Townsville Bushfire Preparedness Case Study

Understanding local peri-urban communities

Centre for Disaster Studies,

James Cook University

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Funding for this project was provided by Queensland Fire and Emergency Services.

Image: Former firefighting equipment -Horse Bay Rural Fire Brigade

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Executive Summary

In 2021, Queensland Fire and Emergency Services (QFES) commissioned the Centre for Disaster Studies (CDS) to conduct a community-based survey within the Townville peri-urban communities of Bluewater, Nome and Horseshoe Bay (Magnetic Island). Supported by the local Rural Fire Service (RFS) in each of these localities, this research was designed to explore current community and social variables relating to bushfires. Key variables included; demographics; property/lifestyle factors; local hazard risk perception; bushfire experience, knowledge and awareness; local bushfire preparedness; bushfire hazard reduction and responsibility; local bushfire hazard management services and facilities; and, local volunteer experience. The information from the survey is intended to provide the local fire service providers a better understanding of issues and capacity within their community, and help inform strategies for improved community resilience and service provision.

While the survey was developed using an online software platform, to maximise return rates within the most susceptible residential zones identified by QFES, the research comprised of three delivery modes: face-to-face delivery; return postage paid paper-based survey; and, an invitation to online access the survey. There was a 35% overall return rate from the survey delivery in the QFES specified sites. With the survey available between August 2021 and November 2021, there were a total of 128 respondents. The majority of these responses were obtained via direct contact with local residents. A non-response bias check revealed that a number of groups may be underrepresented, for example younger people (<35 years), newcomers (at current address for <1 year) and renters (only 7% of respondents). As responses were solicited primarily from the identified higher risk bushfire zones within each locality, the hazard awareness and results may not be entirely representative of each of the broader peri-urban communities (8.6% margin of error). These limitations should be taken into consideration when viewing and using the results of this study.

Demographic profile

- Respondents reflected a fairly representative gender balance with 51.5% female (4 identified as other, or preferred not to say)
- The majority of respondents were aged 35-64 (52.5%), with 33.5% aged 65+ and less than 10% under 35 years of age (5 % preferred not to say)
- In terms of education level, the majority of respondents had completed either university (46%) or TAFE/trade qualifications (21%)
- With 37.5% employed full-time, one third of respondents (33.5%) indicated they were retired
- Primary occupations included 16.5% professional/management, 8% technical/skilled trade and 6.5% self employed
- Almost a quarter of respondents (23%) had children under the age of 18 regularly living in the household

Property and Lifestyle factors

- Most respondents owned their house outright (47%) or with a mortgage (46%). Only 7% rented their dwelling
- The average length of residency was 13.8 years with 29% living at the property for less than 5 years
- Property types were highly variable with the majority (53%) described as residential on suburban blocks, 36% of these properties were identified as less than a quarter acre in size. 42% indicated that their dwelling arrangements were residential on rural properties with one farming/grazing property (over 50 acres)
- The most common reasons for moving to current location was for the rural/island lifestyle, with other motivations including affordability, work, family circumstances and retirement
- The average estimated time it would take respondents to return to their residence, if it was at risk (from place of regular employment/occupation), is approximately 20 minutes with 45% indicating they stayed and/or worked from home. Five respondents regularly work away from the Townsville region
- Most respondents (83%) indicated they had insurance on their dwelling with 22 respondents uninsured or uncertain

Local Hazard Risk Perception

- The majority of respondents (76%) rated cyclone as the most significant natural hazard risk in their locality, closely followed by bushfire (75%)
- When deciding to purchase or rent their current property cyclone threat (54%) rated marginally higher than bushfire (53%)
- Flooding, storm surge and landslide were all considered moderate to limited threats/risk with some variation dependant on respondents location
- While 43% rated the bushfire hazard in their locality as high or very high, almost 80% of respondents self-assessed the bushfire hazard to their personal dwelling/property as moderate, low and very low
- In respect to local hazards (including bushfires) 52% believed their neighbours were at risk, particularly in regards to cleaning up their property. Despite this, only one in five respondents felt it was important to talk to their neighbours about the issue
- Over 23% of respondents were sceptical about their local community's capacity to recover from a natural hazard in a short time period

Bushfire experience, knowledge and awareness

- Almost half of the respondents (47%) had previously experienced a bushfire in either a personal or a professional capacity.
- Of those with personal bushfire experience over half (51%) felt they and/or their property was threatened in the event
- There was no consistent understanding or appreciation of bushfire season in the region, answers were variable with a high degree of uncertainty - although most broadly identified summer and hot/dry months

Local Bushfire Preparedness

- Controlled burning was the highest rated prompt (60.5%) for respondents to think about preparing for bushfire season
- Local bushfires, news media on bushfires, social media and pamphlets all rated between 20-25% as additional prompts
- Almost one in ten respondents (9.5%) indicated they do not prepare for local bushfire hazards
- Cleaning rubbish from yard (77.5%), cleaning leaves from gutters (63.7%), cutting long grass (63.5%) and removing branches and undergrowth around the house (60.5%) were the highest rated bushfire preparation activities
- Checking water supply and hoses (47.5%) and preparing fire breaks (37%) were activities more consistent with respondents on larger properties
- Less than one third of respondents (32%) considered the preparation of an evacuation plan an important action in preparing for bushfire season
- Over one third (36.5%) indicated that social media was the most common source of information on preparing for bushfires. Neighbours and friends in the community (26%), the internet/webpages (26%) and pamphlets in the mail (25%) were all rated highly. Meetings with fire brigade members (18.5%) and information from council (22.5%) were also valuable. Traditional media (TV, radio and newspaper) rated less than 15% while information brought home by children from school rated the lowest on 3.2%

Hazard Reduction and Responsibility

- Most respondents (81.5%) were aware that a controlled/hazard reduction burn had occurred locally within the last two years – predominantly advised by letter box drops, social media and word of mouth. Seven respondents indicated there was no prior warning or information
- Despite some variability in identifying specific months, respondents indicated they believed that controlled burning/hazard reduction should occur mid-year in the cooler months (dependent on conditions)
- The vast majority (93.5%) agreed that controlled burning made the area safer from bushfire and was necessary to maintain plant growth (74.2%); however, over half were also concerned about impacts on wildlife (56.5%) and respiratory problems from associated smoke (63.5%)
- In terms of maintaining firebreaks around property (73.5%), clearing overgrown property (90%) and maintaining access for the fire brigade (78.5%) respondents overwhelming believe this was the property owners responsibility
- Most felt it was the local council's responsibility to remove rubbish from public areas (96%) and keep overgrown bushland and creek beds clean (60.5%)
- Almost 20% felt it was the RFS responsibility to maintain firebreaks around properties (19%) and keep overgrown bushland and creek beds clean (19.5%). 14% also felt they should maintain property access routes

- While 47.5% believed there should be more enforcement for property maintenance by local council, most felt current levels of state and federal government enforcement were adequate
- In terms of burning on own property respondents indicated they would contact the local fire brigade (50%) and fire warden (47.5%) – with a minority indicating they would not formally contact anyone and/or would just inform neighbours

Local bushfire hazard management services and facilities

- In terms of local bushfire hazard reduction services and facilities, the majority of respondents (64.5%) felt that grass in their public areas should be slashed.
- With variations based on locality, over a quarter of respondents (28%) did not believe water supply points were adequate for bushfires
- 19% did not believe there was adequate rubbish disposal
- Most respondents (67%) indicated that if they rang 000 about a fire in their locality they believed the RFS would respond. One in five (22%) believed the local urban or auxiliary brigade would assist while three people identified Queensland Parks and Wildlife Services. Five respondents did not know
- While half of respondents (54%) recognised that members of the local rural fire brigade were voluntary/unpaid, 36% did not know whether they received any remuneration

Local volunteer experience

- More than half of the respondents (55%) indicated that they had been actively involved in a volunteer or community organization, with diverse experience including RFS, State Emergency Service (SES), sports, community (e.g. school and church), environmental and hobby groups
- Seven respondents indicated that they are currently members of QFRS or RFS
- The primary reasons given for not actively volunteering in a community organisation were too busy with other activities (23%) and too busy with work (20.5%). Open-ended responses indicated that age and health/medical conditions were also considered significant barriers. 15.5% indicated that they had never thought about it or never been asked
- Almost one in ten (9.5%) indicated they would like further information about getting involved in a local firefighting organization

Implications

- There is a clear opportunity to leverage notifications of controlled burnings in the area to educate and prompt the community to actively prepare for the upcoming bushfire season
- There is a need to better educate and promote bushfire risk, survival and evacuation planning - particularly if there are dependants in the household, or for anyone with significant medical or physical mobility issues (aging demographic)
- Increased social networking and engagement within the local community may facilitate and provide opportunities for open dialogue between neighbours regarding bushfire risk, preparedness (particularly property maintenance) and mitigation (enhancing community self-sufficiency and resilience)
- There is a need for better community education and understanding of the role and direct responsibilities of the local Rural Fire Brigade within the region – including resourcing, and information on how to volunteer

Introduction

Peri-urban development traditionally refers to development in areas immediately surrounding a city or town. In Australia, this often equates to the interface between urban development and rural or bush areas. As human populations continue to expand into such "fringe" locations, there is increased exposure and community vulnerability to environmental hazards such as flooding, coastal sea level rise and bushfires. Under climate change scenarios, such hazards may also potentially increase. While peri-urban areas are often synonymous with characteristics such as amenity, natural environment, biodiversity, and affordability, research has shown that these peripheral zones reflect dynamic and heterogeneous communities (Koksal,McLennan& Bearman 2020). With variable infrastructure and resources, there are also additional challenges in the provision of emergency support and services for these at risk communities. To implement effective risk management strategies at the local level, it is important for relevant service providers to first understand the local community that they support.

While Australia experiences numerous significant natural hazards and disaster events each year, bushfires continue to pose one of the most substantial social, economic and environmental threats to peri-urban communities. Bushfire behaviour is becoming more extreme and less predictable, with an increase in dangerous fire weather and the length of the fire season (Climate Council 2019). Many of the traditional models and techniques for bushfire management are becoming less effective - recommending new strategic approaches to bushfire hazards. Reducing the risk and impact of bushfires in a bushfire prone community remains a problematic and complex challenge. As all emergency service agencies work proactively to expand their understanding and capabilities to manage the changing risks, there has been an increasing focus on partnerships, stakeholder engagement and collaborative initiatives, which also enhance local community resilience. Beyond formal and institutional arrangements, the relationship between emergency service providers and their communities is now considered a fundamental component of making communities safer.

The Understanding Communities Project (Bushfire Co-operative Research Centre (CRC) 2003-2010) recommended that to improve service provision and resilience in peri-urban bushfire prone communities, local fire services need to expand their knowledge beyond fire risk and important infrastructure, to better appreciate the social variables of the community that lives there – their needs, expectations and behaviour. It was proposed that in developing a comprehensive community bushfire risk and capability profile, agencies such as the Rural Fire Service can make informed decisions and develop strategic tailored approaches that are both locally relevant and meaningful. This report utilises the methodology and survey developed in the Understanding Communities Project to assist local fire service providers in the peri-urban communities of Townsville to better define, support and enhance their community's resilience.

Methods

Overview

Data was collected using both an online and self-administered return postage-paid survey to gain information on a range of social variables relating to bushfire, the risk, and its management. Townsville residents within the peri-urban Rural Fire Brigade (RFB) areas of Nome, Bluewater and Magnetic Island were invited to participate.

Case Study - Townsville peri-urban communities

Townsville is a coastal city located in north-east Queensland, with the local government area covering approximately 3,726.9km^2 (excluding marine area) (Refer Figure 1). The landscape consists of plateaus and escarpments with rugged gorges, wetland systems, coastal plains, beaches and coral reefs. Situated in the dry tropics, the broad range of vegetation types include open and closed forests, woodlands, wetlands, and mangroves at the coast (Townsville City Council 2022). Townsville has a population of approximately 185,000 people (ABS 2016).

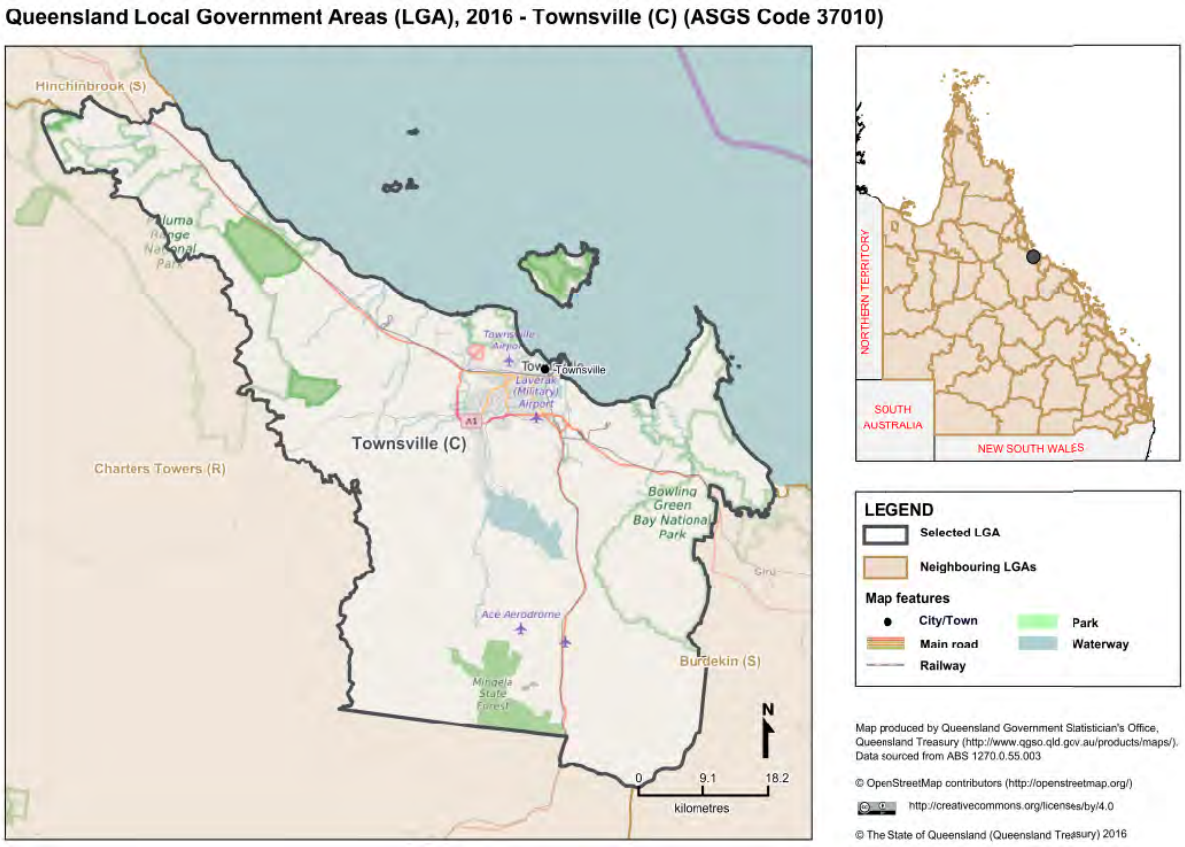

Figure 1 Townsville Local Government Area (LGA) North Queensland, Australia

With a relatively dry climate and low average annual rainfalls, Townsville is prone to bushfires, including areas of low to high bushfire hazard risk. This risk is generally considered greater where high-density housing adjoins vegetation, or rural residential properties are situated amidst or near bushland. As the population of Townsville continues

to grow, there has been a gradual expansion into the peri-urban or "fringe" areas of the region. Reflecting a blend of both well-established settlements and new development, these localities reveal a range of community lifestyles and characteristics. Heterogeneous and dynamic communities suggest variable hazard awareness, resources, capacities and vulnerabilities.

As government, fire and emergency service providers are charged with a level of responsibility for hazard management and the safety of all residents within the region, there is a direct interest in reducing the bushfire risk and increasing local community resilience. This is particularly important in higher risk peri-urban areas that are usually serviced by volunteer Rural Fire Brigades with limits on capacity and resources. Queensland Fire and Emergency Services (QFES) selected three peri-urban Rural Fire Brigade areas of Townsville for this study. This included Bluewater, which is located northwest of the urban city centre; Nome to the southeast; and Magnetic Island, located 8 kilometres offshore (Refer Figure 2 - 6). On Magnetic Island, the area includes both Horseshoe Bay (RFS) and Nelly Bay (Fire and Rescue). Understanding these communities provides the opportunity to maximise resources and approaches to reduce the local bushfire hazard risk.

Online and Mail Survey

While premised on the Thuringowa Bushfire Case Study (2006), to identify pertinent issues for this survey, a number of informal and semi-structured interviews were conducted with relevant QFES staff, local Rural Fire Brigade Officers and associated personnel. Issues raised during these interviews included the variable levels of community bushfire preparedness and engagement across the region, responsibility for property management and bushfire hazard reduction, resource availability, and RFS volunteer recruitment, membership and training. The original questionnaire was modified to address these priorities.

Reflecting developments in methods of survey delivery and accessibility, a questionnaire was designed using an online software platform (SurveyMonkey) to collect data on a wide range of social factors including: demographics and property/lifestyle factors; perceptions of local hazards and community risk; personal bushfire experience; local bushfire knowledge and awareness; levels of bushfire preparedness and hazard reduction; views on responsibility for bushfire related activities; views on local bushfire hazard management services and facilities and involvement in community organisations. The questionnaire was trialled in a pilot survey and appropriate changes were made for the final version (Appendix B).

To maximise return rates, the questionnaire was available via three modes: online self-administered; online facilitated by a trained researcher; and a self-administered paper-based copy with a postage-paid return envelope. Each version of the questionnaire included a detailed introduction letter/cover sheet explaining the purpose of the research, as well as an informed consent letter regarding the option to participate and proposed use of data (refer to Appendix B). Ethics approval was received for this research (James Cook University Human Ethics Approval Number H8466).

Figure 2 Townsville suburb locality

Figure 3 Bluewater Rural Brigade Area of Responsibility

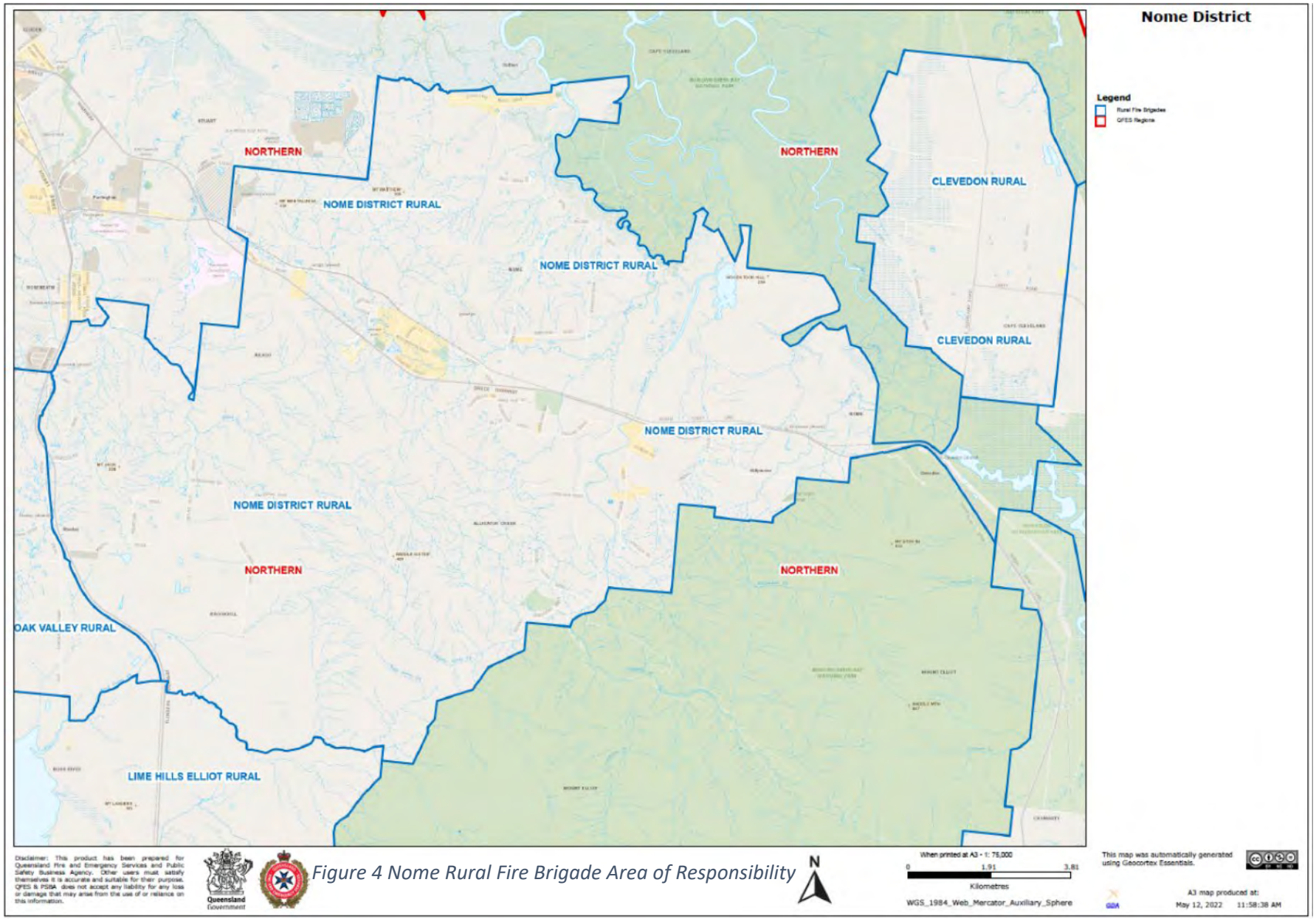

Figure 4 Nome Rural Fire Brigade Area of Responsibility

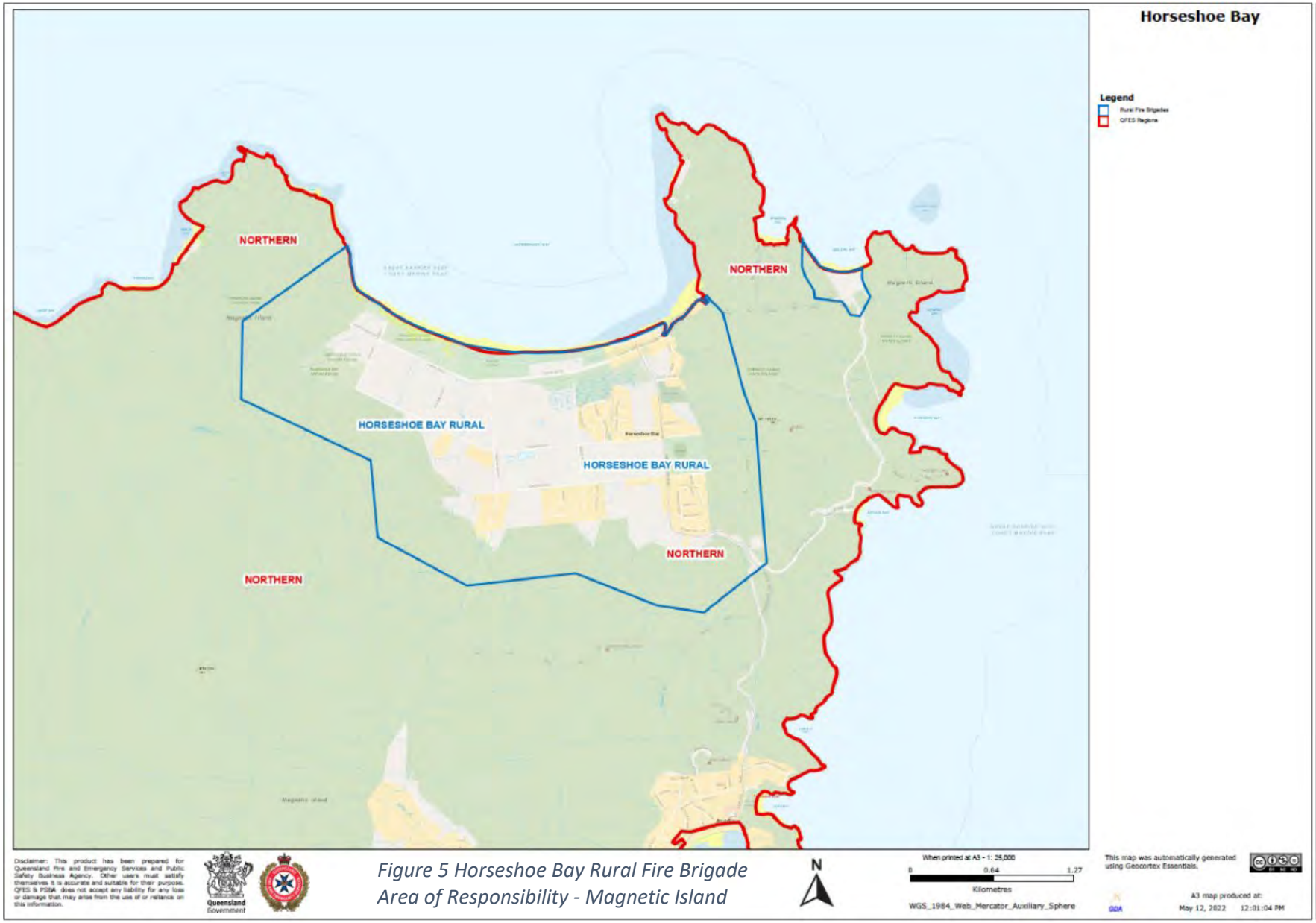

Figure 5 Horseshoe Bay Rural Fire Brigade Area of Responsibility - Magnetic Island

Figure 6 Nelly Bay Fire and Rescue Service - Magnetic Island

The online survey was first advertised via social media for a period of 4 weeks from mid-August 2021 to mid-September 2021. As per Appendix B, an introduction message and request to publically post online was sent to the admin of relevant identified Facebook groups in the targeted communities. This included: Alligator Creek Community News; QCWA - Alligator Creek, Elliot Springs Branch; North Queensland Disaster Watch Page; Bluewater Community Association; Bluewater News, Bluewater Community Centre; Toolakea Our Community; Townsville Community Notice Board; Everything Townsville; Magnetic Island; Magnetic Island New Residents; Magnetic Island Community; and Magnetic Island Resident Community Forum. Relevant Brigade Officers were also emailed a copy of the research poster (Appendix B), with a link to online survey and asked to assist with further promotion and distribution.

The second phase of the research was targeted delivery of the questionnaire in specific zones of interest identified by QFES (refer Figures 7-18). As evident in the associated Google satellite maps, these zones coincided with dwellings or properties with direct proximity to vegetated areas. Commencing in October 2021, trained researchers visited each of the QFES specified zones (over weekends) to administer the survey face-to-face with residents. Where dwellings were accessible and an occupant over 18 was home, the researchers introduced themselves and the project, and provided a copy of the information and informed consent sheet (Appendix B). If consent was given in writing, the researchers facilitated the occupant to complete the online survey using an electronic tablet. In some cases residents indicated they were interested in the research, however, did not have the time or capacity to complete on the spot and these were provided an invitation to self-complete the survey online.

For dwellings with access issues including safety concerns, locked gates, dogs, no adult home, or no one home, a paper-based version of the online survey was left in the letterbox – with relevant information and a request for the respondents to return the questionnaire and consent form using the postage-paid return envelope supplied (Appendix B.) There were also a number of obviously vacant dwellings, houses undergoing renovations, or holiday homes identified at each location in which no surveys was left. The distribution of these targeted surveys is presented in Table 1.

Table 1 Survey delivery in QFES designated zones

Location	Dwellings Approached	Face-to-face Survey	Provided link to Online Survey	Survey Invitation left in letterbox	Declined Survey
Toolakea (Bluewater)	43 (+ 8 vacant)	10	8	22	3
Alligator Creek (Nome)	114 (+ 4 vacant)	15	18	76	5
Horseshoe Bay (Magnetic Island)	45 (+ 8 vacant)	10	14	9	4
Nelly Bay Magnetic Island)	50 (+ 9 vacant)	11	7	15	8
Total	**252**	**46**	**47**	**122**	**20**

Figure 7 Toolakea QFES designated survey zone

Figure 8 Satellite image Toolakea QFES designated survey zone

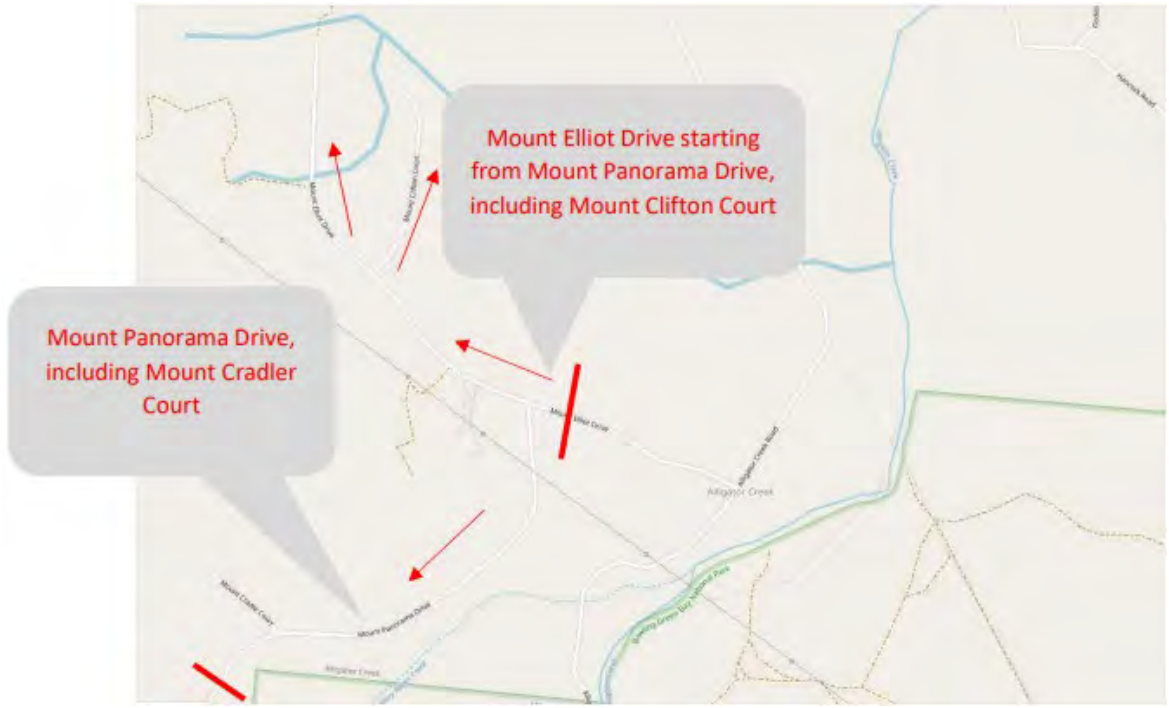

Figure 9 Alligator Creek – QFES designated survey zone

Figure 10 Satellite map of Alligator Creek QFES designated survey zone

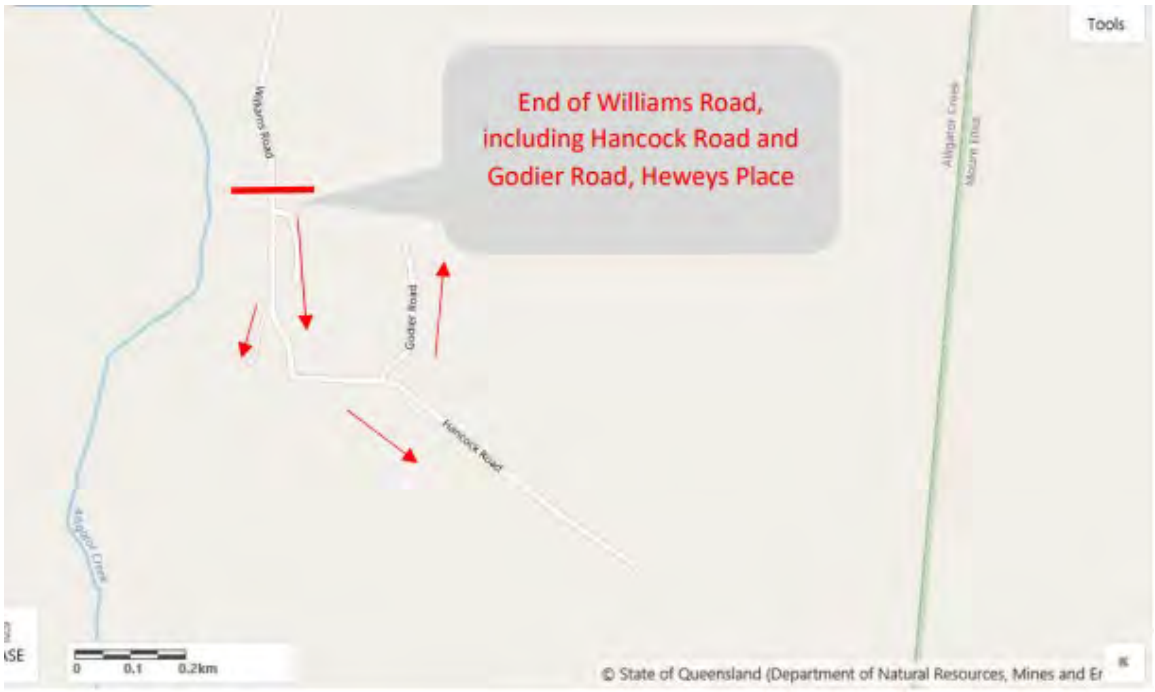

Figure 11 Alligator Creek QFES designated survey zone

Figure 12 Satellite image Alligator Creek QFES designated survey zone

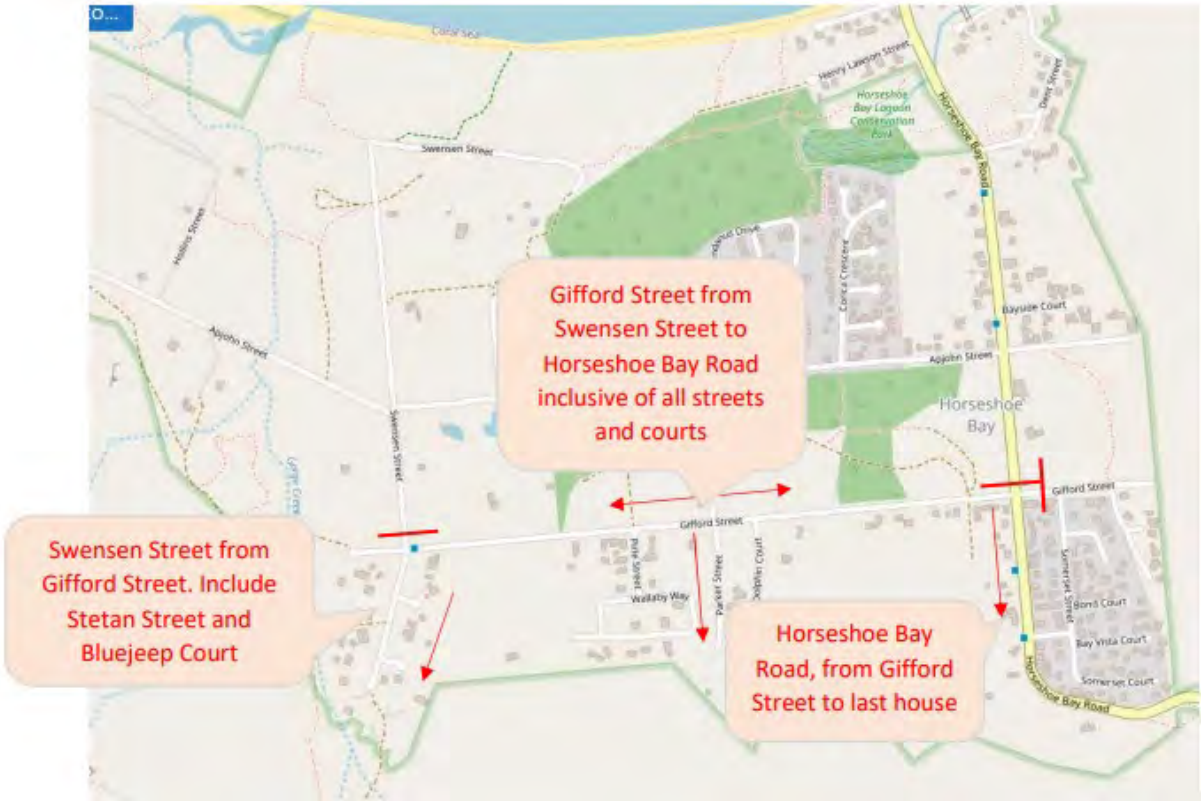

Figure 13 Horseshoe Bay QFES designated survey zone

Figure 14 Satellite image Horseshoe Bay designated survey zone

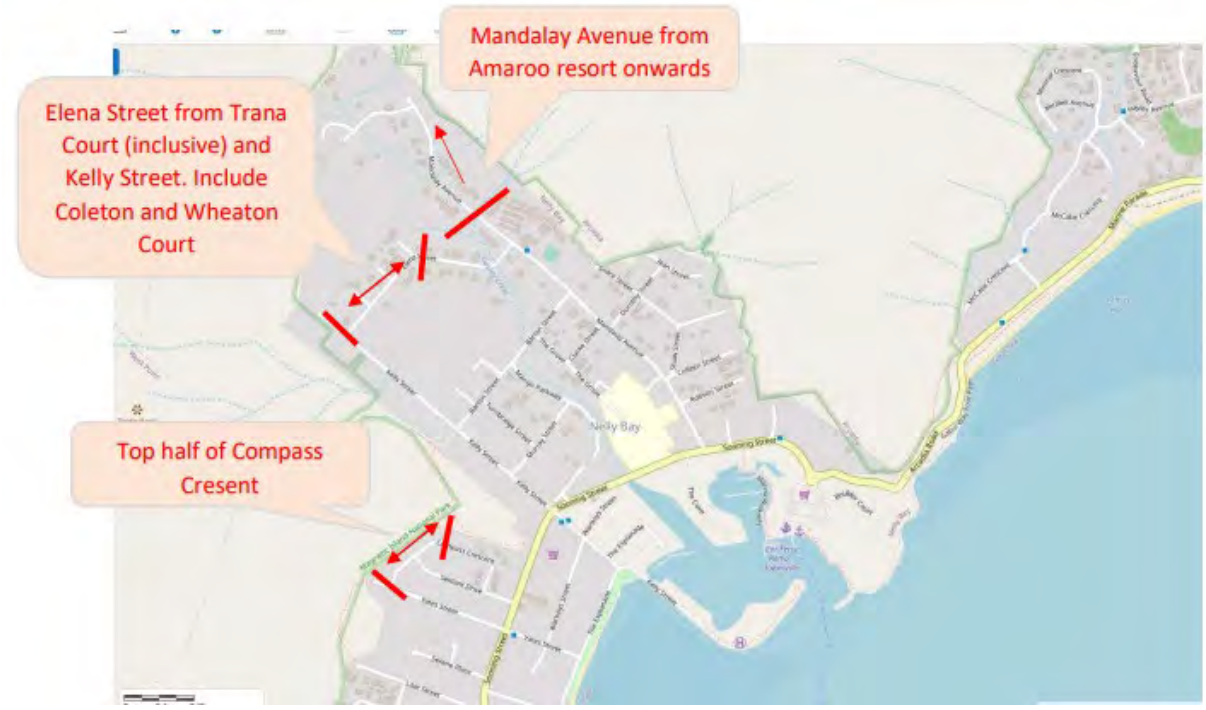

Figure 15 Nelly Bay QFES designated zones

Figure 16 Satellite image Nelly Bay QFES designated zone

Figure 17 Satellite image Nelly Bay QFES designated zone

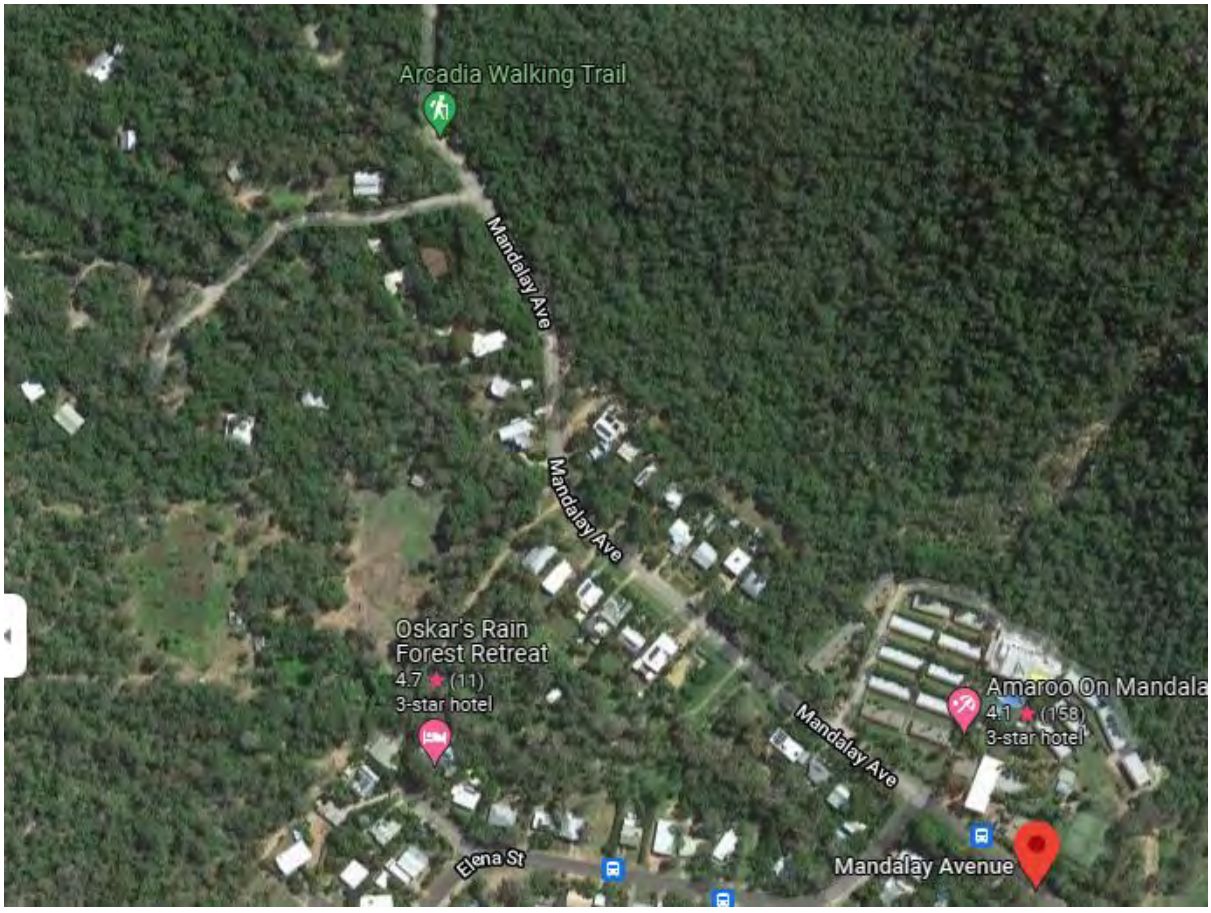

Figure 18 Satellite image Nelly Bay QFES designated zone

Analysis

There were 40 survey responses solicited from the Facebook social media posts (refer Table 2). A further 88 respondents can be attributed to the in-person site visits (refer Table 3). Any data from paper-based surveys returned via post were manually entered into the online survey platform. With 252 occupied dwellings approached during the fieldwork visits, there was a 35% return rate from the QFES designated zones of interest. In total there were 128 responses to the questionnaire (refer Table 4). The survey took approximately 18 minutes to complete with a 95% completion rate (demographic statistics were skipped for a number of respondents).

Table 2 Survey respondents from online Facebook invitation

RFB Area of Responsibility	Online Survey Completed
Bluewater, Lynam, Blue Hills Toolakea	8
Nome, Alligator Creek, Julago, Brookhill	11
Magnetic Island	19
Other/Unspecified	2
Total Respondents	**40**

Table 3 Survey respondents by QFES designated zones

QFES identified zone	Face-to-Face Survey	Postage-Paid Survey Return	Online survey
Toolakea	10	2	4
Alligator Creek	15	4	13
Magnetic Island - Horseshoe Bay - Nelly Bay	 10 11	7	10
Other/Unspecified	-	1	1
Total Respondents = 88	**46**	**14**	**28**

Table 4 Distribution of total survey respondents by survey mode and locality

RFB Area of Responsibility	Face-to-Face Survey	Postage-Paid Survey Return	Online survey	Total Surveys Completed
Bluewater, Lynam, Blue Hills Toolakea	10	2	12	24
Nome, Alligator Creek, Julago, Brookhill	15	4	24	43
Magnetic Island	21	7	29	57
Other/Unspecified	-	1	3	4
Total Respondents	**46**	**14**	**68**	**128**

As SurveyMonkey is an established survey software platform, data for all survey questions was calculated statistically for descriptive analysis. Cross tabulations were conducted to test for any statistically significant relationships between variables of interest, yet were indeterminate given the small sample size. Responses to open-ended questions as well as those that asked the respondents to describe an 'other' category were collated and themed. Relevant written responses have been provided in the results and Appendix A where indicated. As the open-ended responses utilised in this report reflect the participant's comments and sentiments, spelling and grammar has not been corrected in these tables.

Limitations

While all attempts were made to maximise response rates and reduce bias, a number of limitations in the research methodology exist. Online distribution of the survey on social media was primarily restricted to relevant accessible Facebook groups and subsequent post approval from site administrators. In addition to language and the digital access bias, some regions may have had better exposure, promotion and representation than others. As a self-completion questionnaire, there is no means to validate the answers provided. For the targeted survey distribution, all reasonable attempts were made to approach occupied houses in the QFES designated zones; however, this was more difficult in Alligator Creek where property sizes were generally larger and more rural. Surveys were conducted on weekends, later in the fire season to try to maximise relevance and engagement with occupants. Less than 12% of the postage paid paper based surveys were returned.

While the latest Australian census was conducted in 2021 – at the time of this research publication only 2016 data was available for these regions. As peri-urban areas are often dynamic spaces undergoing transition, the 2016 statistics may not be a true comparative representation of current populations.

Results

Demographics

In terms of the demographic profile of survey respondents, there was a slight bias, but a reasonably representative gender balance – 51.5% identified as female, one person as other and three preferred not to say. Based on the 2016 census data from the Townsville statistical region, 50.2% of all residents identified as female (ABS 2016). While all age cohorts were apparent (Figure 19), over one-third (33.5%) of respondents were aged 65 years and over. In comparison, this age group only represents 11.6% at the regional level (ABS 2016). This trend was also reflected in the employment status of survey respondents, where 33.5% indicated they were retired, and only 37.5% working full-time (57% full time for Townsville region, ABS 2016). While employment/occupation varied, 16.5 % identified as professional/management, 8% technical trade, 6.5% self-employed and 12 people identified as other (Figure 20). Almost a quarter (23%) had children under the age of 18 regularly living in the household. With 67% of respondents indicating post-secondary school qualifications/training (46% university, 21% TAFE) (refer Figure 21) average levels of education where comparatively higher than the broader Townsville region (44% post-secondary qualifications)

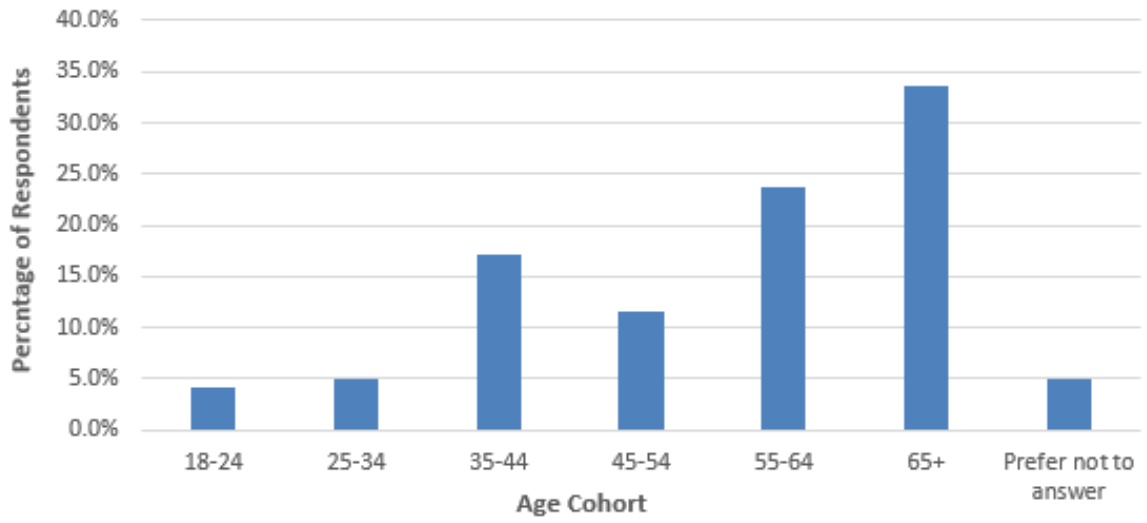

Figure 19 Age of respondents

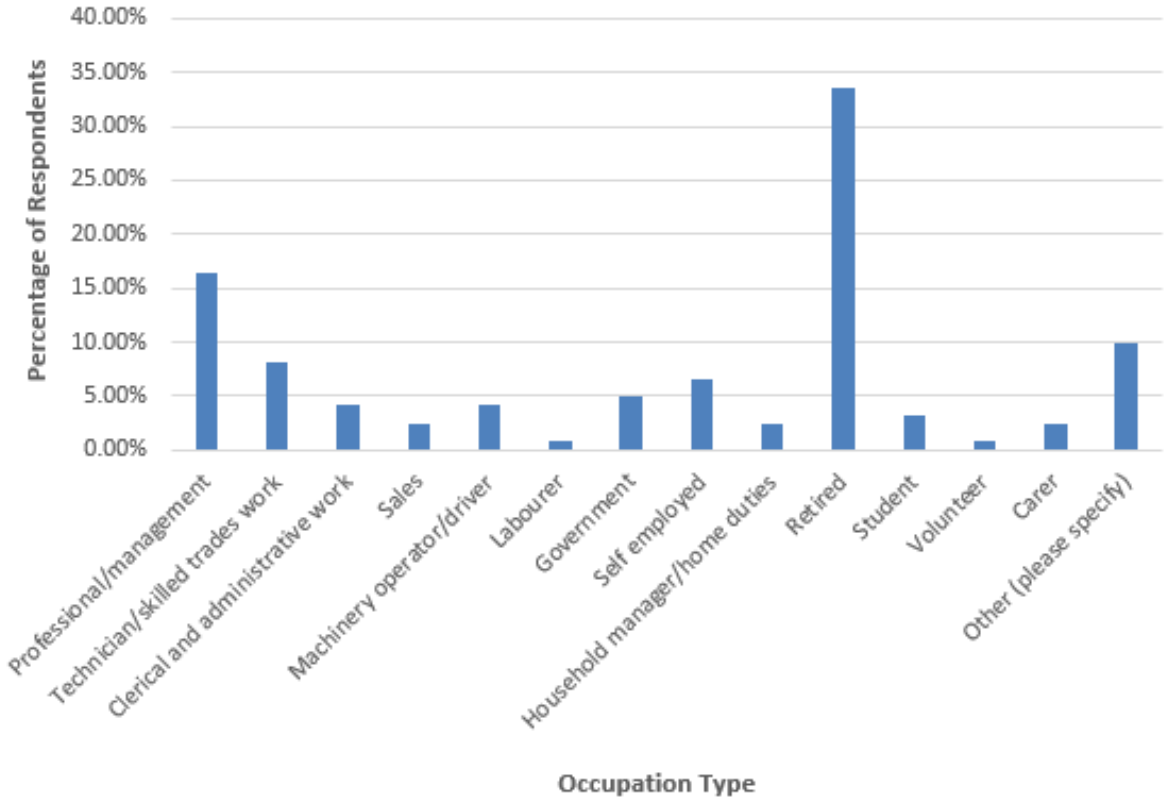

Figure 20 Primary occupation of respondents

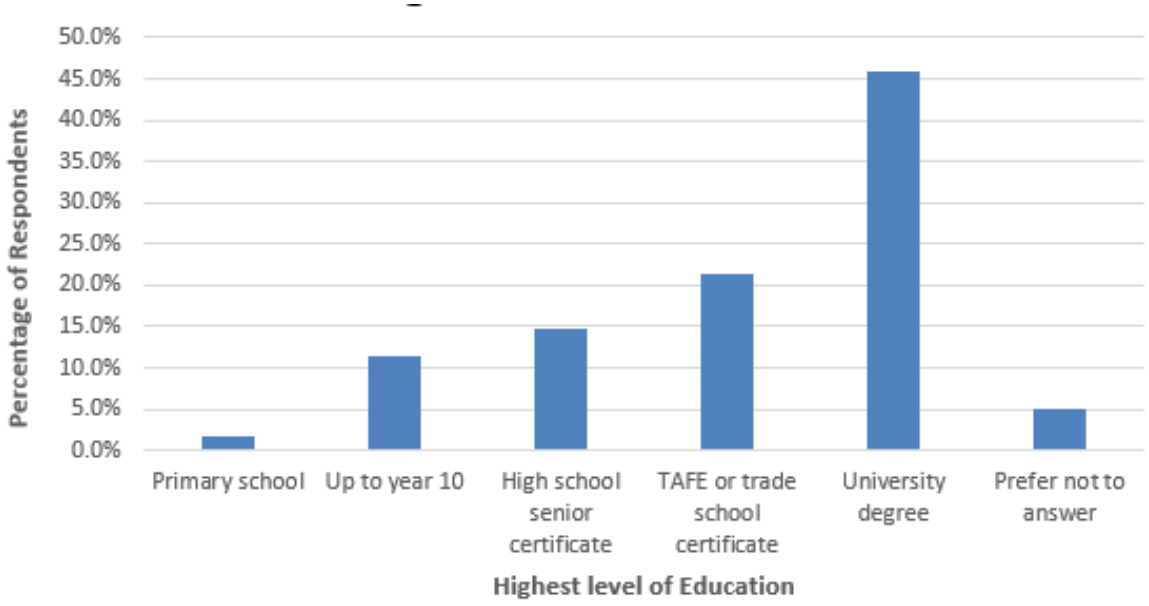

Figure 21 Highest education level of respondents

Property and Lifestyle Factors

Property ownership was high amongst those surveyed. Over 47% owned their property outright, 46% owned with mortgage, and only seven percent were renting. The average rental rate for Townsville is approximately 40% (ABS 2016). There were a number of vacant properties observed in each location, consistent with holiday homes, renovations and/or rentals. Most respondents were long-term residents with almost ten percent (9.4%) indicating they had always lived in their current property, and over two thirds claiming they had lived there more than 5 years (Refer Figure 22). The shortest reported tenancy was only one month, with the longest over 53 years. Approximately half of these properties were classified as residential on suburban blocks (53%), with one third estimated as less than a quarter acre in size (36%). Forty–nine respondents (38.3%) reported block sizes over one acre with one farming/grazing property in excess of 50 acres (Figure 23). With house ages varying from two months to seventy years old, wood (32.8%) and cement block (32%) were identified as the main construction material. Other materials included brick (20%), fibro (12.5%) and "other" such as steel frames and cladding

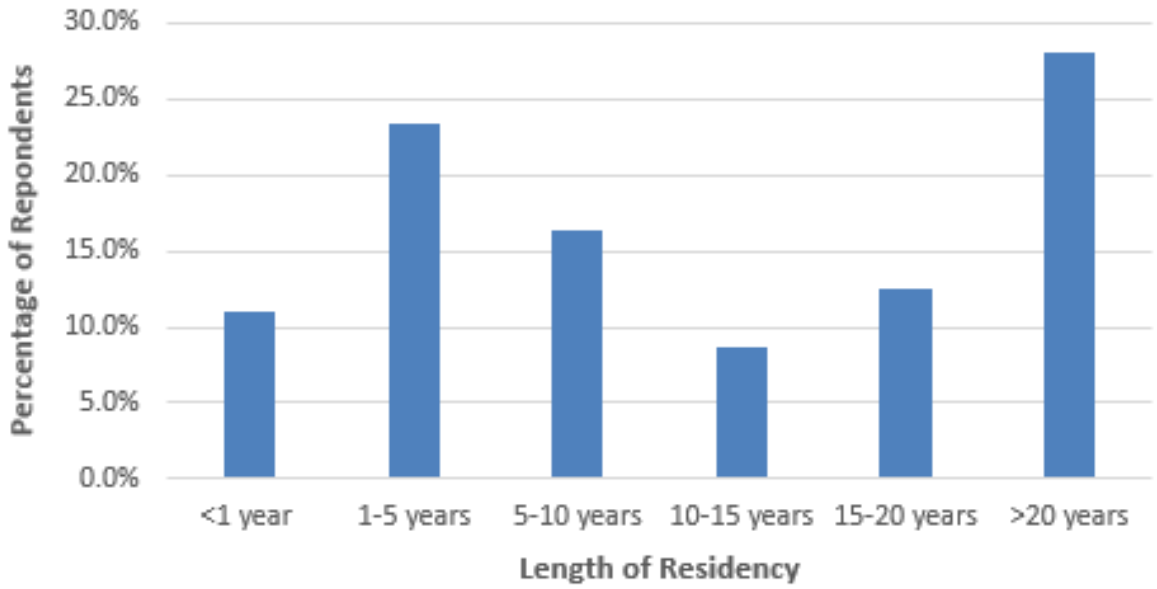

Figure 22 Length of current residency

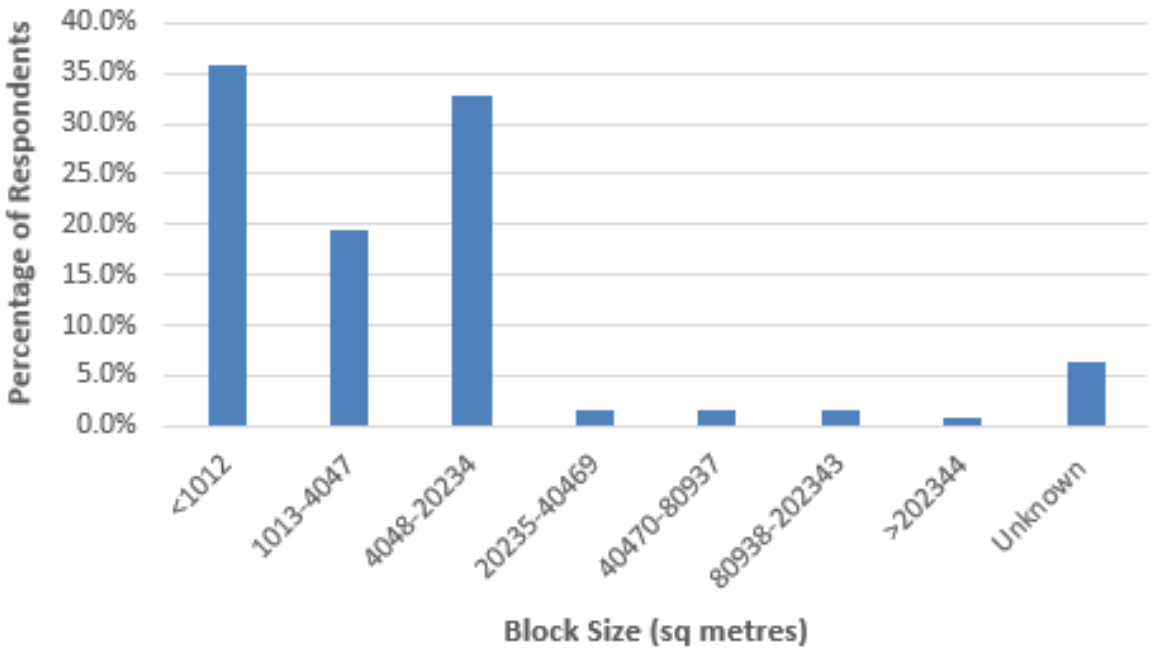

Figure 23 Estimated property/block size

The most common reasons for moving to current residential location was for the rural or island lifestyle, with other motivations including affordability, work, family circumstances and retirement. Respondents however, indicated that they valued environmental factors such as peace and quiet, trees, bushland, and space, more than social elements such as small community and lifestyle. While five respondents indicated they work out of town, almost half (45%) normally worked or stayed at home. Excluding those that work from home, the average travel time from regular employment/occupation to place of residence is between 35-40 minutes, although this was generally higher for residents of Magnetic Island traveling from the mainland. Most respondents (83%) indicated they had insurance on their dwelling with 22 respondents uninsured or uncertain.

Local Hazard Risk Perception

In ranking the most important natural hazard in their locality, the majority of respondents (76%) rated cyclones highest, closely followed by bushfires (75%). When choosing to purchase or rent their current property, they rated both of these hazards less, sharing concern with other risks such as flooding, storm surge, and landslide (refer Figure 24). At the household level, the cyclone threat rated as 54% (very important or important) while bushfire was 53%. There were however, clear variations in these results based on resident location. In focusing specifically on the bushfire hazard in their locality, 43% rated the threat as high or very high, while 22% considered the risk low or very low (refer Figure 25). In comparison, almost 80% of respondents self-assessed the bushfire hazard to their personal dwelling as only moderate (41%), low (26%) or very low (12.5%).

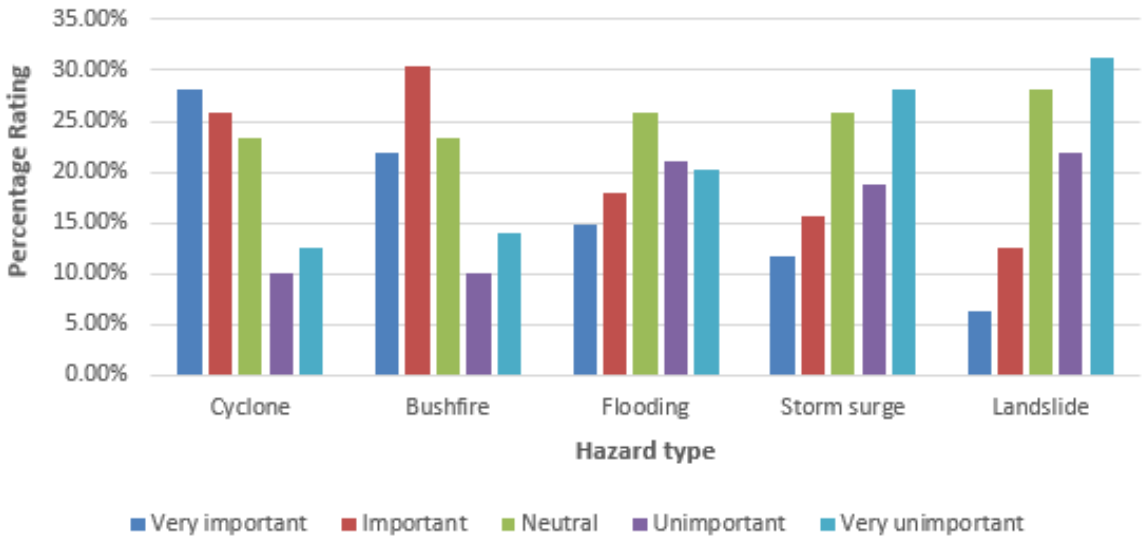

Figure 24 Rating of natural hazard importance when choosing current residence

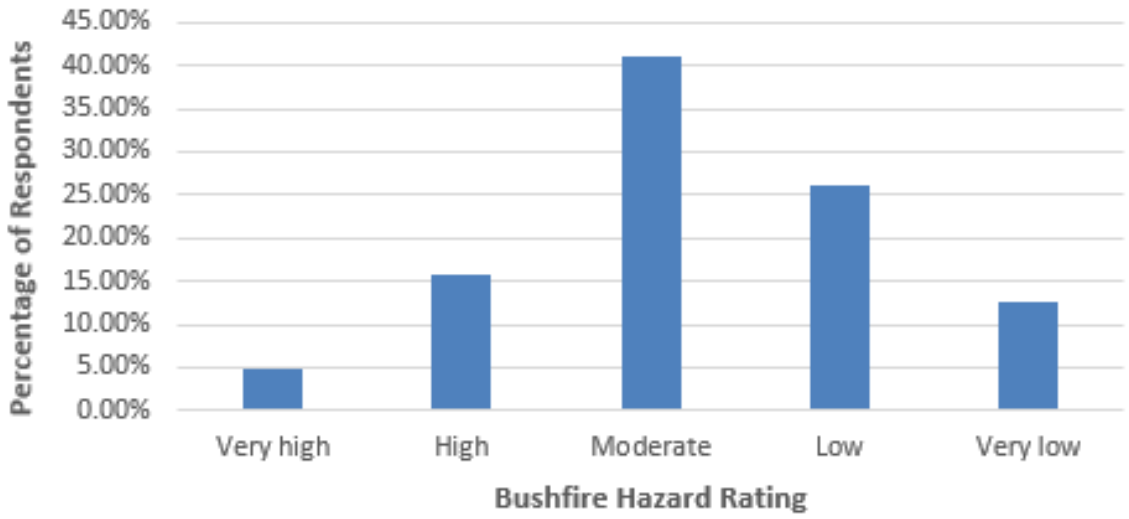

Figure 25 Self-assessed threat of bushfire to current residence

While people predominantly rated their own risk as moderate to low, over half (52.4%) of respondents agreed or strongly agreed that their neighbours were at risk of natural hazards such as bushfire, with 47.6% concerned when their neighbours do not clean up their property. Despite this level of concern most were either neutral (37%) or disagreed with talking to their neighbours about the importance of cleaning up their property (24% disagree, 19.4% strongly disagree). In terms of community resilience, just over a third of respondents believed their locality would recover from a natural hazard such as a bushfire in a short time frame. Areas of local concern for bushfire risk included proximate larger poorly maintained properties, bushland and national parks (refer Tables in each individual Area of Responsibility section).

Bushfire experience, knowledge and awareness

Almost half the respondents of the survey (47.2%) had personally experienced a bushfire previously, with most of this exposure within their current local region and/or working in a fire service capacity. One in every two of these people (51.7%) reported that they felt personally threatened by the fire with 53.3% indicating they felt their property and/or house was threatened.

Fire was raging on many fronts and coming down into the housing areas of Nelly Bay. It came right down to the narrow road on the Kelly St boundary of my property. No fire breaks in place. Only 1 Fire Unit on the Island as had sent others to fires on the Mainland. We were out with hoses and had sprinklers on trying to water down the garden between the fire front and the property. Respondent #40 - Magnetic Island

Felt that timber home was under threat, and it was, and limited resources e.g water as all residents are watering. Huge responsibility to monitor young children and fight multiple fires single headedly (sic) in unpredictable conditions. Respondent #28 Alligator Creek

For those that had experienced a bushfire previously, there were numerous practical lessons about firebreaks, clearing property, and appropriate irrigation, however, other comments related to the need for awareness, preparedness, information and an evacuation plan. Specifics comments on bushfire events highlighted the speed of onset, intensity, uncertainty, and unpredictability (Refer Table 12 in Appendix A).

Despite the existing levels of bushfire experience and average length of current household occupation, there was no consistent understanding of bushfire season in the region or optimum timing for controlled burning. Answers were variable in months identified and duration, reflecting a reasonable degree of uncertainty. For bushfire season, most broadly identified summer and hot/dry months, while controlled/hazard reduction burning was suggested for cooler months in the middle of the year.

Local Bushfire Preparedness

Open-ended responses regarding prompts to prepare households for bushfires (refer Table 13 in Appendix A) suggests that many people rely on experience, self-monitoring of local conditions, and word of mouth, however almost one in ten respondents (9.6%) indicated they did not undertake any sort of preparation for bushfires. Of the established prompts, most (60.5%) felt motivated by controlled burning in the area. Local uncontrolled bushfires, news media about bushfires and social media posts all rated 20-25%. While pamphlets and information in the mail rated just below 20%, more traditional media campaigns and public displays rated less than 10% (refer to Figure 26).

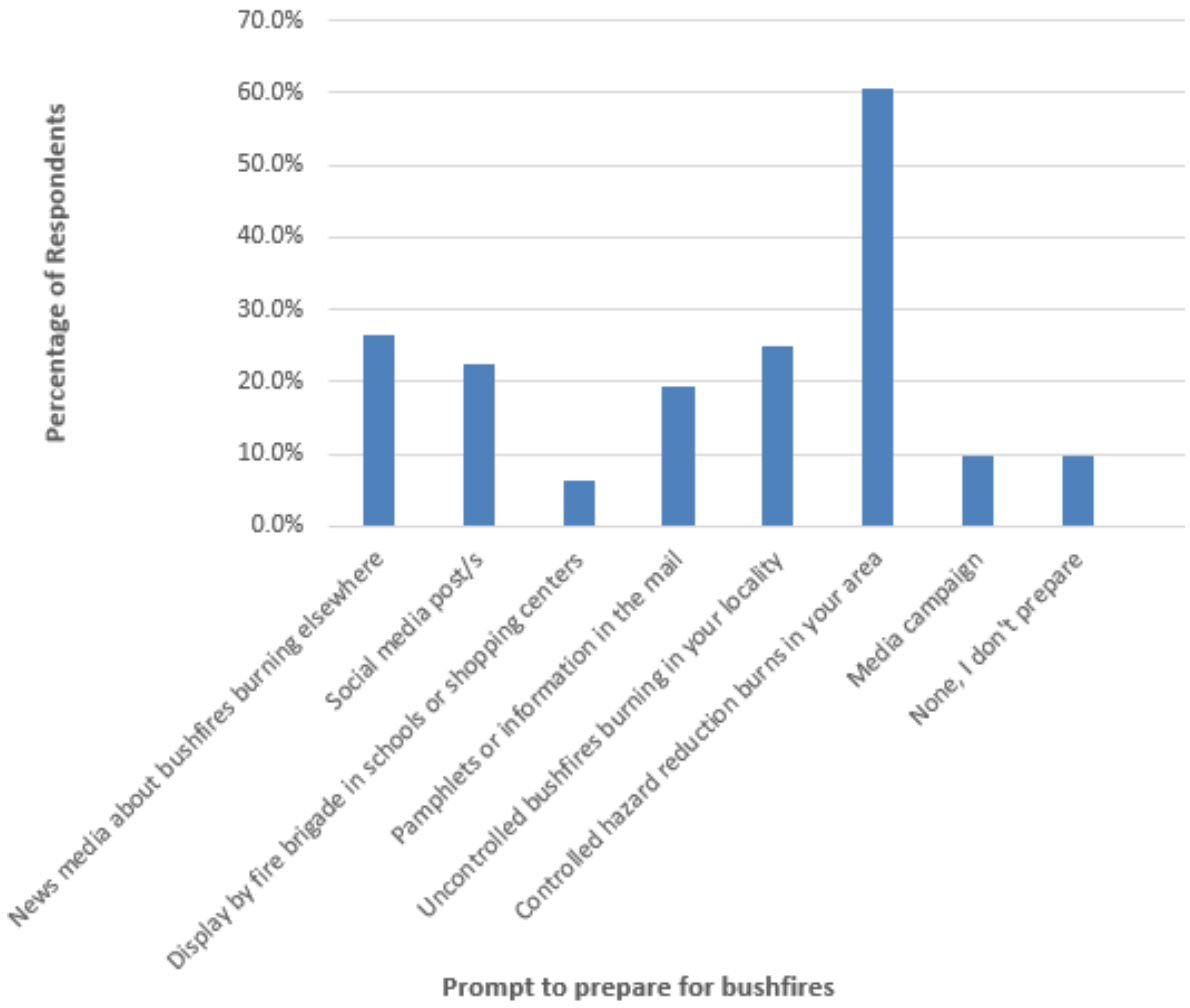

Figure 26 Prompts to prepare for bushfire hazards

When seeking useful information or advice on how to prepare for bushfires, respondent preferences reflected a lot of diversity. Social media rated the highest at 36.3%, while internet/webpages, neighbours/friends in the community and pamphlets in the mail all rated around 25%. Information from council (22.6%) and meetings with fire brigade members (18.6%) were also valued. Traditional media including TV and radio (13.7%) and newspaper (6.5%) rated relatively low. Despite the fact that more than one in five respondents indicated that they had children under the age of 18 living regularly with them, information brought home from school rated at only 3.2%. Door knocks, community meetings, National Parks and Wildlife Services and fire signs were also identified as sources of useful information (refer Figure 27).

For those respondents that did prepare for bushfires, cleaning rubbish from yard (77.4%), cleaning leaves from gutters (63.7%), cutting long grass (63.7%) and removing branches and undergrowth around the house (60.5%) were the highest rated activities. Checking water supply and hoses (47.6%) and preparing firebreaks (37%) were activities more consistent

with respondents on larger properties. Only one-third (32.3%) of respondents indicated that preparing an evacuation plan was an important activity.

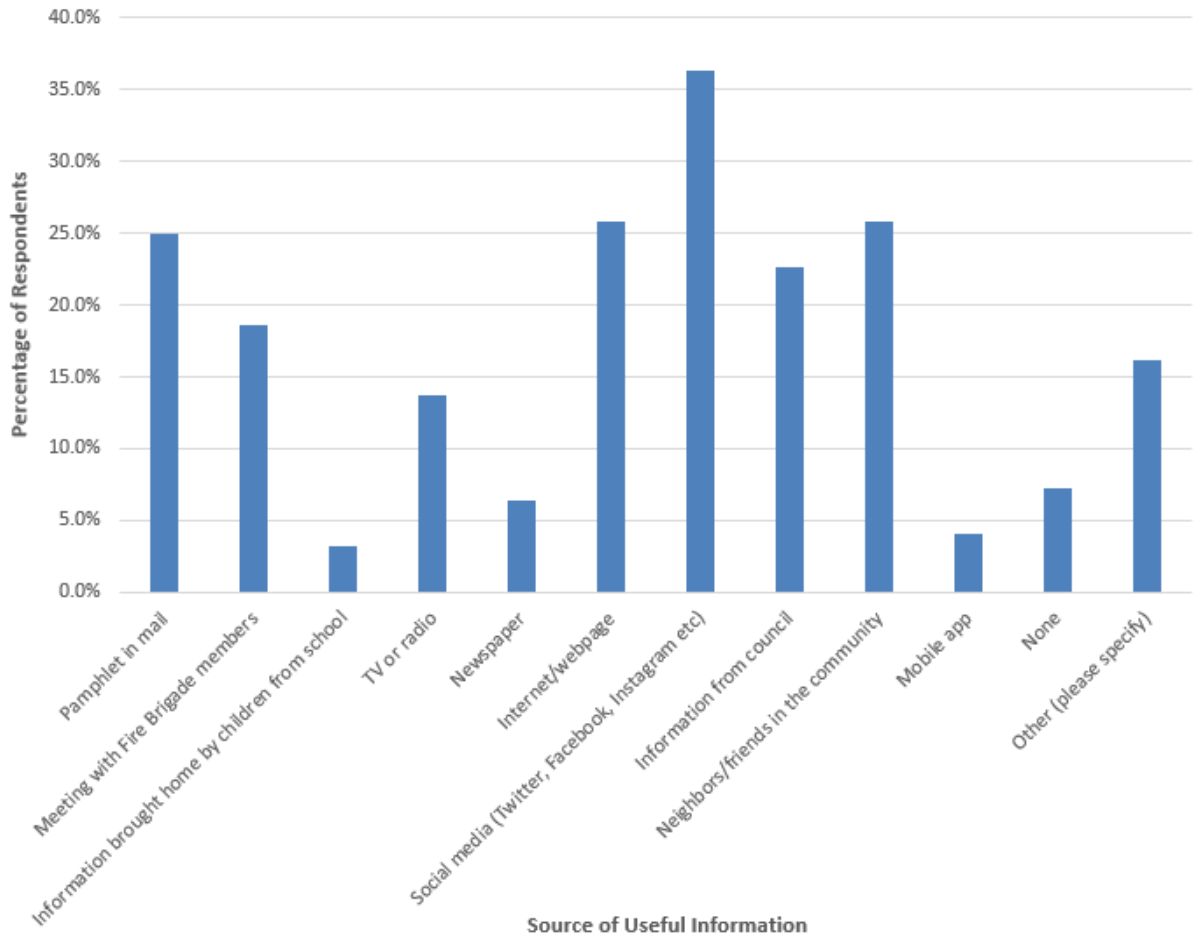

Figure 27 Sources of useful information on bushfires hazards and risk

Hazard Reduction and Responsibility

Questions on hazard reduction and responsibilities considered issues of controlled burning, maintenance of firebreaks, properties, rubbish and fuel loads, and, permissions to burn in the local area. While there was clear regional variability, most respondents (81.5%) were aware that a controlled/hazard reduction burn had occurred locally within the previous two years. A small number of people (5.2%) indicated they had no advance notice regarding these burn events, however, others received information through letterbox drops, social media and word of mouth. The vast majority (93.6%) agreed that controlled burning made the area safer from bushfire and was necessary to maintain plant growth (74.2%), yet over half were also concerned about impacts on wildlife (56.5%) and respiratory problems from associated smoke (63.7%). Approximately 15% of respondents were concerned that people may restart the fires after a controlled burn, or that they might bring their own rubbish to the fire.

Respondents identified that it was the primarily the owner/occupier's responsibility for clearing overgrown property (90.2%), maintaining access for the fire brigade (78.7%) and maintaining fire breaks around the property (73.8%). Consistently, they felt that the local council is responsible for removing rubbish from public areas (95.9%) and keeping overgrown bushland and creek beds clean (60.7%). In terms of the Rural Fire Brigade commitments, respondents also believed they had a role in keeping overgrown bushland and creek beds clean (19.7%), maintaining firebreaks around the property (18.9%) and maintaining fire brigade access to the property (13.9%). Between 1.5-4.9% were uncertain who was responsible for each activity. Consistent with concerns about neighbour's properties, almost half of the survey participants (47.5%) felt there should be more local council enforcement regarding appropriate property maintenance for bushfire hazards. Over one third (35.8%) felt there should be more state intervention and almost quarter (24.6%) felt the Federal government should be more involved. If wanting to conduct a burn-off on their property at any stage, most would contact the local fire brigade (50%) and/or the local fire warden (47.6%). Almost 10% indicated they would contact local council while open-ended responses included neighbours and national parks. Just over 5% said that they would advise no-one if burning off on their property and do it themselves.

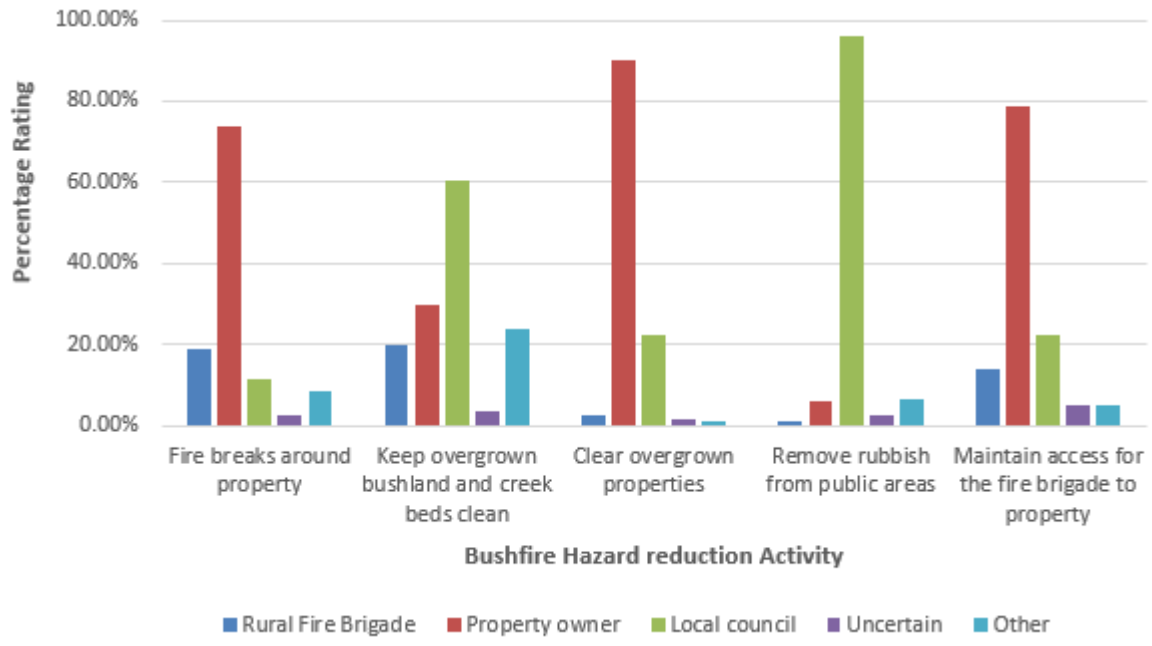

Figure 28 Perceptions of responsibility for bushfire hazard reduction activities

Local bushfire hazard management services and facilities

When considering relevant services and facilities within the local area, most respondents (81.5%) felt there were adequate services to dispose of rubbish, although there was some variance in comments regarding green waste and recycling. Similarly, 76.9% indicated that rubbish tips were readily available. Almost two-thirds (64.8%) agreed or strongly agreed

that grass should be slashed in public areas within the region. While many were neutral (33.6%), 27.9% did not believe water supply points were adequate for bushfires. If they rang 000 about a fire, most (67.2%) would expect the local Rural Fire Brigade would respond, while 22.1% expected the local Urban or Auxiliary brigade. It is worth noting that Nelly Bay is serviced by the auxiliary Fire and Rescue Service. Five respondents were unsure about local fire service provision; with three people indicating Queensland Parks and Wildlife Services would respond. Half of respondents (54.1%) believed that members of the local fire brigade were voluntary/unpaid, with 36% uncertain whether they received any financial remuneration.

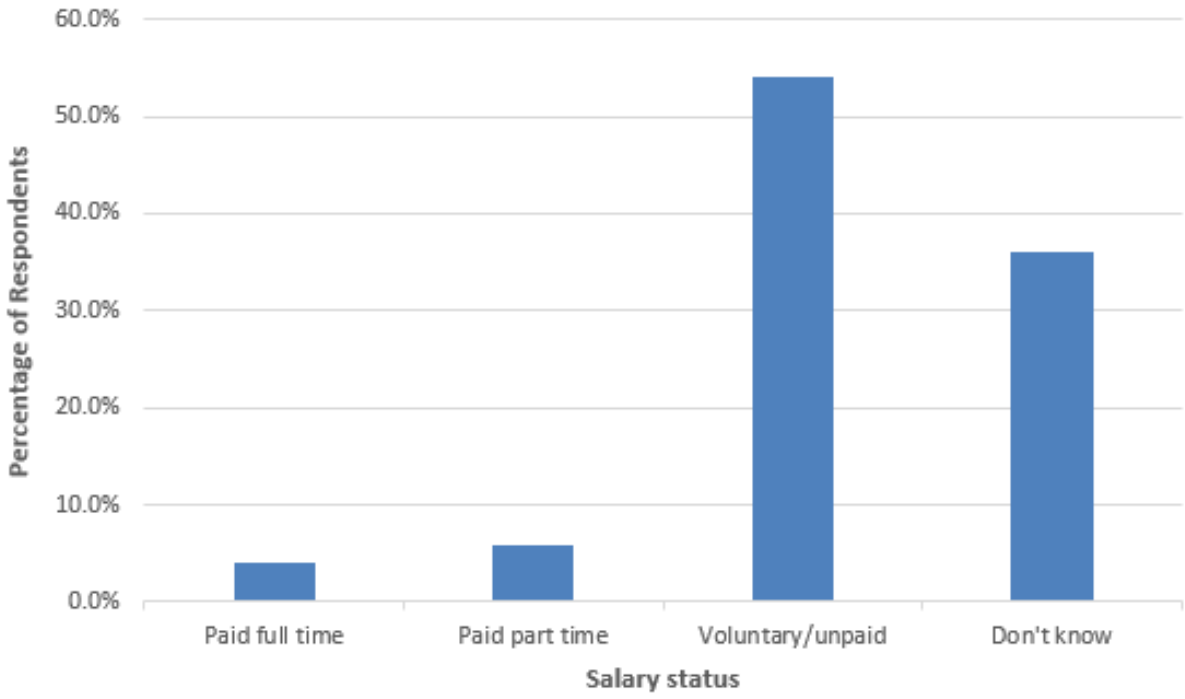

Figure 29 Perceptions on remuneration for local fire service providers

Local volunteer experience

Over half the survey participants (54.9%) had been actively involved in a volunteer or community organisation at some stage, with diverse experience including RFS, State Emergency Service (SES), sports, community (e.g.. school and church), environmental and hobby groups. Seven respondents indicated that they were current members of QFRS or RFS. As per Figure 30 the primary reasons given for not actively volunteering in a community organisation was too busy with other activities (23%), and too busy with work (20.5%) Consistent with the older demographic, open-ended responses indicated that age and health/medical conditions were considered significant barriers (refer Table 14 Appendix A). Commitment to children was also mentioned as a reason. As 15.5% indicated that they had never thought about or been asked about volunteering, almost one in ten (9.8%) indicated they would like further information about getting involved in a local firefighting organization.

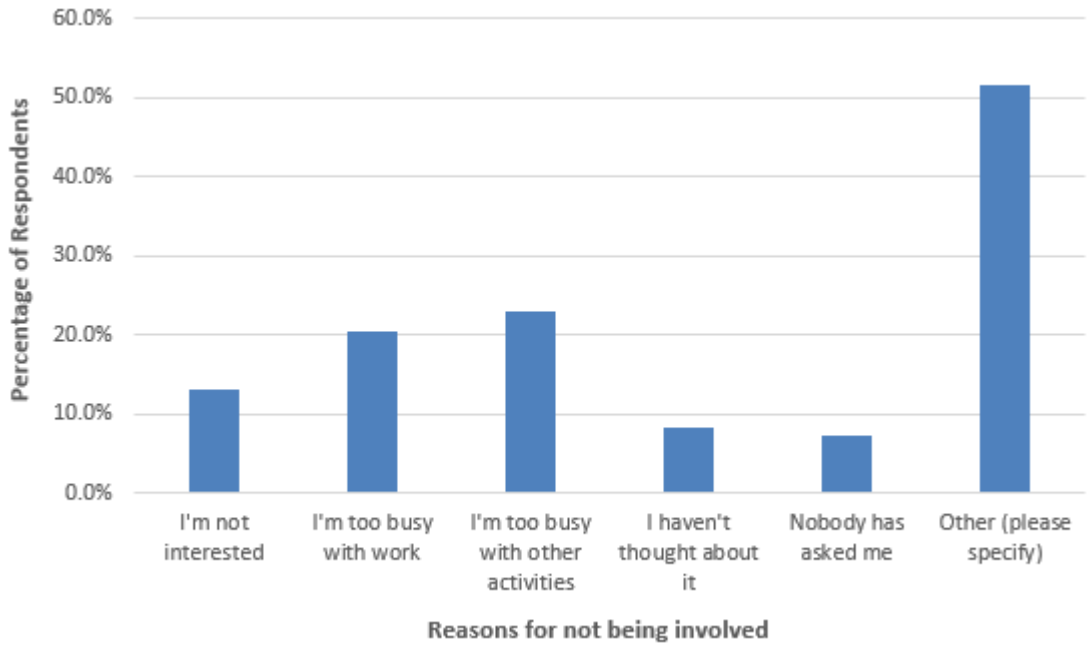

Figure 30 Identified barriers to local community volunteer engagement

Limitations

There were a number of limitations associated with these amalgamated results. While more susceptible, exposed peri-urban communities were specifically targeted for direct survey delivery, the bushfire hazard risk in Townsville is comparably lower than other parts of Australia. In contrast, seasonal cyclone and flooding are considered more frequent and/or recent regional events. Bushfire is often of lower salience to the local community and may reflect the low response rate. Similarly, different communities may reflect different hazard concerns based on local geography, environment and experience. Comparative analysis with 2016 ABS census data both regionally and locally suggests there may also be underrepresentation of some demographic groups with a bias/over representation in others. While census data collection is not synonymous with the RFB areas surveyed, potential underrepresentation includes renters, residents under 35 years of age and newer residents (less than 5 years). Retirees and tertiary educated residents may also have been overrepresented. Whether the figures are directly representative of the population sampled in these areas could not be tested because of a lack of data. It is also important to recognise that this survey was based on reported behaviours and views, not observed behaviour. This data is indicative of local bushfire hazard awareness and self-assessed capacity. Such limitations need to be taken into consideration when viewing and using the results of this study.

Toolakea/Bluewater

Located approximately 25km northwest of Townsville city centre, the Rural Fire Brigade area of Bluewater covers: Bluewater, Lynam, Blue Hills, and Toolakea (Refer Figure 3). This area of responsibility stretches from the coastline to the relatively undeveloped mountainous regions of Lynam, extending toward the Paluma Range National Park. Settled in the late nineteenth century, the land was first formally subdivided in the 1950s. With limited public amenities, this northern region of Townsville encompasses both coastal lifestyles and residential rural properties with larger hobby farms and horse agistments. Based on the 2016 census data, the area had a relatively stable population of around 1250 residents (ABS 2016).

The informal interviews conducted with local fire service officers identified a degree of concern about the level of community preparedness and engagement in bushfire risk management. Typical of the dry tropics, the whole area was deemed high risk with variable terrain and periods of high winds. While the local RFB actively engaged in community events, and provided information via schools, letterbox drops and social media, it was felt there was limited broader community engagement in public meetings and workshops on bushfire risk and management, and that most people in the region were reactive with a "wait and see" attitude, rather than proactive. With people moving into the region, there was recognition of a progressive demographic change within the local community. As many local property owners lived, worked, or had regular commitments in the city, potential travel time and delays were identified as a risk factor in respect to personal property protection from bushfires.

With approximately 30 members and recruits, the local RFB supported about 8-10 regulars on call. Rather than holding official training days, they indicated a well-established system that encouraged independent training and coordinated weekends depending on availability. Succession planning within the organisation was clear, with everyone learning all roles and responsibilities, yet new recruitment was relatively low. The Bluewater RFB expressed good support and collaboration with other RFBs in the region. In terms of identifying particular areas of concern, there were numerous issues identified in relation to access and/or property maintenance by a number of third party stakeholders and larger landowners.

Within this region, QFES identified a number of properties bordering the vegetation line in Toolkea as the primary area of interest for targeted distribution of the survey (Refer Figures 7, 8). Located along a 2km stretch of coastline, the small community of Toolakea has a population of approximately 205 (ABS 2016). There were 51 dwellings identified in the designated area during the site visit. Eight properties were clearly vacant or undergoing renovations. With 43 dwellings contacted, there was a directly attributable response rate of 37.2%. Just over half the dwellings received the postage paid paper-based version of the survey (left in the letterbox) however only two of these were returned (refer Table 5)

Table 5 Survey Distribution and Response in QFES zone and RFS Area of Responsibility – Toolakea/Bluewater

Designated Location	Dwellings Approached	Face-to-face Survey	Link to Online Survey	Survey Invitation left in letterbox	Declined Survey
Toolakea (designated zone)	43 occupied (+ 8 vacant)	10	8 provided 4 completed	22 provided 2 completed	3

RFS Area of Responsibility	Face-to-Face Survey Completed	Online Survey Completed	Returned Postage-Paid Survey	Total Surveys Completed
Bluewater, Lynam, Blue Hills Toolakea	10	12	2	24

Based on 2016 ABS census data Toolakea is a demographically aging suburb. Residents are predominantly Australian/Anglo Saxon, reflecting a slight male majority (54.6%) and median age of 50. Further, 23.6 % of the population is aged 65 and over and retired. Just over a quarter (27.9%) of households in the area support dependent children (none over the age of 15). In respect to the questionnaire, 55.4% of respondents identified as female, indicating a level of overrepresentation in this group. Similarly, there was a respondent bias towards retirees (41.6%), homeowners (owned either outright or owned with a mortgage) and long-term residents (average residency over 18 years). Only two dwellings were identified as less than five years old.

With a relatively even balance in property type between residential on suburban block (54.5%) and residential on rural block (45.5%), the primary reason given by respondents for living in this area was the rural lifestyle and affordability. Consistent with the tree change/sea change movement, retirement and location were also listed as motivations. The residents surveyed most valued peace and quiet, trees and bushland, the rural lifestyle, and space. In terms of natural hazards in the region, respondents rated bushfire as slightly higher risk than cyclone, although five respondents (22.7%) indicated it was unimportant or very unimportant. Consistently, most considered the risk of bushfire as high or very high in the region, yet tended to rate the risk to their own house as moderate. Despite the direct proximity to the vegetation line, only three people rated the risk of bushfire to their property/dwelling as high or very high. Almost 80% also felt their neighbours were at risk, yet only a third felt comfortable talking directly to them. One long-term resident on a suburban block indicated that they do not do prepare for disaster events and rates all hazards as very unimportant.

In terms of preparing for bushfire season, while a few mentioned social media posts or pamphlets, almost 2/3 were prompted to act by controlled burning in the area. Communication with the public regarding these local controlled burn events was ad hoc. The majority prepared for bushfire season by cutting long grass, cleaning leaves from gutters, removing rubbish and branches. While more than half reported preparing a firebreak around the property, less than 1/3 actively prepared an evacuation plan. Over 25%

of respondents also indicated that they felt local dump services were not adequate (refer Table 6). All respondents felt that controlled burning made the area safer from bushfire risks but over 1/3 were concerned that people would restart the fire afterwards. It was widely recognised that the property owner or occupant is responsible for clearing overgrown grass and maintaining firebreaks and property access, with particular areas of concern in the region identified in Table 7. Most felt there should be more enforcement to maintain properties.

Table 6 Open-ended responses on dumping services in Toolakea/Bluewater area

Q25.Are there adequate services for you to dispose of rubbish in your locality? Any comments?
Open-ended responses
Bluewater waste and Jensen disposal
We had a free dump where we all recycled now we have a Transfer Station which is expensive we can't afford to dispose of rubbish. And only open weekends
Tip at Bluewater to get rid of greenwaste
No dumping services to get rid of leaves
Transfer station only open one day a week
Have to remove myself
Local rubbish transfer at Bluewater is free to dump green waste
Lack of dump access
Transfer station

Table 7 Open-ended responses for areas of concern in Toolakea/Bluewater area

Q31.What areas in your locality are you most concerned about as a bushfire hazard?
Open-ended responses
The bushland behind our property.
The Bluewater station and some other big properties that do not have their firebreaks maintained
Areas next to bushland
Bushland near Bluewater station, bushland near creek, bush opp community centre.
The bushland around neighbouring properties
large tracts of unused land
bushland and creek bed directly behind my property
Grass and forest areas
Out back
Behind the property, where the bush lies.
The bush land out the back.
Private and council property
At rear of property
Dead stuff in area
Large land owner who do nothing to prepare their properties for fire season. Commercial businesses who expect the rural fire brigades Volunteers to manage their land and do nothing when the fire is on their property. They own the land therefore the fire. I have been to many large properties and spent hundreds of hours fighting fires and being abused by land owners because we weren't there fast enough or they are losing too much feed.
Crown land
The Esplanade
Key intersection into Toolakea

In terms of self-management or mitigation of a potential bushfire threat, almost half of the respondents worked or stayed at home, with a high proportion of retirees. For those who regularly travelled for work or other activities, it would take an average 35-40 minutes to return home. Respondents were aware that the RFS would be the most likely respond to a bushfire in their area, however, almost half did not know if members of this service were voluntary or paid. While over 50% of respondents indicated that they had provided community or volunteer support services at some stage, based on the 2016 census only 13% of the community currently actively volunteer. Primary reasons for not volunteering included care for young children, age/elderly and health. One person indicated they had never been asked if they wanted to volunteer, while another had not ever really thought about it. In terms of potential recruitment to the RFS three people indicated that they would interested in further information (this includes the prior two respondents).

Alligator Creek/Nome

The RFB area of responsibility for Nome encompasses Nome, Alligator Creek, Julago and Brookhill (refer Figure 4). Located approximately 20km southeast of the Townsville city centre, the region is considered predominantly rural. Bordered by mountain range, it includes scattered settlements, mountainous areas, undeveloped bushland valley, cattle grazing and the developing master planned community of Elliot Springs. Subdivision in this area first began in the early 1970s. With a number of small community settlements, the population of this region is approximately 2550 (ABS 2016).

Based on the informal interviews conducted, the Nome area was characterised as a small community that was relatively self-reliant when it came to bushfire management, with good collaborative support from other local RFBs and National Parks. While demographic transition was recognised, the Brigade Officer felt that most people were aware of the local hazards through lived experience. Consequently, they believed that the majority of landholders adequately prepared and maintained their properties in terms of bushfire hazard management and risk reduction.

With 200 members on the local RFB books (8-10 regulars on call), local knowledge, established contact networks, and practical understanding of the terrain were considered particular strengths. There was however, some concern about internal succession planning, the motives of new volunteers, and potential loss of existing knowledge. The QFES introduced requirement for all members to have a Blue Card was also mentioned as a possible impediment to ongoing membership and recruitment in the area. In terms of community education and RFS training, both were reported as limited due to resources and volunteer availability. Public communication was generally done via the monthly community newsletter and/or on Facebook. Communication more broadly, in terms of unreliable mobile and radio reception was a recognised issue in a potential bushfire or other hazard event.

Given that it is a reasonably established settlement, QFES selected Alligator Creek for the targeted survey distribution in this region. As evident in Figures 9-12, the distribution zone is composed of predominantly larger rural properties with houses dispersed in, or close to,

dense vegetation. During the site visit, there were 114 occupied dwellings identified, 1 resort and four vacant premises (refer Table 8). With access issues including locked gates, aggressive dogs, and extended driveways, 2/3 of surveys were delivered to letterboxes rather than face-to-face. Only four of the postage paid surveys were returned. There were 30 surveys completed from the site visit, reflecting a 26.3% return rate. There were 43 surveys from the entire Nome area of responsibility.

Table 8 Survey Distribution and Response in QFES zone and RFS Area of Responsibility – Alligator Creek/Nome

Designated Location	**Dwellings Approached**	**Face-to-face Survey**	**Link to Online Survey**	**Survey Invitation left in letterbox**	**Declined Survey**
Alligator Creek (designated streets)	114 occupied (+ 4 vacant + 1 resort)	15	18 provided 11 completed	76 provided 4 completed	5
RFS Area of Responsibility		**Face-to-Face Survey Completed**	**Online survey Completed**	**Returned Postage-Paid Survey**	**Total Surveys Completed**
Nome, Alligator Creek, Julago, Brookhill		15	24	4	43

Based on the 2016 ABS data, Alligator Creek is predominantly Anglo-Saxon decent (87.2%) also reflecting German, South African and indigenous heritage. At the time, 5.9% of the community did not speak English at home. There was a slight male majority (51.3%) with a median age of 41. Only 12.9% of the population were retired, with a full-time work force of 61.3%. Consistent with the census data, the survey respondents reflected the median age of the area and were predominantly homeowners (outright or with mortgage - only one rental). While there were a number of respondents in this area that did not complete all the demographic criteria, there was a slight overrepresentation in respect of females (51%) retirees (19%), highest educational qualification, and part time employment/student status.

Reflecting the rural reputation of the region, a majority of survey respondents described their living circumstances as residential on a rural block. Only four people (1%) indicated they lived as residential on a suburban block. The average block size was 2.7 acres, with only six below the ¼ acre size, and the largest at one hectare. Demonstrating the level of recent development in this periphery zone, almost a quarter of respondents indicated that their dwelling had been built within the past 5 years. The primary reasons people chose to live in the area was the rural lifestyle and affordability, while three people indicted it was also due to family circumstances. In terms of aspects that they valued most: peace and quiet, space, trees and bushland, all rated as very important or important. Rural lifestyle and limited crime were also mentioned. Travel times to work or other activities was approximately 35-40 minutes.

As this area is located inland, storm surge was not really a considered an important hazard for the region. Landslides and flooding were similarly rated as neutral, unimportant or very

unimportant by most survey participants. Bushfire was rated the highest hazard for the region, and was the highest risk priority when choosing current residence. While almost all respondents rated the risk of bushfire to their locality as moderate to very high, 38% believed the direct threat to their personal property was low or very low. Just over a third (35.8%) believed their neighbours were at risk from hazards yet only three people indicated they would talk to them about cleaning up their properties (60.5% disagreed or strongly disagreed). Five people indicated they were unsure when asked to identify the months for bushfire season.

While social media, word of mouth, and fire signs were the most commonly recognised sources of information regarding planned controlled hazard reduction burns in the area, over 20% of residents indicated they could not recall one taking place over the previous two years. These burns were the most common prompt to start personal bushfire preparations, although uncontrolled bushfires and pamphlets in the mail were also motivators. Six respondents indicated they did not prepare for bushfires (there was no correlation between prior experience, length of residence, size of property or hazard rating importance). For those that prepared: clearing rubbish from yard; cutting long grass; removing branches; and, cleaning leaves from gutters, were activities reported by over 50% of respondents. Only one quarter indicated they would prepare a firebreak and only 20% indicated they would prepare an evacuation plan. Consistent with the more rural nature and size of properties, 40% reported that they would check water supplies and hoses. If needed, most would source bushfire information from the internet, social media and friends in the community. Almost 75% of respondents knew to contact the fire warden directly if they wanted to burn off rubbish on their properties.

In contrast to the impression given in the local interview, just over 1/3 of respondents reported prior bushfire experience, or a friend/relative that had experienced bushfires. All but one survey participant agreed or strongly agreed that controlled burning does make the area safer from bushfires. While also agreeing that burning was necessary for plant growth/regrowth, there was a level of concern for wildlife and respiratory problems associated with the bushfire smoke. There were particular locations of concerns within the region, indicated in the open-ended response in Table 9. In terms of responsibility, almost all participants recognised that the property owner should clean their overgrown properties and maintain access for the fire brigade, although there was some uncertainty regarding firebreaks. Although many believed that more local enforcement should apply in respect to levels of property maintenance, most were happy with current levels.

While 25% were uncertain whether local fire service providers were voluntary or unpaid most knew that RFS would respond to a 000 fire hazard. Reasons for not volunteering for any community service included too busy with work and other activities, age and medical/health reasons. Two people indicated they would like information on how to volunteer for the local RFS as they had never been asked.

Table 9 Open-ended responses for areas of concern in Alligator Creek/Nome

Q31. What areas in your locality are you most concerned about as a bushfire hazard?
Open-ended responses
Long grass on roadsides, tree debris after high winds
Across the rear at parkland
Private property at rear
Neighbours who have uncared overgrown properties
National park boundaries
The property at rear as is not maintained and not sure who owns it
Any houses backing on to the hill
Julago
National park
Surrounding mountains
protected land
National Park
National Park
By the hills/close to the national park where the bigger blocks are and left “wild”
My backyard
The hills
Hard to access poorly maintained properties nearby
Council and wildlife/national parks
Some neighbours in the north. Lots of dry scrubland around.
All of Mt Elliot.
Unsure
Concerned about the scrub behind my property, state government property/national park.
Neighbouring properties not being cleaned up or managed. Hence providing excessive fuel for bushfires.
1. Land untended i.e. vegetation overgrowth and proliferation of weeds that borders residential land, 2. Individuals landholders
Highway road verges.
Council properties
The rural fire brigade warden’s overgrown property at the end of my street.
The people living on top of the hill
Surrounds of our estate
I live one house down from bush land and am particularly concerned about bushfires in that specific area

Horseshoe and Nelly Bay/Magnetic Island

Magnetic Island is a 52km^2 island located 8km offshore from Townsville. While it has developed since the early 1900s into a local residential suburb, it is also popular as a tourist destination. Fringed by coral reefs, the island supports beaches, mangroves, scrub and rainforest vegetation typical of the dry tropics, extending towards the hilly interior. Over 75% of the island is National Park. There are five main settlements on the island, with a

resident population of approximately 2335 (ABS 2016). Magnetic Island Fire and Rescue Service (paid members) are responsible for supporting the residents of Nelly Bay, Arcadia and Picnic Bay. Horseshoe Bay is service by the volunteer RFS members.

Based on the interviews conducted, it was evident the October 2019 bushfire event on Magnetic Island was considered a catalyst for improving local bushfire management and services. Following this experience, relevant key stakeholders on the island have collaboratively worked with the local RFS to develop partnerships for a clear strong proactive approach based on preparedness and knowing the local community. Founded in extensive communication, education and engagement, there has been a concerted approach to build community trust, social capital and resilience. Additional fundraising and successful grant applications have provided supplementary resources to support both training and capacity. There is regular training and succession planning. The Horseshoe Bay RFS was recognised in the Commissioners Awards for Excellence 2020 in the category of Capable Communities for their outstanding work to improve local community awareness and understanding of fire management messaging.

An integral part of the local RFS strategy has been to establish a consistent credible point of truth and information – whether through community engagement activities, notice boards, local businesses, transport service providers, the community newsletter, and via social media (particularly Facebook). Letterbox drops and pamphlets are used to further educate and advise of local burn offs. Activities with other emergency response organisations on the island are intended to share resources, build familiarity and local understanding, and reduce operational inconsistencies. Particular areas of concern identified were properties where vegetation was encroaching gutters, poor access to water hoses, inadequate clearing and maintenance, asbestos, illegal dumping on vacant land, and backyard burning.

Reflecting similar hazard conditions and proximity, QFES selected fringe properties in both Horseshoe Bay and Nelly Bay for the targeted survey distribution (refer Figures 18-20). Horsehoe Bay is supported by the local RFS while Nelly Bay relies on the urban auxiliary FRS. With the site visit conducted over consecutive days on a weekend, there were 45 occupied dwellings identified in Horseshoe Bay, and 50 in Nelly Bay (refer Table 10). A total of 19 houses were obviously vacant or operating as holiday accommodation. Postage paid envelopes were left for 25% of premises. As it was not possible to determine the exact origin of online and postage paid returned surveys from Magnetic Island, the combined return rate from the site visit is 40%.

Table 10 Survey Distribution and Response in QFES zones Horseshoe Bay (RFB) and Nelly Bay (FRS)/Magnetic Island

Location	Dwellings Approached	Face-to-face Survey	Link to Online Survey	Survey Invitation left in letterbox	Declined Survey
Horseshoe Bay (designated streets)	45 occupied (+ 8 vacant)	10	14	9	4
Nelly Bay (designated streets)	50 occupied (+ 9 vacant)	11	7	15	8
Area Totals	95 occupied (+ 17 vacant)	21	21 provided 10 completed	24 provided 7 completed	12
RFS Area of Responsibility		**Face-to-Face Survey Completed**	**Online survey Completed**	**Postage-Paid Survey Return**	**Total Surveys Completed**
Magnetic Island		21	29	7	57

According to the 2016 ABS census, while residents are predominantly Australian/Anglo Saxon in origin (73%), Magnetic Island demonstrates a level of ethnic diversity including New Zealanders, Germans and almost 3% Aboriginal or Torres Strait Islander people. Approximately 83.5% of people only spoke English at home. While the median age was 54, 27.7% of the population were people aged 65 years and over. There was an almost even gender balance (50.2% male) with almost half the residents educated at the tertiary level (TAFE or University). Survey respondents showed a similar gender balance and educational background, yet retirees (40.3%) and households without children are overrepresented (82.4%). There were only three respondent aged below 35. With less than 10% reported to be renting there is a definite skew towards home ownership (owned outright or with a mortgage).

Reflecting an older more established suburb, there were only five dwellings reported as less than five year old, with others more than fifty years. Consistent with the Google satellite images, property sizes of participants were generally less than ¼ acre and predominantly categorised as residential on suburban block (90%). The largest property was 8.5 acres located in Picnic Bay. Indicating a more transient population, almost one third of those surveyed had moved to their current residence in the past five years, with eight respondents having moved in the previous twelve months. In contrast, three people had lived in their dwelling over 30 years. Motivations for choosing current location ranged from the tropical, bush, beach, or island lifestyle, or more personal reasons such as family, retirement and change in circumstances. Respondents most valued the peace and quiet, trees and bushland, and space. The wildlife, nature, and island lifestyle, were also important to some.

In terms of natural hazards, respondents on the island indicated that cyclones and bushfires were the most important concerns for the region. When it came to choosing their current residence, there was a high level of variability between responses. The data shows almost 2/3 of participants rated cyclones as the most important concern, however flooding and storm surge both rated higher than bushfires. Given the proximity of the mountains to settlements, landslide was also important to almost a third of people. Of those that rated the bushfire hazard as unimportant or very unimportant, there was a weak correlation with those that had moved in since the 2019 bushfires. When asked specifically about the threat of bushfire to the region and their dwelling, over 65% rated this as moderate, low, or very low. Of those that did personally rate the bushfire risk, they felt their dwelling was at a higher risk level than the broader region. Almost 50% of respondents had personal experience, or had a friend/family member that had experienced a bushfire. Almost half of the respondents also felt the community would recover reasonably quickly after a significant hazard event.

While awareness of the formal bushfire season was highly variable, people were generally prompted to prepare by either controlled or local uncontrolled burns. Only ten people were unaware whether a hazard reduction burn had occurred in the past two years with most advised by letterbox drops, door knocks/face-to-face meetings and/or social media. Four people disagreed or strongly disagreed that hazard reduction burns made the area safer from bushfires, while others agreed or were neutral. As most acknowledged that fire was necessary for plant maintenance and regrowth, the smoke hazard was considered an issue. If residents wanted to do some burning on their own property most would call either the local fire brigade or fire warden.

Although four people indicated they did not prepare for bushfire season, clearing rubbish from the property, removing branches and clearing leaves from the gutter were the most common activities reported by respondents. Just over a third prepared an evacuation plan; however checking water and hoses was more common than preparing a firebreak. In terms of responsibility, respondents were divided whether it was the property owner or fire services that should maintain firebreaks and access to the property. People were generally concerned about their neighbour's hazard risk when they did not clean up their property, but felt neutral about discussing the issue. Similarly, most felt current level of enforcement was adequate. Specific areas of concern were provided in open-ended responses in Table 11. While there was a high number of retirees and those that worked/stayed at home, for those who worked in the city/off island return rates if their property was under threat generally exceeded an hour.

Volunteer experience amongst survey participants was over 50% - with a further 10% indicating they were not interested. While three people did indicate they would be interested in further information about the RFS the primary reason given for not getting involved in volunteering included age and medical/health conditions. Others indicated they were too busy with work or other activities.

Table 11 Open-ended responses for areas of concern in Magnetic Island

Q31. What areas in your locality are you most concerned about as a bushfire hazard?
Open-Ended Response
None specifically
The areas of national park, the surrounding mountains and West Point
National parks adjacent to roads
Surrounding National Park
whole island
National Park
National Park and loss of wildlife
National park
Trees between my fence and road
National Park area at my back fence
National parks
West Point, Picnic Bay behind the WTS and WTP, far western end of Horseshoe Bay, Radical and Florence Bays
National Park
People who own unoccupied and undeveloped properties. Interstate owners, etc.
Freehold properties with long grass.
Whole national park on the island
Magnetic Island
West Point
Houses back on to bush
national park
Surrounding national park bushland Large areas of neighbouring property
The forest
Horseshoe Bay
National Park behind property. Unoccupied land nearby.
National park
*Alligator Creek and its surrounds are a death trap - there are homes nestled in idyllic bush settings overlooking vast apocalyptic fuel loads in the national park. The leaf litter is over 4cm deep under impenetrable bush - a catastrophe waiting to happen. Alligator Creek Road is a narrow road and the only way out. A lot of homes have narrow roads zig zagging down steep slopes to Alligator Creek Road, so the area is currently extremely dangerous if the fuel loads are not adequately reduced. People trying to escape can die. Alligator Creek runs parallel to this main exit and dries out in summer, so its dense foliage along its banks will act as a bushfire wick to carry fire rapidly along the road. I am sure that there are a lot of other areas like this around Townsville.
National park
Magnetic Island National Park and adjoining crown land
Any areas around Nelly Bay and Picnic Bay where houses back on to the bush land/Nat Park where parks burn. Horseshoe Bay has fire breaks around the residential areas. We don’t have that.
West point
Surrounded by national park
rear of property
national park

National park at rear and grassed areas
National park areas
Whole national park
End of Henry , or Lawson St. Pine trees at rear street
Houses backing onto national park
National Park
The Hills behind
Properties on Nat park
None except hill development
Our national Park

- *Residents were asked to identify areas of concern in their locality – although some have taken this to include all of Townsville. All responses in this table are from residents of Magnetic Island*

Discussion

Effective bushfire management at both the local and national level continues to be a challenge as populations expand and develop into peri-urban bushland areas of Australia. Given the diversity of external factors and drivers that motivate people to move to such regions, research demonstrates that peri-urban communities can be complex and variable both within and between areas. Consequently, to address changing bushfire risk levels and dynamic community capabilities, local fire service providers such as the RFS need to develop more adaptive approaches to understand their communities. The Understanding Communities Project introduced a framework specifically designed to assist local service providers to define, support and enhance community resilience to bushfire hazards in peri-urban communities. This report utilised the methodology from the Understanding Communities project to enable QFES and local RFS to identify specific vulnerabilities, resources and behaviours in the Townsville peri-urban regions of Bluewater, Nome and Magnetic Island. The information provided is intended to guide strategies for improved efficiency and effectiveness of services, and to contribute to increasing community preparedness and resilience to local bushfires.

The amalgamated data presented provides a general profile of the types of residents that occupy the peri-urban regions of Townsville. Respondents were predominantly older than the average Townsville demographic, retired, well educated and owned (owned outright or with mortgage) their property. While there was variation in respect to the beach, rural, or island context, the most common reason people moved to these areas was for the lifestyle. Various personal social and economic factors were also identified as drivers, yet invariably it was the environmental factors, biodiversity and amenity that respondents valued most. The peace and quiet, trees, bushland, and space, which were all identified as elements that attract and retain many of these residents, may also make them more exposed and susceptible to bushfire hazards. In developing strategies to mitigate the bushfire hazard risk for these residents, it is important to consider and balance such strong attachment to the surrounding environment and personal property.

Despite direct proximity to vegetation and bushland, over half of the respondents felt that bushfires were not really a significant concern in their locality, and rated it even less of a risk at the individual property and household level. In contrast to other regions of Australia, cyclones and flooding are more prevalent and therefore may be of more salience. This could possibly explain why almost 10% undertook no form of bushfire preparation, and less than a third prepared an evacuation plan. Given the pervasiveness of older respondents with identified physical and medical limitations; the number of dependent children households; and, potential return commute times in excess of 40 minutes for some residents; it is important for all households in these peri-urban areas to understand the risks, and either develop or review their bushfire survival management plan to ensure that safety is prioritised for all occupants. Such social variables are indicative of levels of vulnerability and varying self-sufficiency. Local fire services were valued, but as volunteers they may be constrained by available resources, and capacity.

Consistent with the high levels of home ownership, people did accept that it was primarily their responsibility to prepare and clear any rubbish on properties they occupy, maintain firebreaks, and ensure fire brigade access, yet often felt neighbours could do more and this issue should be enforced locally. While local knowledge, experience and collaborative approaches were highly valued by local fire brigades, the reluctance of respondents to discuss concerns with neighbours suggests that social capital and relationships between members within these communities could be stronger. Similarly, in terms of perceived levels of community resilience, only a third felt that people in their locality would recover quickly from a natural hazard such as bushfire. Although many indicated current commitments kept them busy, there was extensive volunteering experience within all of the communities surveyed, and a number who indicated they would like further information on supporting an organisation like the RFS. Increased local recruitment and membership enhances hazard familiarity, service provision and community resilience.

Overall bushfire awareness and experience was highly variable amongst respondents and appeared to have no obvious correlation with locality, risk perception, levels of preparedness or reported behaviours. It is evident from the data that information about bushfire hazard planning, management and preparation was delivered in a multitude of forms, yet local bushfire events (whether planned controlled hazard reduction burn or an unplanned fire) were the most common prompt to start personal preparations annually. To maximise awareness and community preparedness, communication strategies associated with a controlled burn could potentially encompass further information on personal property risk, and household bushfire prevention. Digital and media campaigns could also highlight the value and role of local volunteers in the Rural Fire Brigade in protecting the community and what community member can do to support or assist. Clear consistent communication is critical to informed decision making. Given the demographic, cultural and language diversity in these areas, it is important to maintain a multitude of modes of information delivery rather than rely on a single approach.

While the amalgamated data provides an overall profile of the types of residents that occupy the peri-urban regions of Townsville, the region specific summaries reveals a degree of variation in demographic variables, property types/density, community preparedness, reported behaviours, expectations and responsibilities. Dynamic development histories, populations, spaces, and levels of household bushfire risk management have direct implications on local hazard management and fire service provision. It is evident that understanding such elements of the community is integral to developing effective education and mitigation strategies. Specific challenges relate to local bushfire hazard risk perceptions, awareness, behaviours and household capacity to meet their own needs. Beyond information and communication, resilient communities need to be engaged and connected in a collaborative partnership, sharing responsibilities with relevant service providers, agencies and government. For volunteer organisations such as the RFB, this involves building local trust and visibility - working proactively with communities to develop requisite knowledge and practical skills. Although peri-urban communities often reflect change and transition, regularly profiling community risk, needs and capacity supports informed decision making and helps direct limited resources.

Conclusion

Consistent with previous research, this study demonstrates that the peri-urban communities of Townsville are heterogeneous and dynamic. Residents are primarily attracted to these locations due to the natural environment, amenity and associated lifestyles, despite the threat of bushfires. As more people move to the urban-bush interface there will be increasing numbers of people exposed to bushfires with variable knowledge, experience and capacity. The survey investigated issues identified by local fire service providers, and provided empirical evidence regarding local risk perceptions and reported mitigative behaviours. It also highlighted potential strategies to address proactive community prevention and preparedness to increase resilience. Rather than recommending a singular standardised approach across these communities, the research demonstrated disparate needs and understandings, which recommends an ongoing commitment by all emergency service providers and relevant agencies to collaborative community engagement and capacity building.

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Appendix A – Written Responses to Survey Questions

Q 20. What did you learn from your experience with the bushfire? (Open ended responses)
Q 23 What prompts you to think about preparing for bushfires? (Open ended responses)
Q 38. What reasons would prevent you from becoming actively involved in a volunteer community organisation? (Open ended responses)

Table 12 Bushfire experience – lessons learnt

Q 20. What did you learn from your experience with the bushfire? (Open ended responses)
Cleaning debris and waste control around house and cleaning rain gutters on the house
Haven't experienced a bushfire
Combat climate change, be ready, have an escape plan
The community I grew up in better prepared 20-30 years ago was better prepared than the ones I live with know.
The quicker it was felt with in a coordinated manner the more successful the intervention.
Increased awareness.
The importance of fire breaks and the high likelihood of dangerous fires.
Always learning. Improve the irrigation.
People in the community are not prepared
Threat mitigation
Keep the fence lines clear.
Be prepared.
Keep relevant phone numbers handy and hoses connected
Keep up to date with fire & emergency services notices. Have a plan (stay or leave)
trust your husband!
They take no prisoners
How freaky fast it moved, and turned.
How quickly things get serious. I believe fire got away due to back burn by fire brigade
Taught me to prepare for the situation. It is potentially likely.
Clean the gutters.
How quickly a bush fire can travel/spread
Stay on top of clearing the area.
Definitely know how to do in future if happens again
Nothing new. Stay away from fire.
How quickly things can turn
Leave early. Only stay if you have generators, pumps etc
Preparation
Preparation
How intense they can be and how far from the fire they can spread.
Clear gutters and tidy up yard. Stay informed
Keeping land clear
You can't control for other people's mistakes.
Local auxiliary fire and rescue are highly trained and reliable
I'd rather live in cyclone country than bushfire country. Cyclones give lots of notice and are more predictable
It was an affirmation of changing climates. Fostered awareness of disaster preparation. Created behavioural change.
Preparation
Looking out for debris on the property.
Stop drop roll
National Parks and the fire brigade did well? Made me feel at ease.

That the Nat Parks needed a fire management plan - which they clearly didn't have.; that the Community needed a consistent preparedness action and management plan and that I needed a personal fire preparedness Plan.
Keep fire breaks maintained so back burning can be initiated
Water is a valuable
Keep us green. Leaves are mulch.
Auxiliary fire service kept the community safe all over the island
The paid bushfire hierarchy is the biggest danger in bushfires as there is a lot of money in apocalyptic fires. The firestorm crisis is entirely due to bushfire hierarchy's modus operandi of 1. making it almost impossible to cool burn, resulting in catastrophically few hazard reductions resulting in catastrophically high fuel loads 2. failure to respond rapidly by putting out potentially dangerous fires in extreme weather. The facts over the last decades speak for themselves - the bushfire paid hierarchy has a lot to lose if the inexpensive traditonal Indigenous burning methods returned and hierarchy imposed rules no longer stopped locals from putting out dangerous fires quickly to save their communities. The bushfire paid hierarchy is psychopathic.
Be prepared
To make better firebreaks
Keep own property cleared to fencelines, long hoses, selective planting, following all recommendations available from reputable sources e.g. Rural Fire Bridgade.
Keep a clear firebreak around the house
To be aware
That bushfires are unpredictable and come with little warning. I now always say, I'd rather live in cyclone country than bushfire country
Respect
The local magnetic island auxiliary fire and rescue service are very well experienced dealing with bushfires. Horseshoe bay rurals were no where to be scene. Only the big red trucks
Preparation around the property, keeping gutter clean and tress cut back from the house, making sure you have a survival plan just in case
Extended the Fire hoses to reach further down the block.
IT IS HOT
How to fight them and protect myself
Being prepared helped
To ensure a bushfire plan is ready and report anything suspicious
Preparation is key
To continue to prepare for bushfire each year
Volunteer rural firefighters are exceptional.
Risk management
Keep the property clean
Be sensible, keep leaves on the ground mowed and firebreaks around fence lines
They will happen no matter what.

Table 13 Prompts for Bushfire Preparation

Q 23 What prompts you to think about preparing for bushfires? Other (please specify)
Hot windy days, tinder dry bush
How my garden is going and the moisture content/colour of the natural grasses and vegetation on my property
The fire arrow
Common sense.
Radio
Seasonal changes, when it starts to dry up.
Alligator creek FB page
The seasons
My husband is a rural firey
Accumulated materials on block
Hotter drier wind. When the ground is dry.
always mindful
Word of mouth
Notice from the BOM
Already prepared
Radio
Always do it
Neighbours
Council info, etc
Local SES assists Parks
Chart at the ferry terminal.
Council
Fuel load. Change in weather. Focused on natural patterns.
Local auxiliary fire and rescue driving around the island
I just do it at the end of September
Council
Doesn't bother
Wife
Controlled burns getting away and becoming uncontrolled
After wet season cut fire breaks
Auxiliary fire service driving around in the truck
I just worry about every possible bad scenario
Years observing the complete failure of bushfire paid hierarchy in some regions where rural people have lost control of their safety.
Experience and understanding I am responsibility for my property.
The time of the year
Bushfire preparation is a part of normal property maintenance. Some of the things done e.g general clean up, gutter cleaning apply for both cyclone and bushfire preparation. Other things such as cutting/slashing vegetation in certain areas are scheduled according to vegetation growth, vegetation dryness and weather.
I AM IN RURAL FIRE

Discussions with insurer
Rural fire brigade member
The dry season
Winter is the time to prepare. I needs to have finished any burn offs by spring

Table 14 Reasons participants would not actively engage in a volunteer community organisation

Q38. What reasons would prevent you from becoming actively involved in a volunteer community organisation? Other (please specify)
age - too old
Hearing disability and possibly too old
Health reasons
kids
Age (senior) and health
busy with children
My ability to contribute constructively
I work rotating shift
If the local organisation had corrupt leadership/management.
Age and health.
Medical reasons
Husband is already covering fires down I need to be available for family and work emergencies
Age
Health issues
Already am
Small children to care for at home
health
Health
Not the right time at the moment.
Age
Age and health
Age
I am involved.
Age and health
Too old
Already am
Involved in other communities
Age and fitness
Not interested at present
Way too much politics in local RFS Unit.
Age and health
The politics.
Lack of knowledge from rural fire service
If I didn't agree with their mission or ethos.
Health
None I have been
Blind
Application was lost. The process of application was difficult.
Age
I have an sulp family member with disabilities living at home.

Health
I prefer to protect and not burn.
Secretary
The type of organisations and the conduct and behaviour of all members.
I am
Too old, not healthy enough
Too old
Getting too old to contribute effectively
Done
Members of the horseshoe bay rurals
Nothing
Conditions of belonging to an organisation with which I disagree e.g. having to have a Blue Card for working with children to be be a rural fire fighter. Caring obligations for family, friends and animals.
I AM AN ACTIVE MEMBER OF RURAL FIRE
Member of brigade
Not physically able
NR RFS Heirarchy
Litigation
Irrelevant. I already volunteer
Health condition

Appendix B – Survey and Participant Correspondence

Introduction to the Townsville Bushfire Preparedness Survey/Information Sheet
Participant informed consent
The Townsville Bushfire Preparedness Survey
Participant invitation provided on social media
Poster invitation to survey

Figure 31 Introduction to the Townsville Bushfire Preparedness Survey/Information sheet

INFORMATION SHEET

PROJECT TITLE: **TOWNSVILLE BUSHFIRE PREPAREDNESS SURVEY**

This bushfire survey is being conducted by the Centre for Disaster Studies at James Cook University in conjunction with Queensland Fire and Emergency Service (QFES). Dr Yetta Gurtner is the principal investigator of this research.

This survey will contribute to research to improve the effectiveness of bushfire management agencies in managing the risks from bushfires, and improve understanding of how different communities of Townsville construct and perceive bushfire risk in their area. The target communities for this survey are people who live in Nome (Alligator Creek, Nome, Julago and Brookhill area), Magnetic Island, and the Bluewater area (including Lynam, Blue Hills and Toolakea).

This research is not an evaluation of fire service provision or an indication of an elevated fire risk in any of these communities. The project will lead to a more complete understanding of how people who live in different peri-urban and rural areas perceive risk and how fire service provision works in a particular region.

Your participation in this survey is appreciated and the information collected will be anonymous, it will be used for research publications and reports. You will not be identified in any way in these publications.

If you agree to be involved in the study you must be over 18 and live within Nome (Nome, Alligator Creek, Julago, and Brookhill area), Magnetic Island or the Bluewater area (Bluewater, Lynam, Blue Hills and Toolakea) of Townsville.

You are invited to participate in the completion of a paper based questionnaire regarding Bushfire Preparedness survey to be returned in a pre-paid envelope to JCU. The completion of this questionnaire takes approximately 10-15 minutes of your time. The questionnaire data you provide will be submitted and analysed using the online platform SurveyMonkey.

Taking part in this study is completely voluntary and you can stop taking part in the study at any time without explanation or prejudice. If you choose to withdraw data after submitting the survey it cannot be deleted as it is anonymous.

If you have any questions about the study, please contact the Principal Investigator – Dr Yetta Gurtner

Principal Investigator:

Dr Yetta Gurtner
Centre for Disaster Studies
College of Science and Engineering
James Cook University
Townsville Queensland 4811
Phone: (07) 4781 5617 Email: yetta.gurtner@jcu.edu.au

If you have any concerns regarding the ethical conduct of the study, please contact:

Human Ethics,
Research Office
James Cook University,
Townsville Queensland 4811
Phone: (07) 4781 5011 Email: ethics@jcu.edu.au

If you are experiencing emotional distress at any stage please contact Lifeline Telephone Counselling 13 11 14 or any of your local community support services as advised by The Department of Communities, Disability Services and Seniors

Cairns - Townsville - Brisbane – Singapore
CRICOS Provider Code 00117J

Figure 32 Participant Informed Consent Sheet

INFORMED CONSENT FORM

PRINCIPAL INVESTIGATOR	**Dr Yetta Gurtner**
PROJECT TITLE:	**Townsville Bushfire Preparedness Survey**
COLLEGE:	**College of Science and Engineering**

INFORMED CONSENT

I understand that the aim of this research study is to contribute to research to improve the effectiveness of bushfire management agencies in managing the risks from bushfires, and improve understanding of how different communities of Townsville construct and perceive bushfire risk in their area. The results of this research are intended to assist the development of "best practice" bushfire management strategies for peri-urban and rural communities. I consent to participate in this project, the details of which have been explained to me, and I have been provided with the relevant project information sheet to keep.

I understand that my participation will involve the completion of a paper-based survey to be returned in a pre-paid envelope to JCU, and I agree that the researcher may use the results as described in the information section.

I acknowledge that:

- taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;
- that any information I give will be kept strictly anonymous and that no names will be used to identify me with this study without my approval;
- if I choose to withdraw data after the survey has been submitted online it cannot be deleted as it is anonymous.

(Please tick to indicate consent)

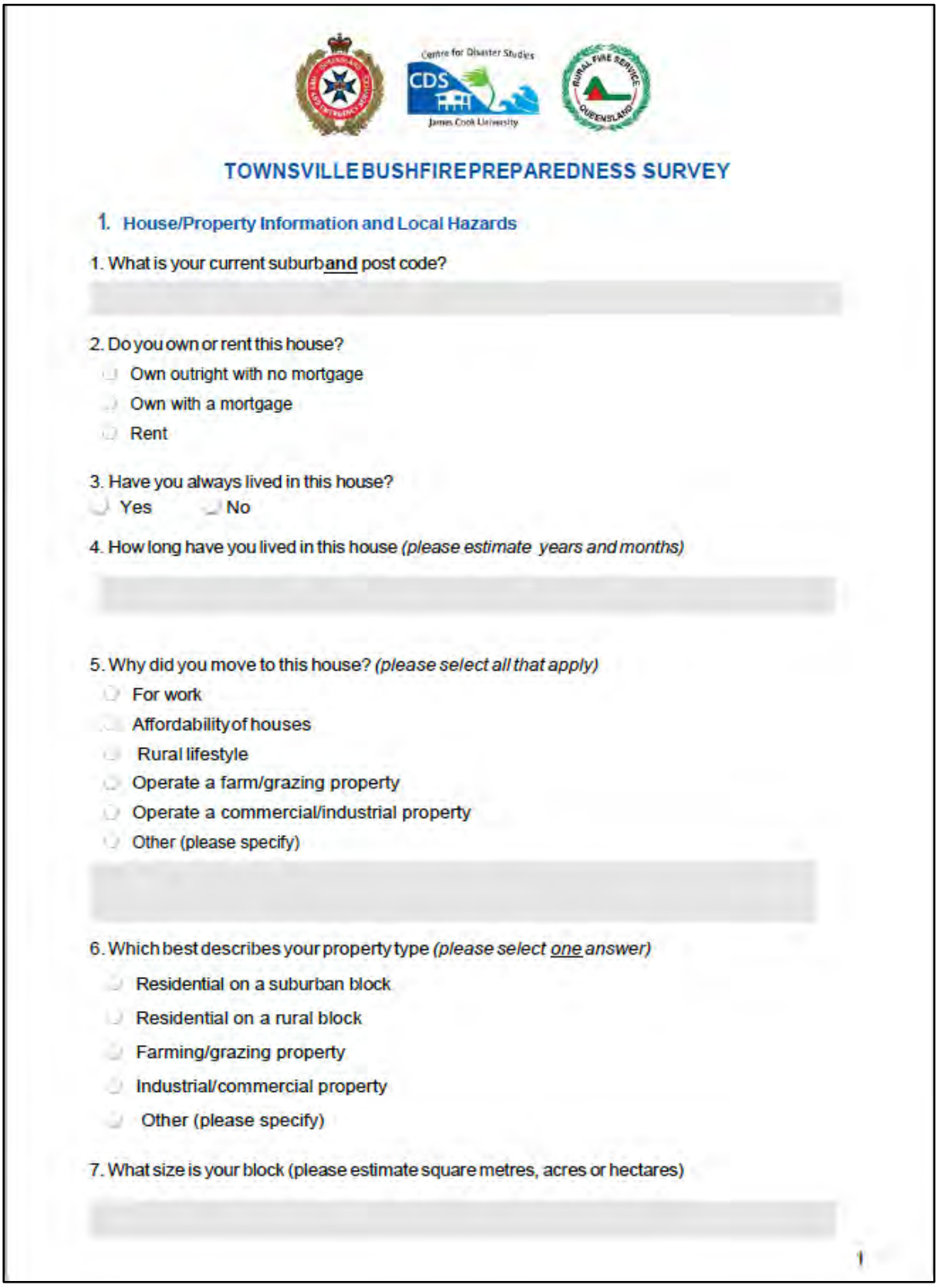
I consent to complete a questionnaire		**Yes**		**No**

Name: *(printed)*	
Signature:	**Date:**

This form is to be returned with the completed copy of your survey – thank you for your time and participation.

Cairns - Townsville - Brisbane – Singapore
CRICOS Provider Code 00117J

Figure 33 The Townsville Bushfire Preparedness Survey



TOWNSVILLE BUSHFIRE PREPAREDNESS SURVEY

1. House/Property Information and Local Hazards

1. What is your current suburb and post code?

2. Do you own or rent this house?
- Own outright with no mortgage
- Own with a mortgage
- Rent

3. Have you always lived in this house?
- Yes
- No

4. How long have you lived in this house *(please estimate years and months)*

5. Why did you move to this house? *(please select all that apply)*
- For work
- Affordability of houses
- Rural lifestyle
- Operate a farm/grazing property
- Operate a commercial/industrial property
- Other (please specify)

6. Which best describes your property type *(please select one answer)*
- Residential on a suburban block
- Residential on a rural block
- Farming/grazing property
- Industrial/commercial property
- Other (please specify)

7. What size is your block (please estimate square metres, acres or hectares)

8. What is this house made of *(please select all that apply)*

- Wood
- Brick
- Fibro
- Cement block
- Other (please specify)

9. How old is the house? *(please estimate years)*

10. What features do you value most in your about your property/locality?

	Very important	*Important*	*Neutral*	*Not important*	*Very unimportant*
Peace and quiet					
Space					
Trees and bushland					
Small community					
Rural lifestyle					

Other (please specify)

11. What natural hazards are of concern to you in your locality?

	Very important	*Important*	*Neutral*	*Not important*	*Very unimportant*
Cyclone					
Bushfire					
Flooding					
Storm surge					
Landslide					

Other (please specify)

2

12. When you were deciding to purchase or rent your current property how important were these hazards to you?

	Very important	*Important*	*Neutral*	*Not important*	*Very unimportant*
Cyclone	○	○	○	○	○
Bushfire	○	○	○	○	○
Flooding	○	○	○	○	○
Strom surge	○	○	○	○	○
Landslide	○	○	○	○	○

Other (please specify)

13. Do you have insurance on your property which includes loss from natural hazards?

○ Yes ○ No ○ Don't know

3

2. Personal Bushfire Experience

14. How do you rate the bushfire hazard in your locality?

Very high *High* *Moderate* *Low* *Very Low*

15. How do you rate the bushfire hazard to your house?

Very high *High* *Moderate* *Low* *Very Low*

16. Has anyone you know (friend, relative, colleague) suffered due to a bushfire?

Yes No

If yes, please provide details

17. Have you ever personally experienced a bushfire before?

Yes No

If no skip to question 21

If yes, please provide details (when and where)

18. Did you feel personally threatened by the bushfire?

Yes No

If yes, please describe how you felt threatened?

19. Did you feel your property and/or house was threatened by the bushfire?

Yes No

If yes, please describe how you felt your property or house was threatened?

20. What did you learn from your experience with the bushfire?

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3. Local Bushfire Awareness

21. For hazards including bushfires, please indicate how much you agree or disagree with the following statements

	Strongly agree	*Agree*	*Neutral*	*Disagree*	*Strongly disagree*
I believe my neighbours are at risk	○	○	○	○	○
I am concerned when my neighbours do not clean up their property	○	○	○	○	○
I talk to my neighbours about the importance of cleaning up their property	○	○	○	○	○
People in my locality would recover from a natural hazard such as bushfire in a short time	○	○	○	○	○

22. When is bushfire season in your locality? Please write which month/s

23. What prompts you to think about preparing for bushfires? (*please select all that apply*)

- ○ News media about bushfires burning elsewhere
- ○ Social media post/s
- ○ Display by fire brigade in schools or shopping centers
- ○ Pamphlets or information in the mail
- ○ Uncontrolled bushfires burning in your locality
- ○ Controlled hazard reduction burns in your area
- ○ Media campaign
- ○ None, I don't prepare
- ○ Other (please specify)

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24. What are the most important actions you undertake to prepare for bushfires on your property? *(please select all that apply)*

- Clear rubbish from the yard
- Prepare fire break around property
- Cut long grass
- Remove branches and undergrowth around the house
- Clean leaves from gutters
- Check water supply and hoses
- Prepare evacuation plan
- None, I don't prepare
- Other (please specify)

25. Are there adequate services for you to dispose of rubbish in your locality?

Yes No

Any comments?

26. Who would you contact if you wanted to do some burning on your property?

- Local fire brigade
- Fire warden
- Police
- Local council
- Other (please specify)

27. What time of year do you think controlled/hazard reduction burning should occur in your area? *(please write which month/s)*

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28. Please indicate how much you agree or disagree with these statements on controlled/hazard reduction burning?

	Strongly agree	*Agree*	*Neutral*	*Disagree*	*Strongly disagree*
It makes the area safer from bushfires	○	○	○	○	○
The smoke causes respiratory problems	○	○	○	○	○
It's necessary to maintain plant growth	○	○	○	○	○
I'm concerned for the wildlife	○	○	○	○	○
Some people restart the fire afterwards	○	○	○	○	○
Some people bring their own rubbish to the controlled burn	○	○	○	○	○

29. Are you aware of a controlled/hazard reduction burns in your area over the last two years?

○ Yes ○ No

If yes, how did you receive information about the controlled burn prior to the event

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30. From which sources do you receive the most useful information about preparing for bushfires? *(please select all that apply)*

- Pamphlet in mail
- Meeting with Fire Brigade members
- Information brought home by children from school
- TV or radio
- Newspaper
- Internet/webpage
- Social media (Twitter, Facebook, Instagram etc)
- Information from council
- Neighbors/friends in the community
- Mobile app
- None
- Other (please specify)

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4. Responsibility for Bushfire Management

31. What areas in your locality are you most concerned about as a bushfire hazard?

32. Who do you believe is responsible for maintaining the following? *(Please select your answer)*

	Rural Fire Brigade	*Property owner*	*Local council*	*Uncertain*	*Other*
Fire breaks around property	☐	☐	☐	☐	☐
Keep overgrown bushland and creek beds clean	☐	☐	☐	☐	☐
Clear overgrown properties	☐	☐	☐	☐	☐
Remove rubbish from public areas	☐	☐	☐	☐	☐
Maintain access for the fire brigade to property	☐	☐	☐	☐	☐

33. What level of enforcement should there be to improve the maintenance of properties for bushfire hazards?

	More enforcement	*Current level of enforcement*	*Less enforcement*
Local council	○	○	○
State government	○	○	○
Federal government	○	○	○

34. Please indicate how much you agree or disagree with the following statements for your area

	Strongly agree	*Agree*	*Neutral*	*Disagree*	*Strongly disagree*
Water supply points are adequate for bushfires	○	○	○	○	○
Grass in public areas is slashed	○	○	○	○	○
Rubbish tips are readily available	○	○	○	○	○

35. Which type of fire service would come if you rang 000 about a fire in your locality?

- ○ Local Urban or Auxiliary Brigade
- ○ Local Rural Fire Brigade
- ○ Queensland Parks and Wildlife Service
- ○ Other (please specify)

36. Are the members of the fire brigade in your locality?

- ○ Paid full time
- ○ Paid part time
- ○ Voluntary/unpaid
- ○ Don't know

37. Are you or have you ever been actively involved in a volunteer or community organisation?

○ Yes ○ No

If yes, please provide details

38. What reasons would prevent you from being actively involved in a volunteer community organisation? (please select all that apply)

- ○ I'm not interested
- ○ I'm too busy with work
- ○ I'm too busy with other activities
- ○ I haven't thought about it
- ○ Nobody has asked me
- ○ Other (please specify)

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39. Are you and any member of your household part of a Queensland firefighting organisation?

- No
- Queensland Fire and Rescue Service (QFRS)
- Rural Fire Service(RFS)
- If yes, please provide details

40. Are you interested or would you like further information about getting involved in a firefighting organisation?

- No
- Queensland Fire and Rescue (QFRS)
- Rural Fire Service (RFS)
- Other (please specify)

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5. Basic demographic details

41. What is yourgender?

Male Female Other Prefer not toanswer

42. What is your age?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+
- Prefer not to answer

43. What is your highest level of education completed?

- Primary school
- Up to year 10
- High school senior certificate
- TAFE or trade school certificate
- University degree
- Prefer not to answer

44. Do you have children under the age of 18 regularly living in the household?

Yes No

45. Which best describes your occupation?

- Professional/management
- Technician/skilled trades work
- Clerical and administrative work
- Sales
- Machinery operator/driver
- Labourer
- Government
- Self employed
- Household manager/home duties
- Retired

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- Student
- Volunteer
- Carer
- Other

46. Which of the following best describes your employment?

- Full time
- Part-time
- Casual/temporary
- Student
- Retired
- Not currently working

47. If you had to return to your house or property at short notice due to the threat of a natural hazard (such as a bushfire) how long would it take to travel from your regular place of employment/occupation?

Thank you for your time and interest in completing this survey. If you wish to obtain further information about this project or have any questions regarding this survey, please contact the principal investigator:

Dr. Yetta Gurtner
Centre for Disaster Studies College of Science and Engineering James Cook University
Townsville Queensland 4811
Phone: 4781 5617
Email: yetta.gurtner@jcu.edu.au

If you have any questions, would like further information, or are interested in joining your local Rural Fire Brigade, please access the following link or email:

https:/www.ruralfire.qld.gov.au/Pages/Home.aspx

Email: RFSQ.Townsville@qfes.qld.gov.au

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Figure 34 Participant invitation provided on social media

SOCIAL MEDIA INVITATION

Admin please delete if not allowed

Given the greater exposure of peri-urban/rural Townsville to bushfire hazards (compared to urban residents) the Centre of Disaster Studies in conjunction with the Queensland Fire and Emergency Services is conducting an online survey to assess Townsville Bushfire Preparedness in the areas of:

Nome (including Alligator Creek, Nome, Julago and Brookhill)

Magnetic Island

Bluewater (including Lynam, Blue Hills and Toolakea)

If you are a resident of any of these locations (aged 18 or over) I was wondering if you would be willing to participate and/or distribute my Townsville Bushfire Preparedness Survey (this has received full human ethics approval Ref. .....)

This research is not an evaluation of fire service provision or an indication of an elevated fire risk in any of these communities. The project will lead to a more complete understanding of how people who live in different peri-urban and rural areas perceive risk and how fire service provision works in a particular region. The survey data will be used by fire service providers to develop improved targeted strategies and resource use for the communities they support.

If you would like further information or to participate please click the link provided. You may exit the survey ay anytime without prejudice – data is not recorded unless the survey is submitted. All information remains anonymous and I would be happy to address any concerns. Please also feel free to distribute to anyone you believe may be interested.

https://www.surveymonkey.com/r/Bushfireaware

If you are experiencing emotional distress at any stage please contact Lifeline Telephone Counselling 13 11 14 or any of your local community support services as advised by The Department of Communities, Disability Services and Seniors

Thanks

Dr Yetta Gurtner – Centre for Disaster Studies

Figure 35 Poster invitation to survey