue
261	Have a sign with basic instructions or tips for saving someone at edge of beach to educate people. They'll read it while checking the waves. Make it known to check up on all surfers together even strangers after each wave
262	Regular social media posts with info
263	Board specific training - using your board as a flotation device to aid rescue management and how to handle your board in the surf with another person on it
264	Communication between local SLS clubs and board riders' clubs to provide free training 1 day courses in rescue techniques and patient management for surfers
265	to be aware they usually have more experience and surf knowledge than the clubbies so should go to help as soon as they can
266	Help surfers understand and feel more obligated to help in a situation that could save someone's life. I feel like most surfers would assist in any situation if it were to unfold near them.
267	Unsure
268	In this situation the man had torn his hamstring and was really struggling to reach the shore, so I believe stretches prior to could have potentially prevented the situation
269	Easiest to start from school, but otherwise just have a simple board with the basic details of the dangers of the beach. And easier access to rescue information.
270	Life bouys at remote beaches
271	CPR
272	surf rescue tv programme. First Aid training
273	Yes - if he'd lost his board we'd have been in real trouble
274	Training, easy access to floatation devices at beaches, more education in schools
275	Education. Also there are some kooks at gnarly breaks. Almost need warning signs
276	In this case nothing
277	Education through surfing media channels. Offering courses. Recommend surf lifesaving training
278	I should have taken fins as well because only the victim could fit on the board and I had to hang off the back trying to get him in a strong rip
279	Promote surfers rescuing on surf report websites
280	short form video on social media eg instagram reels showing how to perform a rescue. You tube tutorials on how to swim someone in if you do have and don't have a floatation device.
281	This swimmer got picked up by the lifeguards after I rescued from rip by floating him on my board (eventually). Surfers need to be told to not believe what swimmers say about how they feeling as this guy wanted to swim off and got in trouble again!
282	Equipment on the beach

283	Maybe offer an online course with some basic first aid to be a bit more confident to get involved
284	Make sure leg ropes are not too old or damaged
285	Surfers knowing their own limits so they can properly weigh up if they should intervene or get help
286	Nothing, not a surfers obligation that's what lifeguards are for. In saying that you are always going to help if someone is in danger and you are in a position to help. The two people I rescued both had absolutely no idea of the power of the ocean. More public education/prevention is needed
287	Swimming lessons for free and more for adults
288	I think experienced surfers are pretty well equipped already for most emergencies they come across but CPR training would definitely be of benefit.
289	To have respect from the clubbies. When I was growing up, they were happy to assault us young grommets.
290	Have free safety trainings around this
291	More publicly available safety rings with long ropes. My board doesn't have a lot of float.
292	YouTube courses/surf meets
293	Watching other ocean goers like surf angels. We know the waves, ocean conditions so keep an eye on all people entering the surf (where possible).
294	Social media campaigns showing what surfers need to do
295	I think general awareness / training on best way to rescue people on a short board
296	Have courses available like the ones we do as surf instructors
297	Collaboration with Nz surf life saving
298	To be honest most experienced surfers should be okay with rescues, especially people like me. I've grown up living in Muriwai and surfing there from a young age in all sorts of conditions, good and bad. The best thing for surfers to safely carry out rescues like my example is having the experience and understanding of the beach and surf. Along with that experience and understanding comes with the ability to stay calm in tricky situations which I myself have managed to get into with boards snapping or a leg rope snapping, then you can translate that calmness into the person in trouble. I think for equipment it might be good to have a flotation device on all surf beaches, probably no point to have them at say Takapuna beach but definitely something to have at Muriwai, Piha, etc. Especially in winter when lifeguards aren't on duty.
299	Education
300	Short social media videos
301	Lifesaving kits on the beach
302	Educational/awareness campaigns. Most surfers have the hard skills required but could probably use help with "soft skills" like recognizing when someone is in trouble and best way to approach etc.
303	Have lifeguards at all beaches
304	Free rescues course for surfer
305	Willingness to help someone if they think they are in trouble
306	CPR training
307	The board and leg rope usually suffice
308	Understanding of using rips
309	Provide CPR training if people want it

310	I think a first aid course and surfing with friends.
311	Free training courses focusing on our to use your board to be the most effective possible.
312	Surfers 24/7 courses
313	Good communication with each other.
314	I think most are pretty competent in the water and usually willing to help if needed
315	Free first aid courses to help with CPR
316	I think on average surfers with a reasonable amount of experience will be confident enough to rescue someone if required.
317	Identification of rip areas
318	Get more people to join their local lifesaving club.
319	Training courses related to surf rescue
320	To have a better connection with SLSNZ as their resources and trainings are very good. Surfers, if they wish, could learn scenarios and practice using the equipment available to them to save lives in an efficient and safe manner.
321	? Possibly teach strategies based on saving groups. Quite often I encountered multiple people in trouble
322	training, boxes with gear to help people in them, blankets, floats, etc..
323	Offer a surf lifesaving NZ affiliated course to bridge the disconnect between surfers and lifeguards
324	Nothing
325	In a perfect world specific rescue training, obviously been patrolled would have helped (it used to be a patrolled beach) maybe having rescue tubes located close by, but that would not have helped in this situation as they were already "climbing the ladder" by the time we got to them
326	Free training. Better emergency service contact (decrease call out squad response time)
327	Making visual assessment of people swimming in flat water currents. Using appropriate techniques using their surfboard as a rescue floatation device
328	education about rips/signs asking for swimmers to look first, signs indicating rips outside of patrol hours
339	As we live on an island. I suggest water safety is taught compulsory to all. Not just surfers.
330	That day professionals' lifeguards completely missed the person in trouble 200 metres north of the flags
331	Work more closely with Surf Lifesaving NZ
332	How to paddle with someone else on your board

Appendix G: Research Approval Letter



Auckland University of Technology
Private Bag 92006, Auckland 1142, NZ
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www.aut.ac.nz

16th March 2022
Jamie Mead
37 Lynmore Ave
Lynmore
Rotorua 3010

Dear Jamie

Thank you for submitting your PGR1 Research Proposal application for the Master of Disaster Risk Management and Development.

Your proposal has been reviewed and approved by the Faculty of Health and Environmental Sciences, which will be noted at the Postgraduate Research Committee April 2022 meeting.

Your enrolment details are:

Current programme:	Master of Disaster Risk Management and Development
Enrolment:	HEAL901 Dissertation (Part-time)
Student ID:	0491243
Topic:	Examining the role of surfers, conducting bystander rescues at the beaches of New Zealand and the trends characterizing those rescues
Primary supervisor:	Dr Loic Le De
Secondary supervisor:	Dr Melanie Moylan
Start date:	4 April 2022
Expected completion date:	31 March 2023

For more information about the programme of study, please refer to the [Postgraduate Handbook](#).

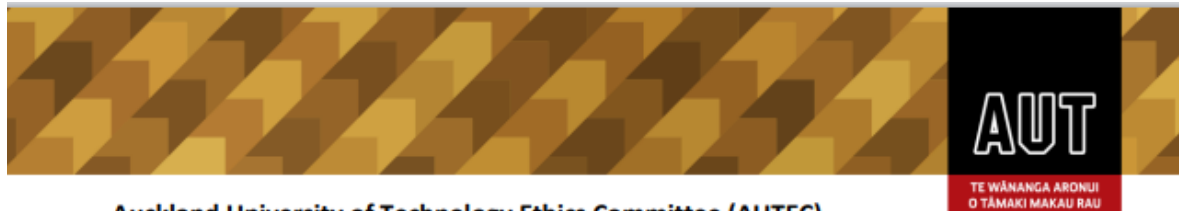
Yours sincerely

Associate Professor Nigel Harris

Associate Dean Postgraduate Research · Hoa Mautaki Taura Rangahau
Faculty of Health and Environmental Sciences · Te Ara Hauora A Pūtaiao
Auckland University of Technology · Te Wānanga Aronui o Tāmaki Makau Rau
09 921 9666 extension 7301

Cc Primary supervisor Dr Loic Le De

Appendix H: Ethics Approval letter



Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

4 May 2022

Loic Le De
Faculty of Health and Environmental Sciences

Dear Loic

Re Ethics Application: **22/66 Examining the characteristics of bystander rescues conducted by surfers at the beaches of New Zealand.**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 4 May 2025.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the [Auckland University of Technology Code of Conduct for Research](#) and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through <http://www.aut.ac.nz/research/researchethics>

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: Jamie_mead@outlook.com; Melanie Moylan