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JANUARY 2020 NSW BUSHFIRES STUDY

Bushfire impact research - NSW South Coast

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Risk Frontiers

Version	Release history	Date
1.0	Initial release of document	18/06/2020

Publisher:
Bushfire and Natural Hazards CRC

June 2020

Citation: George S, O'Brien J, Hussein S & van Leeuwen J (2020) January 2020 NSW bushfires study, Bushfire and Natural Hazards CRC, Melbourne.

Cover: Post 2019 Banyabba bushfires. Source: Lukas Gibb

TABLE OF CONTENTS

ACKNOWLEDGMENTS

This research was funded through the Bushfire and Natural Hazards Quick Response Fund.

INTRODUCTION

In late January, 2020, Risk Frontiers with the support of the BNHCRC deployed a team to the NSW South Coast region. Areas surveyed include Moruya, Mogo, Malua Bay, Rosedale, the Catalina area of Batemans Bay and Lake Conjola. The majority of damage occurred on December 31, 2019 as catastrophic weather conditions (extreme temperatures and high magnitude winds) intensified existing fire fronts. The conditions transported large quantities of embers into vulnerable communities, destroying hundreds of residential and several commercial buildings. In total, the survey identified 426 bushfire affected properties, most of which were destroyed. Industries/Infrastructure affected included: Bowling / Services club, unit block (12 units), Heritage Park, industrial complex with numerous businesses, extensive damage to electricity infrastructure (power poles and wires along the Princes Highway). This report complements our report for northern NSW (Risk Frontiers, 2020).

BUILDING AGE AND RESILIENCE

As the 2019/2020 fire season has progressed, the scale of damage and losses experienced across the country has engendered a growing interest in evaluating the resilience of buildings to bushfires. Aspects of buildings such as age, performance of construction materials and a structure's vulnerability due to its proximity to bushland were the key focus of the NSW South Coast survey. To evaluate the performance of building archetypes impacted by fire, the Insurance Council of Australia (ICA) has charted the year of construction of over 25,000 residential buildings located within bushfire impacted areas across four states (Figure 1). Categories range from Old Colonial (pre-Victorian) to post-2009, when bushfire building standards began to be improved and were mandated in certain locations.

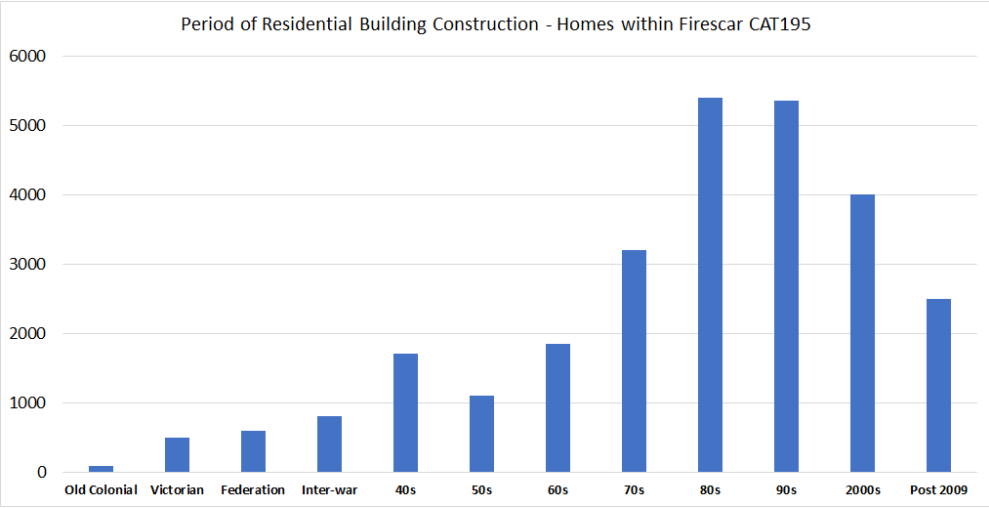

FIGURE 1: THE PERIOD OF CONSTRUCTION FOR OVER 25,000 BUILDINGS LOCATED WITHIN THE CURRENT BUSHFIRE IMPACTED AREAS ACROSS FOUR STATES. MEDIAN YEAR OF CONSTRUCTION IS 1977 AND ONLY 9.5% OF BUILDINGS WERE CONSTRUCTED AFTER 2009 UNDER MORE RIGID BUILDING STANDARDS. SOURCE: INSURANCE COUNCIL OF AUSTRALIA, 2019.

The ICA data shows that only 9.5% of residences were constructed post-2009, after changes were made to Australian Standard 3959 to ensure that new buildings in bushfire prone areas were safer and more likely to survive a fire

(BNHCRC, 2019). It is apparent that the scale of residential losses occurring in this fire season presents a small window of opportunity to conduct further damage surveys, prior to recovery and debris removal, and would provide a considerable 'post-2009' cohort to assess building performance and inform future design. In the near future, further analysis will be undertaken by Risk Frontiers to establish the construction age of the South Coast properties to further existing research.

OBSERVATIONS OF DESTRUCTION / DAMAGE – CONSTRUCTION MATERIALS

The survey team recorded aspects of fire affected buildings such as construction materials and damage ratios (destroyed / partially damaged). The field observations from the South Coast survey are compared to those of Rappville (2019) and the Tathra (2018) official losses and appear in Figure 2.

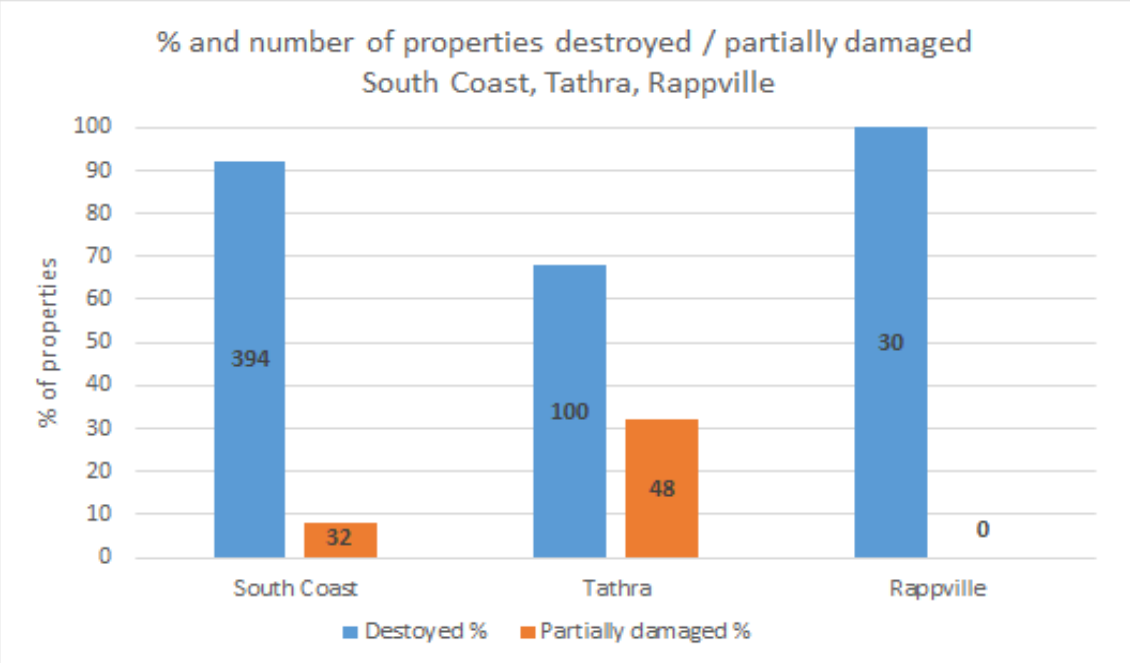

FIGURE 2: THE PROPORTION AND NUMBER (IN COLUMN) OF BUILDINGS CATEGORISED AS DESTROYED / PARTIALLY DAMAGED FROM THE SOUTH COAST, RAPPVILLE (2019) DAMAGE SURVEYS USING A BUILDING FOOTPRINT METHOD SO PARTIALLY DESTROYED REFERENCES THE BUILDING, NOT THE LOT. THE SAMPLING METHOD FIGURES FROM THE TATHRA FIRE IN 2018 ASSIGNED PARTIALLY DAMAGED ON THE PROPORTION OF THE WHOLE LOT - THAT IS, IF A SHED WAS DESTROYED BUT THE HOUSE WAS UNDAMAGED, THEN A PARTIALLY DAMAGED RATING WAS ASSIGNED. THE DATA SHOWS THAT ONCE A BUILDING IS ALIGHT, THE LIKELIHOOD OF IT BEING DESTROYED ARE HIGH (TATHRA 68%), NEARLY CERTAIN (SOUTH COAST 92%) AND VIRTUALLY CERTAIN (RAPPVILLE 100%). THE NUMBER OF PROPERTIES DESTROYED ALSO INDICATES THE DIFFERENCE IN SCALE OF THE FIRE EVENTS BETWEEN LOCATIONS.

The South Coast findings reinforce those developed from the Rappville (Risk Frontiers, 2020) and Tathra surveys, in that, once a building catches fire, regardless of construction material, it will likely be totally destroyed. The official Tathra figures have 68% of all fire affected premises as being ultimately destroyed. Data collected from the South Coast and Rappville surveys provides much stronger indications of this trend, where 92% and 100% respectively, of the buildings observed were destroyed. (The Rappville and South Coast results represent only those properties located and observed, not all fire affected properties).

In terms of building specifics, the South Coast survey provided numerous examples of fire affected residences, primarily constructed of 'nonflammable' materials (brick and blockwork (piers and walls)). These structures demonstrated

some resilience to the fire, at times remaining wholly or partially intact. However, the remaining material comprising the premises (structural roof / wall timbers internal walls and house contents), once alight, would ultimately render the entire building to be unsalvageable (destroyed). Timber beams supporting house roofs and carports were uniformly level on the ground (as though dropped). Metal framed buildings (e.g. sheds) and structural elements (e.g. lintels) did not perform well - failing due to extreme heat and leading to the building warping and impacting brick/masonry when collapsing. There were numerous examples of vehicles completely burnt out in front and rear yards and some isolated examples of aluminium boats that had undergone some degree of melting.

At partially damaged properties, the building features most often impacted were constructed from timber such as external stairs, decking or to the side of buildings which were a fascia material not further described. There were numerous examples of destroyed properties categorised as 'asbestos contaminated' though this was less common than during the Rappville survey where asbestos was present at over 50% of properties. The large number of these assessments of asbestos contamination were speculative based on observations and erred on the side of caution with further assessment and testing usually noted as necessary. The possible exception to this would be Rosedale which experienced near total destruction and where homes predominantly appeared older, often constructed using fibro or sheeting and were surrounded by bushland.

STATISTICAL DEPENDENCE OF BUSHFIRE RISK ON DISTANCE TO BUSH AND THE INFLUENCE OF EMBER ATTACK

Previous field research conducted by Risk Frontiers has established that proximity to bushland is a significant factor in determining a building's vulnerability. Figure 3 depicts bushfire damage based on aggregated data from recent major bushfires and shows the percentile of destroyed buildings in relation to the most likely ignition source (bushland).

As with previous fires studied, Figure 3 confirms the significant role that 'proximity to bushland' played in the South Coast losses where approximately 38% of destroyed buildings were situated within 1 metre of surrounding bush. The average distance from bushland of all 426 properties surveyed was 55 metres (satellite imagery). However, a feature not captured in Figure 3, South Coast data, yet evident in the Rappville and Duffy examples, is the impact of extreme conditions and the capacity of embers to propagate fire over large distances. Witness accounts from fire fighters and locals have described embers being transported by extreme winds across Lake Conjola, for distances greater than 1km. The South Coast survey data would appear to confirm such reports, as two properties surveyed were >1.3km from bushland and 73 were located >100 metres from bush.

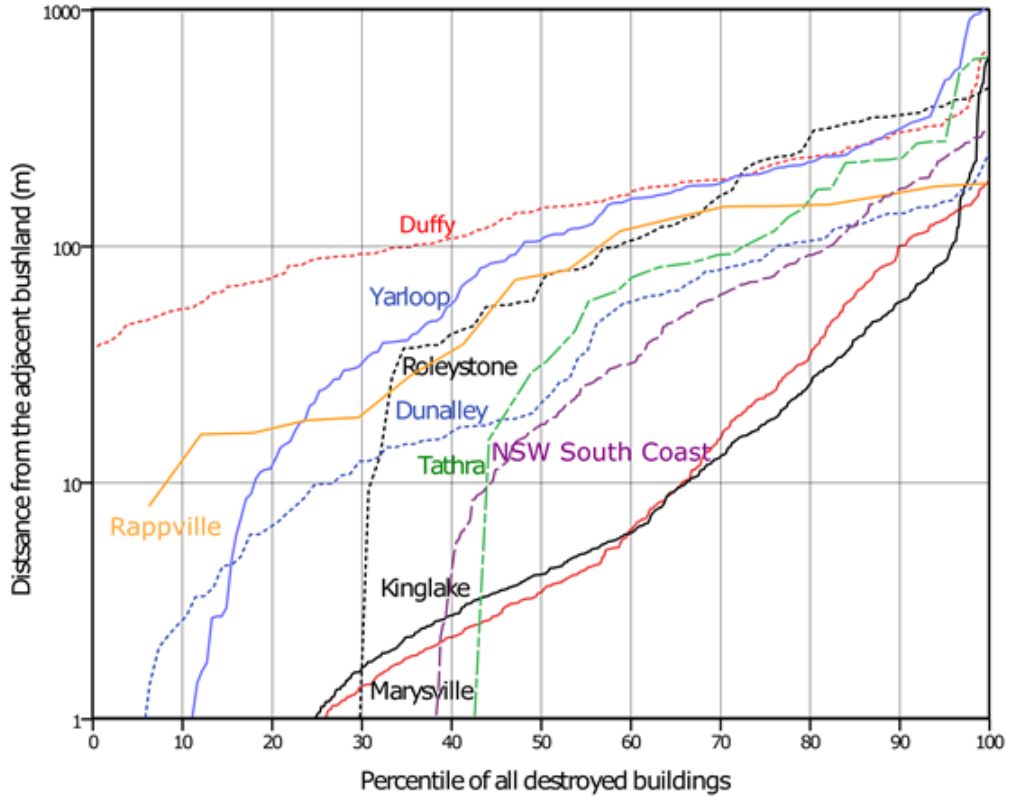

FIGURE 3: CUMULATIVE DISTRIBUTION OF BUILDINGS DESTROYED IN RELATION TO DISTANCE FROM NEARBY BUSHLAND FOR RECENT MAJOR EVENTS.

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