HAZARD NOTE

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TOPICS IN THIS EDITION | DECISION MAKING | EMERGENCY MANAGEMENT | MULTI-HAZARD

SUPPORTING EMERGENCY MANAGEMENT TEAM PERFORMANCE DURING EMERGENCIES

Above: THIS RESEARCH DESCRIBES THE KEY TASKS COGNITIVE AID THAT CAN BE USED TO SUPPORT STATE AND REGIONAL-LEVEL EMERGENCY MANAGEMENT TEAMS DURING AN EMERGENCY. PHOTO: SOUTH AUSTRALIA COUNTRY FIRE SERVICE.

ABOUT THIS PROJECT

This research was conducted by CQUniversity and the South Australian Country Fire Service, in partnership with the Bushfire and Natural Hazards CRC and Fire Rescue Victoria, as part of the *Improving decision making in multi-team environments* project. This *Hazard Note* presents the Key Tasks Cognitive Aid – one of six tools developed by this project. The Aid is a checklist designed to support regional and state-level emergency management team operations.

Hazard Note 33 discusses two team management tools developed earlier by A/Prof Chris Bearman and colleagues – the Emergency Management Breakdown Aide Memoire and the Team Process Checklist.

Hazard Note 73 discusses two strategic decision-making tools developed by A/Prof Benjamin Brooks and Dr Steven Curnin – the Psychological Safety Checklist and the Cognitive Bias Aide Memoire.

Hazard Note 92 presents the Emergency Management Non-Technical Skills (EMNoTS) tool, also developed by Dr Peter Hayes and A/Prof Bearman, which further supports emergency management teamwork.

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SUMMARY

State and regional-level emergency management teams are often required to work under considerable pressure and heavy workloads. On occasion, these pressures can overwhelm individuals or the team and disrupt the ability to function effectively, leading to key tasks and functions being neglected. The Key Tasks Cognitive Aid supports state and regional-level emergency management teams by providing a checklist of key tasks that need to be completed during an emergency.

You can access all tools developed by this project, including the Key Tasks Cognitive Aid, at www.bnhcrc.com.au/driving-change/tools, under the 'Teamwork tools' heading.

BACKGROUND

State and regional-level emergency management teams play a central role in coordinating the response to thousands of incidents each year. The demands on these teams in large-scale emergencies can be considerable. They can be required to coordinate multiple incidents, make sense of information from multiple disparate sources, assist in the provision of public information and warnings, and liaise with numerous stakeholders with different information needs.

These demanding conditions can lead to very high workload, fatigue and stress, which impacts on both individual and team performance (Bearman et al., 2015; Brooks et al., 2018; Owen et al. 2014). It is important to better support people in these roles so that they can maintain effective performance under these conditions. One way to do this is to provide simple checklists and cognitive aids that people can refer to to ensure that critical tasks are not being neglected.

Checklists and cognitive aids are now routinely used in many different safety critical industries to help people reduce errors and omissions, and to improve the speed and fluency of performance. The use of cognitive aids is particularly beneficial for people working under conditions of stress and fatigue, as stress and fatigue have been shown to adversely affect an individual's thinking and perceptual (that is, cognitive) processes, making it more likely that critical tasks will be neglected.

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH

Since 2015, the research team has been developing tools that support and enhance the performance of individuals and teams in emergency management. The Key Tasks Cognitive Aid featured in this *Hazard Note* is the sixth tool developed by this research team (see the breakout box on page 1 for how to access all six tools).

The Aid was developed using a hierarchical task analysis – an analytical technique that can be used to identify fundamental goals, information processing and cognitive activities that underpin complex activities. This is done by identifying critical activities undertaken by an individual or team and clustering these into discrete tasks and subtasks, and identifying typical sequencing. These tasks can then be assessed for effectiveness or possible improvements.

To develop the Aid, researchers constructed initial task analyses using observations of state and regional coordination centres, and through discussions with agency personnel experienced in working at the state and regional levels. These analyses were converted into a preliminary observation tool, which was developed, refined and evaluated in an iterative cycle during a set of exercises with four regional coordination centres (RCCs) using a human-centred design method.

The exercises required each centre to coordinate the response to a large-scale simulated fire. Two state-level observers evaluated the performance of each regional coordination centre and used the preliminary observation tool to assist in this assessment. The observers considered the extent to which the tasks were undertaken and made comments alongside the items if they observed something noteworthy. At the end of each exercise, the observers met to discuss the tool, how well it captured the key activities, and how it could be improved. The review of the tool at the end of each exercise led to modification of tasks and the amendment of wording to better describe the tasks.

The tool was further developed and evaluated through a set of interviews with six subject matter experts from two additional emergency management agencies. Each of the experts was an experienced state or regional-level controller. The interviewees reviewed the state and regional task analyses and suggested further refinements.

RESEARCH FINDINGS

A set of tasks and subtasks was identified for the state and regional level. Two task analyses were developed, one for the state and one for the regional level. Each task analysis identified five phases of activity, which are now reflected in the Key Tasks Cognitive Aid: *Readiness*, *Escalation*, *Coordination*, *De-escalation* and *Termination*. Each of the phases lists between three and 25 tasks or subtasks that must be carried out to ensure effective coordination of emergencies at state and regional levels. These sets of tasks form the basis of the Aid, which can be accessed in both digital and PDF format at www.bnhcrc.com.au/driving-change/tools under the 'Teamwork tools' heading.

Readiness is when a state or regional team is in place due to the elevated threat of incidents. During this phase, the state or regional coordination centre team ensure that they are aware of, and are monitoring, weather conditions and resources, and have appropriate plans in place to scale-up if required. During the *Escalation* phase, there is a shift in emphasis to responding to evolving incidents, ensuring that regional and state teams anticipate likely developments and review resourcing. The third phase, *Coordination*, is the most active period and has the greatest number of tasks. The focus of this phase is on the requirements to coordinate multiple operations, liaise with other agencies, and monitor and assist with public information provision. The *De-escalation* phase covers the period in which there is decreasing intensity of incident management operations. This phase requires careful sequencing in the wind-down of activities and resourcing. The final phase is *Termination* and has the fewest number of tasks. This phase focuses on wrapping up the centre's activation.

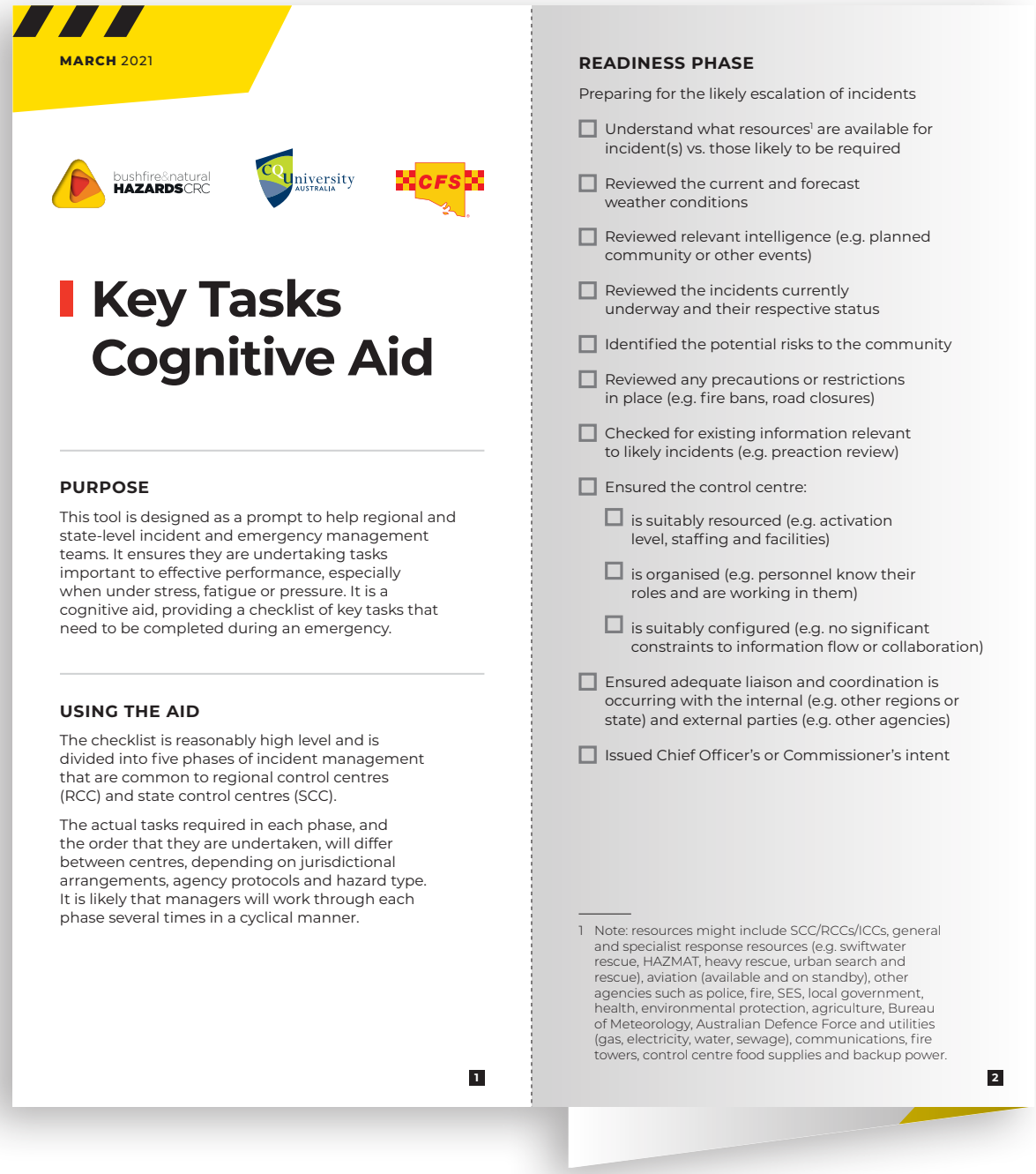
The Aid reflects the tasks and subtasks relevant to the participating agencies. The actual tasks and subtasks required in state and regional coordination centres may differ depending on jurisdictional arrangements, agency protocols and hazard type.

Although the Aid indicates a logical order for undertaking these tasks and subtasks, the dynamic nature of incidents means that it is likely managers will work through each phase of the Aid several times in a cyclical manner. The sequencing of tasks and activities is indicative only, so the order in which tasks are handled may vary depending on the circumstances. Users may find it useful to identify the status of each task by using a traffic light coding system of green (G) for good or in-hand, amber (A) for marginal or incomplete, and red (R) not yet addressed.

HOW SHOULD THIS RESEARCH BE USED?

All of the tools developed by this project are helpful in improving the performance of individuals and teams. This is particularly the case for complex activities, such as those completed by state and regional-level emergency managers.

There are some important differences between emergency management and other sectors that routinely use checklists, such as aviation and medicine. Emergency management teams coordinate operations in environments that are dynamic and tend to have less structure. The demands on emergency management teams may rapidly change as the number, scale and complexity of incidents fluctuate. These



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Key Tasks Cognitive Aid

PURPOSE

This tool is designed as a prompt to help regional and state-level incident and emergency management teams. It ensures they are undertaking tasks important to effective performance, especially when under stress, fatigue or pressure. It is a cognitive aid, providing a checklist of key tasks that need to be completed during an emergency.

USING THE AID

The checklist is reasonably high level and is divided into five phases of incident management that are common to regional control centres (RCC) and state control centres (SCC).

The actual tasks required in each phase, and the order that they are undertaken, will differ between centres, depending on jurisdictional arrangements, agency protocols and hazard type. It is likely that managers will work through each phase several times in a cyclical manner.

1

READINESS PHASE

Preparing for the likely escalation of incidents

- ☐ Understand what resources[1] are available for incident(s) vs. those likely to be required
- ☐ Reviewed the current and forecast weather conditions
- ☐ Reviewed relevant intelligence (e.g. planned community or other events)
- ☐ Reviewed the incidents currently underway and their respective status
- ☐ Identified the potential risks to the community
- ☐ Reviewed any precautions or restrictions in place (e.g. fire bans, road closures)
- ☐ Checked for existing information relevant to likely incidents (e.g. preaction review)
- ☐ Ensured the control centre:
  - ☐ is suitably resourced (e.g. activation level, staffing and facilities)
  - ☐ is organised (e.g. personnel know their roles and are working in them)
  - ☐ is suitably configured (e.g. no significant constraints to information flow or collaboration)
- ☐ Ensured adequate liaison and coordination is occurring with the internal (e.g. other regions or state) and external parties (e.g. other agencies)
- ☐ Issued Chief Officer's or Commissioner's intent

1 Note: resources might include SCC/RCCs/ICCs, general and specialist response resources (e.g. swiftwater rescue, HAZMAT, heavy rescue, urban search and rescue), aviation (available and on standby), other agencies such as police, fire, SES, local government, health, environmental protection, agriculture, Bureau of Meteorology, Australian Defence Force and utilities (gas, electricity, water, sewage), communications, fire towers, control centre food supplies and backup power.

2

▲ **Above:** A SAMPLE OF THE KEY TASKS COGNITIVE AID. YOU CAN ACCESS THE FULL AID ON THE CRC'S ONLINE TOOLS PAGE, UNDER THE 'TEAMWORK TOOLS' HEADING.

teams may be required to concurrently manage multiple incidents at different phases of development. These incidents may be the same hazard type, but could also be different (for example, floods and bushfires). The Key Tasks Cognitive Aid can be used to keep track of tasks for multiple incidents. Users are likely to revisit some task items multiple times within a phase (for example, updating the state-level coordination centre, Chief Officer or Commissioner with a situation report).

It is recommended that state and regional emergency management teams use a separate Aid checklist for each incident to enable tracking of phases and tasks. Use of the Aid is a simple way that these teams working in fast, complex and demanding workload conditions can improve their ability to remember and sequence important and interdependent tasks.

The Aid can be used by state and regional coordination centres in at least three ways:

As a memory aid

It has been designed to help managers ensure they are undertaking tasks important in coordinating the control centre and the incidents they have oversight of. State and regional teams may be working under conditions of stress and fatigue, so a tool that helps to reduce mental workload and improves cognitive ability is valuable. The Aid provides a useful prompt for new personnel or those returning after a period away. Use of this Aid can help practitioners focus on completing tasks rather than having to use their cognitive resources remembering what tasks to do next or what might have been missed. The experienced managers who piloted the checklist reported that it provided useful cues to help them stay on track with tasks and activities.

As a training and development resource

It can be used in several ways to support the training and development of practitioners. The checklist conceptualises the likely

sequence and interdependence of key tasks and activities. This can be used as a training resource to help new personnel build a clear understanding of the phases of an incident and the likely hierarchy of tasks required to coordinate the control centre. These features of the Aid can be used to develop appropriate face-to-face and online training materials.

An additional way the Aid can be used by emergency managers, instructors and coaches is as a diagnostic tool to help structure their feedback for training and development purposes. The checklist provides a common vocabulary that can be used to discuss an individual's or team's performance and provide more structured feedback. The checklist can be used with personnel during exercises, warm starts and on the job, and so can assist new personnel to transition into their roles more quickly.

For continuous improvement

It can be used as part of continuous improvement programs to assess how well a coordination centre is operating. The checklist can also play a useful role in guiding after-action review discussions of a coordination centre's arrangements and activities at the end of a shift or period of operation.

This Aid has already been adopted by the South Australian Country Fire Service and incorporated into its standard operating procedures for conducting and managing real time evaluations (SOP12.4). The CFS also use the checklist to identify the functions of a state or regional coordination centre as specified in a range of procedures that include SOP 1.05 and 1.06. There has been strong interest in this tool from various other agencies including Emergency Management Victoria, Fire Rescue Victoria, and Fire and Rescue NSW.

FUTURE DIRECTIONS

For agencies planning to use the Aid, it will be important to ensure it reflects their local arrangements and aligns to the types of hazards their organisation manages. This may require some customisation. Widespread adoption of this checklist by Australian and New Zealand agencies would help enable:

- the development of a common language for state and regional-level emergency management
- additional assistance to personnel deployed to state or regional-level teams in another agency or jurisdiction
- further guidance for evaluating the performance of state and regional-level emergency management
- greater visibility of key emergency management tasks and activities undertaken in the sector
- the opportunity to improve consistency in how emergency management is undertaken in the sector.

END-USER STATEMENT

"The progression of an incident can be quite rapid, requiring escalation involving regional and state level coordination. Given the nature of these levels of command, progression through preparedness, alert to managing the incident can place pressure and workload on personnel. The use of checklists that guide regional and state emergency teams can contribute to effective management and ensuring all tasks are appropriately considered. The [Aid] also articulates the difference in tasks between regional and state teams which means more effective coordination and support occurs. When aspects of this research and guide are integrated into organisational procedures, it ensures an end to end process is established and understood by emergency team members."

Mark Thomason AFSM, Manager Risk and Lessons Management, South Australia Country Fire Service

FURTHER READING

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Hazard Notes are prepared from available research at the time of publication to encourage discussion and debate. The contents of *Hazard Notes* do not necessarily represent the views, policies, practises or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire and Natural Hazards CRC.