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Supplementary material

'Any prediction is better than none'? A study of the perceptions of fire behaviour analysis users in Australia

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Australian FBAN User Survey 2020

Survey design by: Timothy Neale, Matteo Vergani, Chloe Begg

Q1 Over the 2018-2019 and 2019-2020 bushfire seasons, your **primary** operational role in bushfire response was: State Controller; State Agency Controller; State Duty Officer; Regional Controller; Incident Controller; Planning Officer (SCC/RCC/ICC); Operations Officer (SCC/RCC/ICC); Intelligence/Situation Officer (SCC/RCC/ICC); Public Information Officer/Warnings Officer (SCC/RCC/ICC); Other (please specify)

Q2 Over the 2018-2019 and 2019-2020 bushfire seasons, you **primarily** performed this operational role in: Australian Capital Territory; New South Wales; South Australia; Tasmania; Victoria; Western Australia

Q3 You have been in this operational role for: 0-2 years; 3-5 years; 6-10 years; 11-20 years; >20 years

Q4 You have had an operational role in bushfire response for: 0-2 years; 3-5 years; 6-10 years; 11-20 years; >20 years

Q5 You have completed Fire Behaviour Analyst (FBAN) training: yes; no

Q6 How would you rate your knowledge of fire behaviour analysis and fire behaviour science compared to others engaged in bushfire response? Very high; high; average; low; very low

Please answer these three quick questions to test your knowledge of fire behaviour science. Please do not search for answers online. The answers will not be identifiable and will not be disclosed to anyone.

Q7 A fire's rate of spread will generally increase by what percentage with every 10 degrees of upward slope? 10%; 50%; 75%; 100%; I don't know

Q8 If you compared a forest fire with 6,000 kW/m intensity against a grassfire with 6,000 kW/m intensity, would you expect the grassfire's rate of spread to be: a little faster; a little slower; a lot faster; a lot slower; about the same

Q9 The 1977 McArthur Mk5 Forest Fire Behaviour Model **does not** include the following inputs: 10-metre open wind speed; Fine fuel moisture; Air temperature; Drought factor; Relative humidity; I don't know

The following questions ask about your experience of predictive services personnel (i.e. Fire Behaviour Analysts or FBANs) and outputs (i.e. fire spread prediction maps) when deployed in your operational role.

Q10 When deployed, how often do you consult predictive services personnel or outputs: Hourly or more frequently; Daily; Weekly; Monthly or annually; Never

Q11 When seeking knowledge about a given fire's potential behaviour, you prefer to (please rank all options): consult an FBAN directly in person or via telephone; consult a live or recorded

briefing; consult a mapped prediction printed on paper; consult a mapped prediction sent via email, shared directory, or online platform; other (please specify)

Q12 Please rate your agreement with the following on a scale from "strongly agree" to "strongly disagree": The predictive services you receive from FBANs meet your needs in terms of: accuracy; quality; timeliness; clarity

Q13 Please rate your agreement with the following statements on a scale from "strongly agree" to "strongly disagree": Predictive services information and outputs are of high value to my role; Predictive services information and outputs are of higher value to people in other roles than to me

Q14 In your opinion, predictive services are most valuable for which operational roles? Please rank **at least your top three options** according to relative value (1 being highest value, 9 being lowest value): State Controller; State Agency Controller; State Duty Officer; Regional Controller; Incident Controller; Planning Officer (SCC/RCC/ICC); Operations Officer (SCC/RCC/ICC); Intelligence/Situation Officer (SCC/RCC/ICC); Public Information Officer/Warnings Officer (SCC/RCC/ICC); Other (please specify)

Q15 When consulting predictive services about an existing fire event, you are typically most interested in (please rank all options): the potential rate of spread; the potential impact zone; the potential impact on assets and values; the potential for dynamic fire behaviour (e.g. pyrocumulonimbus, fire-induced thunderstorm)

Q16 When consulting predictive services about short-term fire hazard (i.e. the next 1-2 days), you are typically most interested in (please drag and rank all options): potential rates of spread; potential times of greatest hazard; potential places of greatest hazard; potential for suppression to be effective

Q17 For decision-making in your role, it is very important that you know (please drag and rank all options): potential fire behaviour over the next 6-12 hours; potential fire behaviour over the next 12-24 hours; potential fire behaviour over the next 2-4 days

Q18 In your opinion, Incident Control Centres should (please choose preferred option): always be staffed with an FBAN; only be staffed with an FBAN by request of the Incident Controller; have an FBAN on call in the State Control Centre; other (please specify)

Q19 When consulting mapped predictions, you tend to (please choose): read the accompanying report; not read the accompanying report

The following questions ask you to consider hypothetical bushfire response scenarios. Please read each scenario carefully, answer the following questions and provide a clear explanation of your response. The more detail you provide, the better.

Q20 A fire has started near a township. In the control centre, the FBAN has conflicting information about where the fire started and where the fire is currently located, and they do not know when further intelligence will become available. The Incident Controller has asked the FBAN to produce a prediction of the fire's potential spread 'as soon as possible'. The FBAN refuses to give the Incident Controller any spread predictions until they are confident their intelligence is reliable and verified. Please assess the FBAN's decision using the following scale: very appropriate; appropriate; not appropriate at all

Q21 Please explain your response:

Q22 There is a campaign fire in a mountain range near a town. A bad fire weather day is expected tomorrow and the Incident Controller has asked the FBAN to advise whether the town will be directly affected. The FBAN produces a fire spread prediction map and explains that it is 'possible but not highly likely' that the township will be affected by spotting from the fire.
If you were the Incident Controller, how would you likely utilise this map (Extremely likely = 1 to Extremely unlikely = 7)? Hold a town meeting and show the map to residents; Prepare a Watch and Act for the town; Publish the prediction map on social media and send it to news media; Send the prediction map to firefighting contacts via email and/or text message

Q23 Please explain your responses:

Q24 Two fires (X and Y) have started near neighbouring areas of high ecological significance. A local fire manager calls the Incident Controller and says that they think the potential impact of Fire X is significantly greater than Fire Y. An FBAN in the State Control Centre tells the Incident Controller that their predictions show the potential impact of Fire Y is significantly

greater than Fire X. If you were the Incident Controller, what percentage of your firefighting resources would you deploy to (the sum must be 100): Fire X; Fire Y

Q25 Please explain your response:

Q26 An FBAN tells you that, based on their bushfire simulations, it is ‘probable’ that a fire will reach Town B. Based on this information, the probability of the fire reaching Town B is approximately (please select your answer using the slider 0-100):

Q27 An FBAN’s fire spread prediction map of the next 12 hours shows that National Park C is within a fire’s potential spread. A Planning Officer asks the FBAN about the probability of the prediction and the FBAN replies that the impacts are ‘likely’. Based on this information, the probability of the fire impacting National Park C is approximately (please select your answer using the slider 0-100):

Q28 A Warnings Officer is adjusting the warning polygon for a current fire and asks an FBAN to show them any areas where it is 'possible' that the fire might affect in the next 24 hours.

Based on this information, the FBAN should look for potential fire impacts with a probability above what probability (please select your answer using the slider 0-100)?

The following questions focus again on your experience of predictive services personnel (i.e. Fire Behaviour Analysts or FBANs) and outputs (i.e. fire spread prediction maps) when deployed in your operational role.

Q29 For decision-making in your role, it is important that you know (Extremely important = 1 to Not at all important = 5): The 'most extreme' or 'worst case' potential fire behaviour; The 'likely' potential fire behaviour; The 'highly likely' potential fire behaviour

Q30 In your opinion, a fire behaviour prediction is 'wrong' when (please select the percentage using the slider): The actual fire spread matches the predicted fire spread below [x] percent (0-100); The input data used to make the prediction is below [x] percent certainty (0-100)

Q31 Please explain your responses:

Q32 The most trustworthy method for predicting fire behaviour is (please drag and rank the options): Consulting a weather forecast; Manual prediction; Simulated prediction; Ensemble prediction; Other (please specify)

For the following three questions, please weight your preference attributing a higher score to the most important or relevant factors. Note: the total sum of your answers must be 100 for each question.

Q33 What are the most important skills for an FBAN to have (please drag and rank the options): Fireground experience; Operational experience using fire behaviour tools; Knowledge of fire behaviour science; Knowledge of computer programming; Interpersonal communication skills; The ability to improvise based on intuition; The ability to follow official rules and guidelines; Other (please specify)

Q34 It is most important for FBANs to (please drag and rank the options): Produce a standard set of products for all users; Provide predictive intelligence as requested by SCCs/RCCs; Provide predictive intelligence as requested by the public; Provide predictive intelligence as requested by ICCs

Q35 You prefer to receive information about potential fire behaviour from (please drag and rank the options): Someone I have worked with previously; Someone with academic expertise in fire

science; Someone with a long career in firefighting; Someone who complies with all official rules and guidelines

And finally, two questions about you:

Q36 What is your age? 20 to 29; 30 to 39; 40 to 49; 50 to 59; over 60

Q37 What is your gender? Male; Female, Non-binary; Other (please specify)