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This research paper was prepared for DFES WA by students in ANZSOG's [Executive Master of Public Administration \(EMPA\)](#) program as part of the EMPA's Work Based Project module. Work Based Projects are a key part of the EMPA and see teams of students, who are public servants themselves, conduct original research and make recommendations on an issue of concern to a public sector agency. This research has been made publicly available by ANZSOG, with the permission of DFES, because of its quality and relevance to public sector agencies more broadly.



Image: The New Fitzroy River Bridge, Western Australia (Source: Infrastructure Partnerships Australia)

Unseen Bridges

Building stronger connections for
more effective disaster recovery
in Western Australia

Group 1

Alicia Le'Roy | Cory Pearce | Kate Jobling |
Pratthana Hunt | Suzi Woodrow-Read | Troy Davies

Acknowledgement of Country

We acknowledge the Aboriginal and Torres Strait Islander peoples as Traditional Owners and Custodians of the sacred lands, waterways and skies where we each work, and pay our deepest respect to ancestors and Elders who have gone before us. Elders who nurture and guide us today and future Elders who will be the knowledge keepers and caretakers.

We pay particular respect to the long and deep connection of the Aboriginal people of the many traditional lands and language groups of Western Australia that is a focus of this research report. Many of the concepts discussed of collaborative work in service of communities have been modelled by Aboriginal peoples for tens of thousands of years. We acknowledge that sovereignty has never been ceded and that this always was, always is and always will be Aboriginal land.

Our Thanks

We extend our sincere gratitude to Professor Emeritus Allan McConnell for his invaluable guidance and expertise throughout this research project. His insights and mentorship have significantly enriched our understanding of conducting an applied research project, disaster management, policy implementation and crafting recommendations. We are grateful to Su Groome from the Department of Fire and Emergency Services (DFES) WA, whose support and facilitation assisted with our exploration of the issues addressed in this research report. Our thanks also go to the various WA state government agencies and government officials who generously gave their time to help us investigate the areas discussed in this research. Finally, we express our appreciation to DFES WA for the incredible work they do, their openness, collaboration and commitment to enhancing their practices. This research would not have been possible without the significant contributions of these agencies and individuals.

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01

Executive Summary

Executive Summary

The Department of Fire and Emergency Services (DFES) in Western Australia plays a crucial role in coordinating disaster response and recovery efforts across the state's vast and diverse regions. As natural disasters become more frequent and complex, effective knowledge sharing and collaboration between DFES and other government agencies is increasingly critical for successful long-term community recovery.

This research project examined how DFES can enhance its knowledge-sharing capabilities with key government agencies during the transition from immediate disaster response to long-term recovery. The research focused on the 'implicit' or 'soft' enablers of effective collaboration, such as organisational culture, leadership approaches and inter-agency relationships, which complement the more explicit technical solutions and formal structures already being refined by DFES. The implicit factors are the 'unseen bridge' that enable stronger connections between agencies working together in long-term recovery to rebuild communities.

Methodology

The research employed a qualitative approach, conducting semi-structured interviews with key personnel from DFES and other relevant government agencies. Document analysis supplemented the interview data. The research team utilised artificial intelligence tools to assist in analysing interview transcripts and identifying key themes.

Key findings

1. Clarity

There is a need for clearer delineation of roles, responsibilities and communication channels between agencies during the recovery phase as more non-emergency management agencies increase their involvement. Effective communication is hindered once the transition from response to recovery occurs.

2. Capability

Many agencies lack the organisational structures and capabilities specifically designed for disaster recovery. There is a need to develop both explicit (e.g. integrated data systems) and implicit (e.g. collaborative mindsets) capabilities across agencies.

3. Collaboration

Differing organisational cultures and approaches between emergency services and other agencies impede effective collaboration. Building trust and fostering a whole-of-government approach is crucial for enhancing successful long-term recovery outcomes.

The research identified the concept of 'boundary spanning' as a key strategy for improving knowledge sharing and collaboration. Boundary spanning can take the form of individuals, mechanisms or workforce dispositions that connect across organisational boundary siloes to facilitate information flow.

Recommendations

1. Develop and implement a comprehensive Strategic and Operational Knowledge Sharing and Coordination Maturity Framework for disaster recovery operations

Utilise a framework that identifies different levels of maturity in knowledge sharing and collaboration. These tools will guide DFES and partner agencies in improving their capabilities over time and provide clarity to promote best practices.

2. Establish a structured cross-agency capability development program focused on building knowledge sharing and collaboration skills

Invest in training programs focused on collaborative leadership, crisis communications, technology skills and data literacy. Promote boundary spanning skills across all agencies in both strategic and operational workforces to create a common language and mode of operating.

3. Implement a systematic approach to building and maintaining strategic networks across partner agencies

Implement strategies such as embedded liaison officers and trust-building and networking opportunities to strengthen relationships between key stakeholders.

4. Develop and implement a strategy to enhance organisational culture supportive of knowledge sharing and collaboration

Strengthen organisational culture, capability development and relationship management practices to support formal processes and achieve optimised collaboration.

Conclusion

This research has highlighted the critical importance of implicit enablers in fostering effective collaboration and strategic decision-making during disaster recovery. DFES has made significant progress in developing the explicit technical solutions and formal structures, however, there remains considerable opportunities for improvement in areas such as organisational culture, leadership approaches and inter-agency trust.

Implementing the recommendations outlined in this report, particularly the development of boundary-spanning capabilities will significantly enhance DFES' capacity to fulfil its crucial role in leading effective disaster recovery. By improving knowledge sharing with key government agencies, DFES can better inform strategic decision-making, leading to more comprehensive and sustainable support for affected communities.

The findings and recommendations of this research have broader implications for emergency management practices across Australia and internationally. The focus on implicit enablers and the concept of boundary spanning provides valuable insights that can be applied in various disaster management contexts.

By addressing these challenges and opportunities, DFES can strengthen its ability to coordinate and lead effective disaster recovery efforts across Western Australia. The unseen bridges that are built through improved knowledge-sharing practices will serve as the critical connections that enable DFES and its recovery partners to work together more effectively. Just as physical bridges connect communities and facilitate the flow of resources, these unseen bridges of knowledge and collaboration will allow strategic information to flow between agencies, leading to more informed decision-making and better outcomes for affected communities.



Image: Mariginiup bushfire impacts in Wanneroo and Swan, 22-26 November 2023 (Source: DFES)

02

Introduction



Image: New Fitzroy River Bridge Project, Western Australia (Source: Main Roads WA, 2023)

Introduction

Disaster Management in Western Australia

The Western Australian Department of Fire and Emergency Services (DFES) plays a crucial role in managing disasters across the state's geographically diverse regions spanning over 2.5 million square kilometres, one of the largest states in the world (Tourism WA, 2024). With a population of more than three million people and 20% of the population living within regional Western Australia (WA) (Hastie, 2024), it is critical that disaster management is responsive and accessible. Effective disaster management, across the phases of acute response and into long-term recovery and community rebuilding, is increasingly recognised as a whole-of-government function, requiring strong coordination and collaboration across multiple agencies (Boin and 't Hart, 2010). This demands a multi-faceted approach requiring technological, structural and governance solutions activated in consideration of behavioural and relational realities such as organisational and project-oriented cultures, leadership and inter-agency relationships (Kapucu and Garayev, 2016).

DFES' role is complicated by the increasing frequency and severity of natural disasters in Western Australia and the critical importance of effective long-term recovery in fostering and building community resilience (Handmer et al, 2021). With the increasing occurrence of disaster events across the world, recovery efforts that support resilience building better prepares communities for the future.

Recovery is defined as “the support of emergency affected communities in the reconstruction and restoration of physical infrastructure, the environment and community, psychosocial and economic wellbeing” (s3 *Emergency Management Act 2005* (WA)). The state's vast and diverse geography, ranging from densely populated urban areas to remote communities, adds complexity to both disaster management and recovery efforts. Each region presents unique challenges, requiring tailored approaches and localised knowledge to ensure effective recovery.

Following the acute response phase, responsibility for disaster recovery in most jurisdictions is typically shared across various levels of government, with a strong focus on local leadership backed by state and federal resources. In WA, as it is across Australia, local councils bear primary responsibility for managing recovery efforts in their local municipalities. State governments provide integral support and coordinate efforts for larger-scale disasters through dedicated emergency management agencies, while the federal government offers financial assistance and national coordination when needed (COAG, 2011; Department of Home Affairs, 2018). In WA, when the severity of an event exceeds local capacity, provisions exist for state-level involvement through DFES which has the power to appoint a State Recovery Coordinator, a State Recovery Coordination Group, or a State Recovery Controller (Government of Western Australia, 2023). The focus of this report is on the recovery phase of disaster management, particularly when this local capacity is unable to cope with the demands created, and DFES assumes leadership.

DFES' role in recovery

DFES takes on a leadership role in recovery operations, with a recently established team dedicated to this function (Government of Western Australia, 2023). This organisational context is significant, as it places DFES at the forefront of both coordinating multi-agency responses to disasters and overseeing long-term recovery efforts across WA's immense and sparsely populated territory.

The recovery phase of a disaster presents complexities in the coordinated effort between local and state government agencies, non-government organisations and community groups. The challenge of managing systemic multi-agency disaster recovery efforts requires collaboration between stakeholders that have a shared intent in supporting the community but often differing enabling and constraining realities. These realities impact decision-making power, ease of access to real time information and the legislative and political expectations and accountabilities that must be responded to. A difference in agency focuses between those that view their work through a disaster event focused lens, and those who view their primary role through a people and impact focused lens, impacts a shared perspective of success and appreciation of the work of others. The importance of establishing trust between key agencies and an understanding of the context and culture in which others function is acknowledged as an essential element. This is a significant challenge to collaborative efforts to maximise community outcomes. In the context of DFES' role, this requires not only having robust systems and procedures in place but also fostering a cross-agency and cross-jurisdiction way of working that promotes collaboration, effective and timely knowledge sharing, and innovation and continuous improvement.

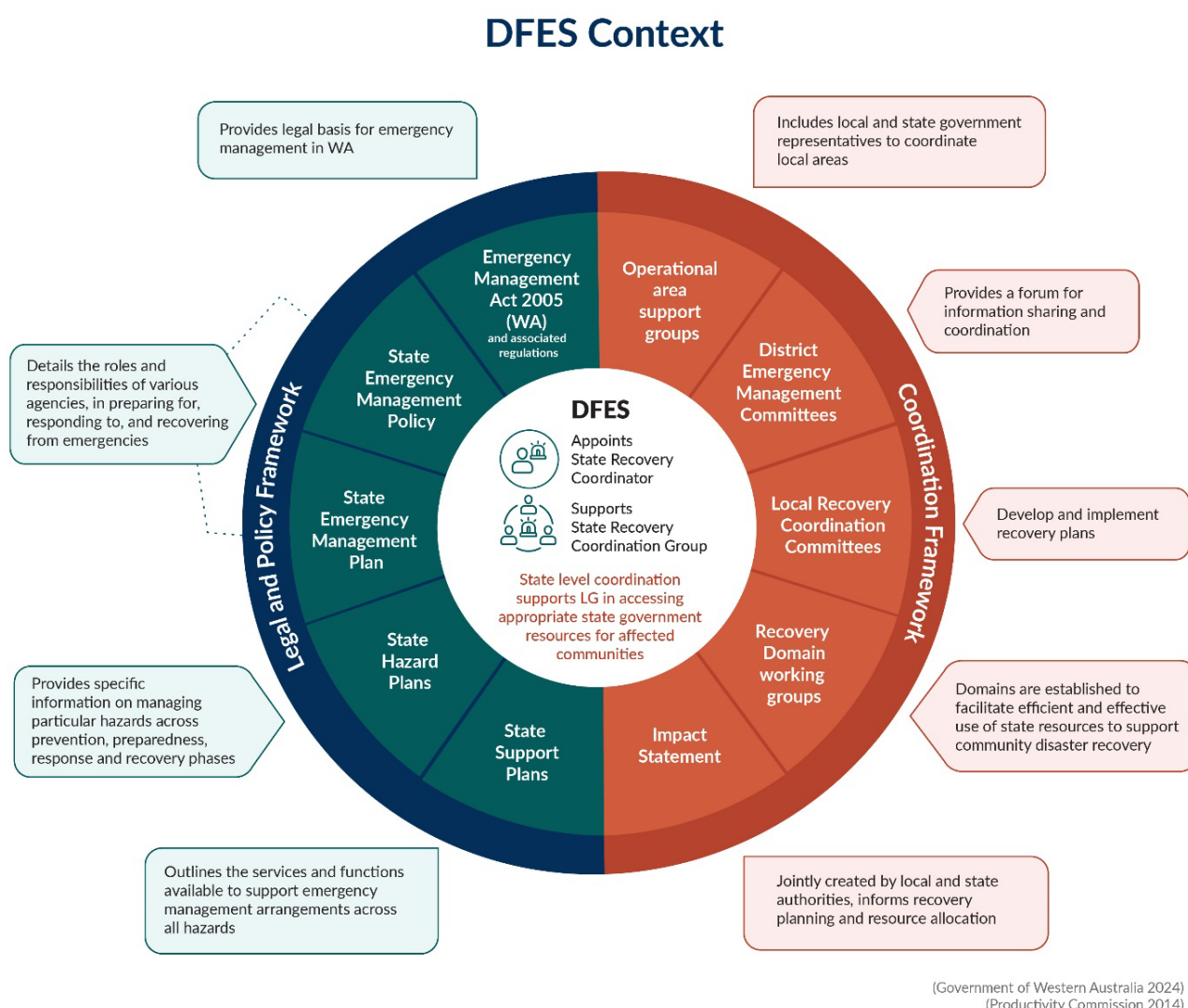
DFES' role in facilitating collaboration is critical to the success of recovery efforts. The consequences of inadequate knowledge sharing in supporting strategic decision-making can be significant and include delayed recovery efforts, inefficient use of resources, duplication of

efforts and, ultimately, a failure to meet the long-term needs of affected communities (Altay and Green, 2006). The need for better emergency management arrangements was highlighted in the Royal Commission into National Natural Disaster Arrangements Report (Commonwealth of Australia, 2020). Despite best intentions, when efforts to support transition to recovery are not well coordinated or managed, it can lead to community frustration, fatigue and further trauma beyond the event itself. In the context of Western Australia's communities, inadequate knowledge sharing contributes to recovery efforts that fail to address the unique needs of different regions, potentially exacerbating their existing vulnerabilities.

Legislative and policy context for DFES' role

A comprehensive legislative and policy framework governing WA's disaster management arrangements and mechanisms to facilitate effective coordination between local and state governments during the recovery phase are established (as represented in Figure 1). These arrangements emphasise a collaborative, whole-of-government approach to emergency management, with DFES playing a central coordinating role across four domains: social, built, environment and economic. This comprehensive framework ensures a structured approach to disaster recovery whilst allowing for flexibility in addressing diverse disaster scenarios. This multi-tiered approach is mirrored in other countries such as the United States, New Zealand and Canada, where local or regional authorities lead recovery efforts with backup from higher levels of government (FEMA, 2016; NEMA, 2020; Public Safety Canada, 2019). The consistency of this approach across different nations underscores its effectiveness in managing the complex challenges of disaster recovery.

Figure 1



Problem framing

“Recovery starts during the emergency response and encompasses linked and overlapping phases of relief and short-term recovery, early recovery planning and medium to long term recovery.”

(State Emergency Services Tasmania, 2024)

Despite the established framework and DFES' designated leadership role, challenges persist in effectively transitioning from the immediacy of disaster response to long-term recovery. Knowledge sharing at this stage is identified as vital to inform decision-making that will impact the available resources for community rebuilding into the future. The transition requires a purposeful mindset and practices that shift from the specialised technical problem solving needed in effective response, to the adaptive problem solving required during recovery, where variables and interrelationships increase. High levels of complexity, the absence of a clear delineation between the timeframes of these phases, the roles that different agencies are expected to play and the heightened stress that disasters create, all impact the speed at which

the necessary and efficient command and control disposition of emergency service agencies, essential during the response phase, moderates to the community-focused disposition of recovery agencies. The importance of effective knowledge sharing to inform decision-making is not the sole responsibility of DFES and is an ongoing whole-of-government challenge.

The broad **problem statement** guiding this research paper is:

"The knowledge-sharing ability of Western Australia government departments following natural disasters is not at the level of maturity required for comprehensive, integrated, sustainable support to rebuild affected communities."

Insights from research

A review of approaches across international and Australian jurisdictions provided valuable insights for DFES' leadership role, highlighting several key themes that shaped this research.

The importance of **clear frameworks and protocols** for transitioning from response to recovery phases, the growing recognition of the interconnected and compounding nature of disaster impacts and the need for comprehensive recovery strategies were present in multiple contexts:

- New Zealand's approach is characterised by a seamless integration of response and recovery activities, emphasising early recovery planning and a holistic consideration of social, economic, natural, and built environments (NEMA, 2020).
- Japan's model focuses on pre-disaster recovery planning and rapid initiation of recovery efforts, facilitated by legislation allowing for the quick establishment of a Reconstruction Agency following major disasters (Ranghieri and Ishiwatari, 2014).
- The UK model, in contrast, maintains a clearer distinction between response and recovery phases, with a formal handover process and the establishment of a Recovery Coordinating Group to manage the transition (UK Cabinet Office, 2013).
- The Queensland Reconstruction Authority's model demonstrates the benefits of a dedicated, cross-agency approach to disaster recovery (Queensland Reconstruction Authority, 2019).

The requirement for **adaptive processes** in disaster management is apparent and emphasises the need for flexibility, continuous learning and collaborative decision-making (Comfort et al, 2010). These elements were identified as essential for navigating the complex and often unpredictable nature of disaster recovery with research highlighting the need for adaptive governance structures that can respond flexibly to the evolving challenges of disaster recovery (Tierney, 2012).

Frameworks for public administration of crisis situations were provided by Rosenthal et al (1991), Boin and 't Hart (2010) and Stark (2014). Utilising different terminology, all consider the phases of emergency management response, recovery, resilience and business-as-usual with a delineation between strategic and operational realities and influencing factors. All highlight that

institutionalised structures, governance and administrative arrangements often sit in tension with the need for more extreme forms of adaptation, spontaneity and innovation during urgent decision-making in the crisis phase. However, key actors (largely emergency agencies), which make decisions for response operations, often do not hold responsibility for the subsequent recovery phase and so therefore often underestimate what Boin and 't Hart (2010) call the 'crisis after the emergency' (p. 363). Boin and 't Hart (2010) assert that policymakers must prepare more intensely for this phase, and Stark (2014) claims crisis research should question whether the institutional fabric of bureaucracy itself provides a solid platform for the post-crisis phase.

The significance and scope of this research

The current body of knowledge on emergency management and disaster recovery emphasises the importance of integrated approaches that span the entire disaster management cycle, from prevention and preparedness to response and long-term recovery (Coppola, 2015). However, the critical point in time transition from immediate response to long-term recovery receives less focus in literature and practice. In some ways this is unsurprising as it is at this time that media, visible emergency agency response and political focus often shift. Emergency agency leadership and its legislative command and control powers give way to the need for collaboration between a range of agencies that may not be structured or resourced adequately for the recovery phase, with community demands often exceeding their business-as-usual delivery. There is a gap in understanding and addressing the complex reasons for ineffective knowledge sharing between government agencies during this transition period. As the key coordinating agency in recovery, DFES holds both formal and informal influence and its role can be seen as an important lever for change across government.

To address this issue, the **research question** for this project is:

"In the aftermath of natural disaster responses when transitioning towards long-term recovery, how can the Department of Fire and Emergency Services (WA) (DFES) foster better knowledge sharing with key government agencies to inform strategic decision-making to rebuild affected communities?"

This question addresses the heart of DFES' dual role in responding to emergencies and coordinating recovery efforts across multiple agencies and stakeholders. Effective knowledge sharing is essential for ensuring that all parties involved in recovery have access to the information they need to make informed decisions for effective recovery and rebuilding of affected communities.

Research points to the importance of **how** agencies and individuals relate, work and learn together when working in complex environments. Despite their influence and impact, these often less visible factors, are not given the same attention or weighting as the structural shifts that are assumed will provide better delivery of services to communities (Boin and 't Hart, 2010; Getha-Taylor et al, 2019; Getha-Taylor, 2019; Ballintyne et al, 2018; Butcher et al, 2019).

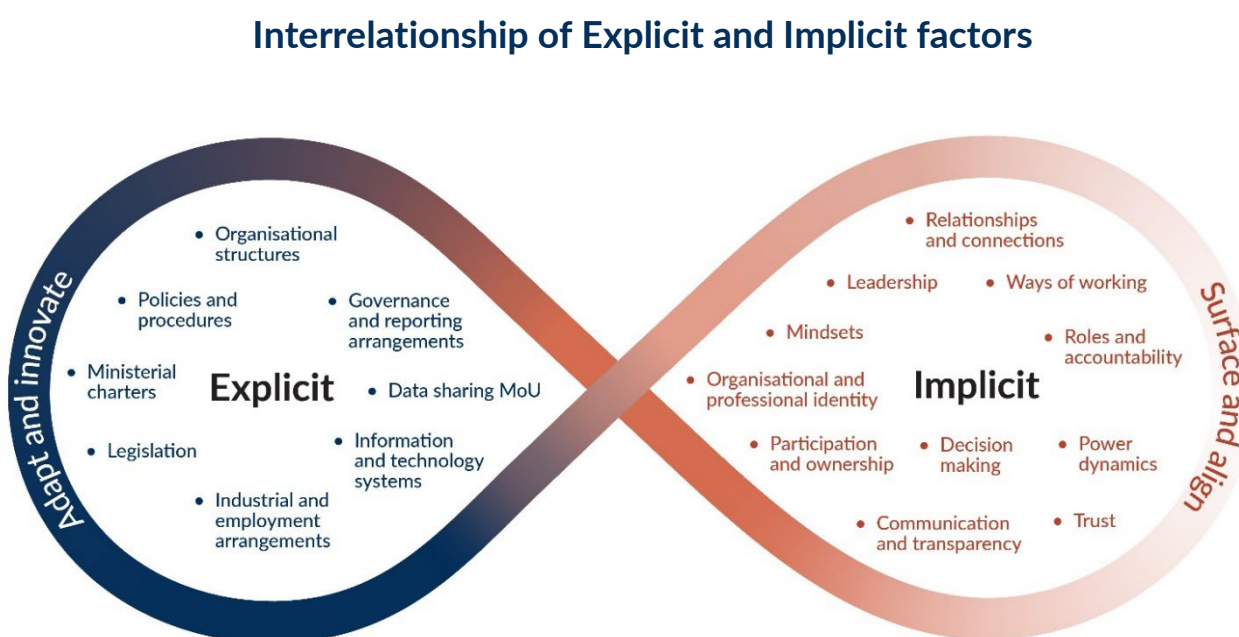
Key enablers of effective knowledge sharing are often delineated into dichotomous and rigid components, described as 'hard/soft', 'formal/informal', 'tangible/intangible', 'technical/behavioural' or 'structural/relational' (Curnin et al, 2015; Boin and 't Hart, 2010). While recognising that these dichotomies are one way of framing different elements that can often feel in tension, interviews pointed to a wide range of elements that are interdependent and together create a unique context based on the specific disaster scenario. Some are visible, seen and explicit and others invisible, unseen and implicit, depending on the context and people's experiences. For example, a 'hard' element such as terms of reference and meeting minutes with stated responsibilities and decision-making processes might actually be hidden when the reasons for decisions are made in 'other rooms' because of time constraints. 'Soft' elements such as communication, ownership and transparency might be experienced overtly as lacking and are a visible gap in ways of working.

For the purpose of this research project and to provide clarity, enablers will be framed as:

1. **Explicit enablers:** These are the visible, structural elements that mostly take the forms of technical systems, legislation, agreed best practices and compliance and reporting protocols. They are easy to recognise and communicate, often with clear linear reasoning from problem to solution.
2. **Implicit enablers:** These are the less formal cultural elements of how people relate, learn and organise. They are less tangible, more dynamic and harder to measure and shift. They are often deprioritised as they are unseen but are aspects of knowledge sharing that materially impact the lived experience of people working within recovery contexts.

Figure 2 represents the ongoing interplay of the explicit and implicit factors as they influence outcomes.

Figure 2



Adapted from [Governance – the overlooked route to transformation: How can we best organise for change? – The Futures Centre](#)

With the establishment of a dedicated internal team supporting the recovery functions they hold, DFES is already focused on improving capabilities both within DFES and across the broader system. Document analysis, discussions with the DFES project sponsor and interviews with WA Government employees highlighted the progress of various working groups, training programs, technology projects and policy work that have evolved in parallel since this research project commenced in February 2024.

The work undertaken by DFES primarily focuses on explicit enablers and therefore this research project primarily focuses on the implicit enablers. This is driven by the recognition that, while technological and structural solutions are important, human and organisational factors often play a crucial role in determining their successful implementation (Waugh and Streib, 2006). By focusing on these elements, the research aims to complement DFES' existing initiatives and provide a holistic approach to improving knowledge sharing and recovery coordination.

The significance of this project lies in its potential to support the maturing and impact of DFES' capabilities, enhancing the organisation's ability to fulfil its critical role in leading effective disaster recovery. The implicit elements that impact knowledge sharing and decision making are often the hardest to develop because questioning, challenging and reconfiguring relationships, organisational and long-established practices are difficult, especially during complex and high stress situations.

The project's focus on implicit enablers is particularly important in the context of WA's dispersed and often vulnerable communities that face complex disaster risks. By enhancing DFES' ability to share knowledge strategically and effectively, the research aims to improve the organisation's capacity to tailor recovery efforts to the specific needs of different regions and communities across the state. This will lead to more equitable and effective recovery outcomes, particularly for isolated communities.

Should DFES fail to appropriately lead the coordination and development of these implicit enablers across WA's disaster recovery agencies, it risks significant reputational damage in not achieving safer WA communities before, during and after disasters. It may also fall short of expectations as WA's leading emergency management agency by not properly implementing all the requirements needed to maximise the effectiveness of agencies in disaster recovery.

As disasters become more frequent and complex due to factors such as climate change and urbanisation, the need for effective knowledge sharing and coordinated recovery efforts becomes increasingly critical (Handmer et al, 2021). The findings of this research can have broader implications for emergency management practices across Australia and internationally.

A glossary of terms can be found at Appendix A.

03

Research Methods and Data Collection

Research Methods and Data Collection

Selection of research method

To inform the research approach, the research team reviewed:

- key organisational documents and information publicly available on the DFES website relating to their functions and vision
- information provided by DFES relating to Emergency Management and organisational structures
- recent formal inquiries into disaster management, and
- Australian and international research on the barriers and enablers for effective recovery efforts.

While there is accessible information on accepted emergency management processes, governance practices across jurisdictions vary widely and there was sparse research available nationally and internationally about best practice for cross-agency knowledge-sharing in the unique context of a single agency being responsible for leading transition between disaster response and long-term recovery and the symbolic and operational realities this presents. This led the team to utilise research methods that provided an opportunity to more deeply explore the problem as experienced by DFES and partnering agencies.

Qualitative research creates a deeper understanding of complex issues by providing an avenue to hear the stories and experiences of the people impacted by a challenge, issue or process. With the research focus on the 'implicit enablers' this approach allowed the research team to best explore this context. The project sponsor's initial briefing indicated existing tensions between agencies and differing views within DFES on the process of knowledge sharing. The research team was interested in identifying where conflict and tension between parties is most apparent so semi-structured interviews with key individuals were chosen as the primary data collection method. The collective nature of focus groups can create greater barriers to expression, so interviews were deemed better suited to create an environment where behavioural factors were more likely to emerge.

Participants

Following ethics approval from the Australian and New Zealand School of Government (ANZSOG), DFES provided a list of key people involved in recovery efforts from within the WA public service. Fifty-seven representatives from 19 entities, covering the Recovery Coordination Group and the established Economic, Built, Environmental and Social domains were nominated. To scope appropriately for the time available for data gathering, key agencies were selected. The approach to the sampling strategy was to initially target participants based on the recency and regularity of involvement in significant recovery efforts. This strategy was seen as appropriate given WA has experienced two major and unprecedented disasters in the previous 12 months. The desired mix included both central and line agencies across strategy, policy and delivery units.

Nineteen (19) people were invited to participate via an email sent from the DFES Recovery, Strategy and Policy group. The email outlined the research, voluntary nature of participation and the Consent Form and Information Statement were attached. Eight interviews were conducted with single participants and one interview with eight participants from one agency. Three representatives were from DFES, two from central agencies and 11 from other agencies. We did not ask participants to provide any demographic information in addition to their role title and agency.

Interviews

The interviews were held via Microsoft Teams over a period of four weeks. Two members of the research team attended each interview and with the consent of participants, all interviews were recorded. The participant interview guide was utilised for the interviews with research team members adapting questions to delve deeper into individual responses as they were provided.

At the beginning of each interview, participants were reminded of the reason for the research, that participation was voluntary, that the recording and transcript would only be reviewed by the research team to aid analysis and that any information would be de-identified within the final report.

All interviews were scheduled for a maximum of 60 minutes. One key department asked for multiple representatives to participate together, and the duration was negotiated to 90 minutes with the interview structure adapted to better accommodate multiple participants.

The aim of the interviews was to understand and identify:

- the barriers and enablers of effective collaboration in the transition to recovery after natural disasters
- the essential mindsets and behaviours conducive to productive decision-making, particularly in complex, multi-agency contexts
- the timeline in the transition from response to recovery in which different capabilities are essential
- current and potential approaches to strengthening relevant individual, organisational or system capabilities.

04

Research Analysis

Research Analysis

Data selection and management

Four hundred and two pages of transcripts were analysed both by researchers and generative Artificial Intelligence and qualitative data analysis programs (Claude Sonnet 3.5, ChatGPT, Gemini AI and MAXQDA). The research team validated the results generated from AI by utilising multiple platforms, targeted research team analysis and discussions drawing on the public service experience, emergency management expertise and WA public service understanding within the team. The video recordings, transcripts and research team notes have been saved securely consistent with ANZSOG Ethics Approval.

Thematic analysis

The method for data analysis was drawn from the six elements of qualitative data analysis highlighted by O'Leary (2021) which drills in from raw to reduced data and abstracts out through identifying interconnected data, themes and broader understanding and conclusions.

The process of analysis moved between inductive and deductive reasoning, predicting that recurring, interesting, significant or contrasting perspectives elicited through the research interviews would:

- enhance the research team's understanding of the problem that was initially provided by the sponsor and be understood more broadly through literature research
- identify issues perceived to be problematic within the WA Government context
- identify suggestions for improvement and whether they align with practices from other contexts.

The analysis approach utilised five elements:

1. Noting overall impressions from interviews and identifying biases

The team members attending each interview conducted an initial debrief on key themes directly after each interview. Team members shared impressions from the interviews they had conducted that week with the broader team. Microsoft Teams-generated transcripts and recordings were later shared with those that did not attend. Two members of the team were intentionally not involved in the live interviewing process so that they could listen for themes and ask probing questions to further draw out interviewer insights. For the first five interviews, research team

discussions were used to identify comments from interview participants that were of surprise or aligned with learnings from the literature, documentation review or our sponsor's initial briefing.

We identified that we held biases based on our association with the content (one team member works in emergency management) and location (two team members work in WA) and with the particular area of initial literature review we had undertaken. We also noted that we had a bias in listening based on our perception of fulfilling the sponsor agency's expectations, even when it was not aligning with our evolving research direction. We consciously reoriented to a discovery mindset.

2. Reducing data

The raw data (transcripts and/or recordings) were independently reviewed by team members who were not present at the live interview with the aim of identifying factors that participants had said enabled and those that hindered knowledge-sharing. Particular attention was given to identifying where DFES and other agencies held different perspectives of a shared experience and context. After the fourth interview and initial group discussions, AI was utilised to summarise each individual transcript based on identified challenges and enablers for knowledge-sharing and this method was used following each interview and team discussion from that point on.

Initial interviews highlighted that many initiatives associated with technological, policy, funding and governance issues had been progressed by DFES since the commencement of the project. This validated the research focus on implicit factors to support the successful implementation of this work that had already progressed.

The research team revisited the work of Boin and 't Hart (2010) and their assertion that "it is not formal structures but the quality of communication, coordination and collaboration within, across and beyond emergency services that matter most in shaping the quality of crisis response" (p. 367). This led to focusing the analysis on the data pertaining mostly to the implicit element factors identified by interview participants as this was not being addressed in the work being progressed by DFES. We utilised AI to aid reduction of the data to the key implicit and behavioural factors. As interviews continued, we observed that many interviewees began with discussing the explicit factors but shifted to the implicit factors when identifying the challenges and barriers. This provided validation for the direction of the research.

3. Searching for patterns and interconnections

Comments were analysed and grouped in the broad framing of behavioural/implicit challenges and enablers, whilst still noting the technological and explicit factors mentioned. Key quotes were identified from the transcripts that succinctly encapsulated concepts emerging, and these were then grouped to aid analysis.

In reviewing the transcripts, the research team observed that interviewees described the impacts of these challenges and enablers in different ways at different stages of the EM process. These also pointed to the changing role and influence of different agencies across that timeline. This

process provided a further opportunity to validate (and discard) potential themes based on their relevance to the tightening scope of research.

4. Mapping and building themes

The research team reviewed and reorganised interviewee comments, quotes and areas already identified from research within a more granular categorisation under the broad framing of informal challenges and enablers for knowledge-sharing. We then storyboarded a collective narrative as it applied to the additional aspect of the research question: informing strategic decision making. This also enabled mapping along the response and recovery timeline and the observation that problems identified by participants in earlier stages of transition resulted in potentially avoidable consequences in later stages. Insights emerged from this mapping regarding key capabilities currently perceived to be at varying levels of maturity and that they impact key agencies in diverse ways at different points in the process. This also led to the development of a metaphor which enabled the visualisation of the connection between this research on informal structures and their impact of formal structures and outcomes.

5. Building and verifying theories

Themes were reviewed and interrogated in relation to whether they informed the problem definition compared to those that informed potential recommendations. At this final stage the themes were also classified into broader groupings to support the articulation of findings and to find connections back to the document and literature analysis and how that may further inform recommendations.

Authentication of findings

Key DFES personnel were targeted in the final period of interviews following initial analysis, in order that we could start to validate some of the insights that emerged from earlier interviews. This also enabled some initial testing of the direction of recommendations to ensure they were implementable and would enhance work already underway.

05

Findings and Discussion

Findings and Discussion

Disasters are becoming more complex. This is reflected in the Sendai Declaration (United Nations Office for Disaster Risk Reduction, 2015) which recognised the increasing impact of disasters and their complexity in many parts of the world. The complexity can range from compound disasters, to cascading events and protracted or slow onset events such as drought (Lukasiewicz and O'Donnell, 2022). In part, the increased complexity is due to global networks being more interdependent, climate change continuing to intensify weather patterns, population growth in areas that traditionally experience natural disasters, and as social inequality intensifies (Gissing in Lukasiewicz and O'Donnell, 2022).

Compound disasters have been described as:

- 1. two or more extreme disaster events occurring simultaneously or successively*
- 2. combinations of extreme events with underlying conditions that amplify their impact; or*
- 3. extreme impacts that result from combinations of “average” events*

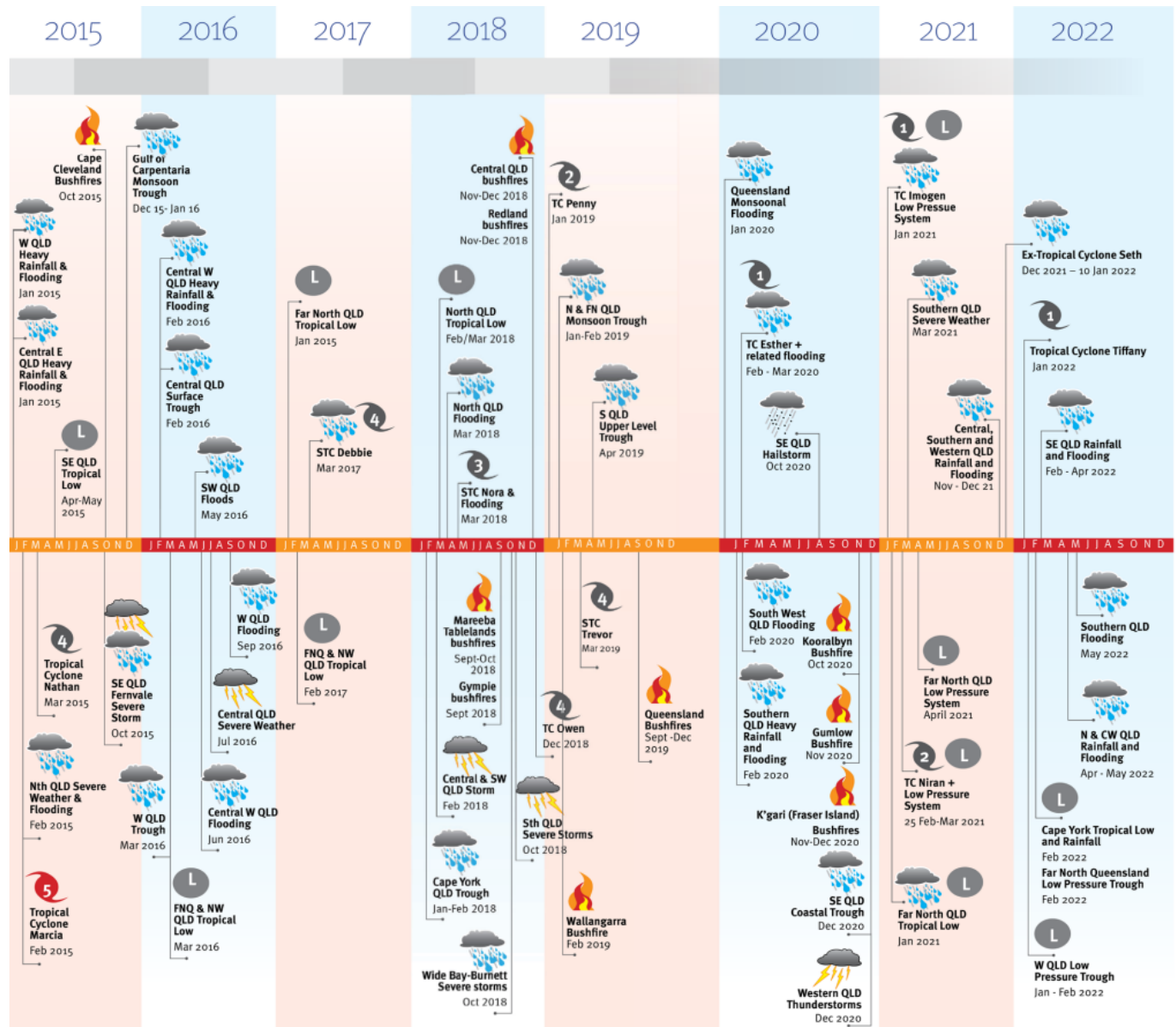
(Lukasiewicz and O'Donnell, 2022; Gissing et al, 2021; Pescaroli and Alexander, 2016; Ridder et al, 2020)

Compound disasters significantly impact recovery efforts if subsequent events occur within the same jurisdiction. This can be through the second event inflicting further damage in the area affected by the first disaster, or through personnel and contractors having to respond to a second event as well as contribute to community recovery from the first (Gissing et al, 2021).

Figure 3 from the Queensland Strategy for Disaster Resilience 2022–2027 (Inspector General Emergency Management Queensland, 2022) demonstrates how a jurisdiction can be impacted by compounding events.

Figure 3

Impact by compounding natural disasters on jurisdictions



As disasters become increasingly complex and their size and frequency larger and stronger, the limitations of single organisations to deliver on recovery with limited physical and human resources is exposed (Oh and Daewoong, 2022). As this theme of exposure to the changing disaster risk environment emerged during our documentation analysis, the research team considered what actions could be taken by government organisations to strategically make decisions on the best way to use the limited resources available during recovery. Efficient information sharing, and the crucial role of communication in ensuring scarce government resources are used as best as they can be in recovery (Comfort, 1985; Comfort et al, 2012) emerged as fundamental challenges throughout the analysis.

The research team concluded the emergence of these challenges was unlikely to be a surprise to DFES given its initial request for information sharing, data management arrangements and shared IT platforms between agencies involved in long-term events to be part of the consideration of the research project. Interviews with key personnel from DFES and other agencies involved in disaster

recovery confirmed that knowledge sharing was also at the front of their mind when it came to coordination and service delivery in recovery. DFES personnel confirmed in interviews that as the coordinating authority for state level activity, the department was moving quickly to consider options for the technical sharing of information before, during and after disasters.

Given that significant work is already progressing on the technical considerations (explicit enablers) by DFES and its partners, the research team determined that the best approach would be to explore what implicit barriers may still remain for organisations to share information, which impact the effectiveness of the implementation of these refined systems.

Knowledge sharing during response and recovery phases of disasters

The interviews focused on knowledge sharing during both the response and recovery phases of disasters with focus on the transition between these two phases. From the interviewee's responses, AI was utilised to identify key differences in knowledge sharing across this timeframe.

Interview participant insights suggested that knowledge sharing in the response phase focused on rapid, operational coordination with a smaller group of stakeholders, while the recovery phase required more long-term strategic knowledge sharing between a broader range of agencies, with more complex information flows required. The key differences in knowledge sharing factors expressed are summarised in Table 1.

Table 1 – Summary of differences in knowledge sharing from response to recovery stage

Aspect	Response Stage	Recovery Stage
Focus of knowledge sharing	Immediate, operational needs	Strategic, long-term planning
Speed and complexity	Rapid, straightforward, tactical	Slower, more complex, strategic
Stakeholder involvement	Emergency services, fewer agencies	Broader engagement with multiple sectors
Type of knowledge shared	Real-time, short-term operational data	Evaluative, forward-looking, policy-related data
Challenges	Communication bottleneck, coordination issues	Policy misalignment, fragmented long-term planning

Table 1 provides direct insights into the differing roles and actions required of agencies during response and recovery. It highlights the changing dispositions required to maximise the impact of effort, moving from a cooperative disposition during high stakes response phases suited to command and control to collaborative disposition in recovery where the decision-making timeframe is elongated but the stakes no less important.

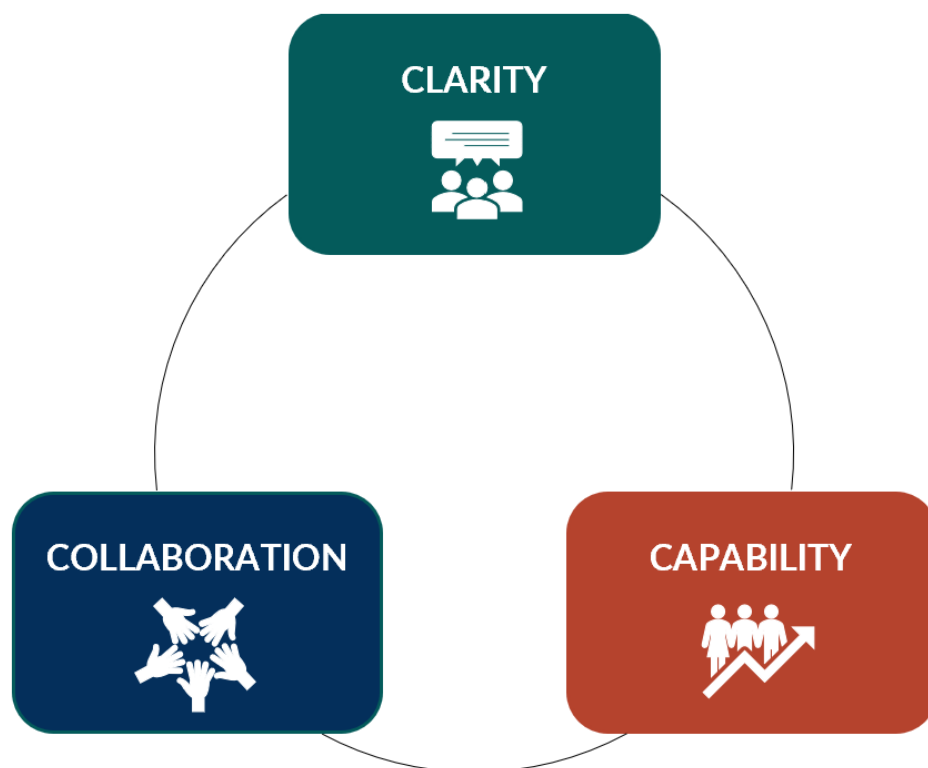
For most agencies, effectiveness is assisted by having a clear frame of reference of the contribution they are expected to make with their specific expertise, but for DFES this is more difficult as they straddle both the response and recovery stages. Logemann et al (2019) refers to this challenge as playing both a **sense giving** role (in response) and needing to be willing and able to play a **sense making** role (in recovery). The complexity of skill set, judgement and strategy required to navigate these two stages is challenging.

Interview findings

Analysis of the interview responses identified several challenges in transitioning from response to recovery, with the frequency of issues codified into three thematic findings. These were the challenges associated with a need for greater **clarity**, improved **capability** and enhanced **collaboration** to achieve a more mature and effective disaster recovery function.

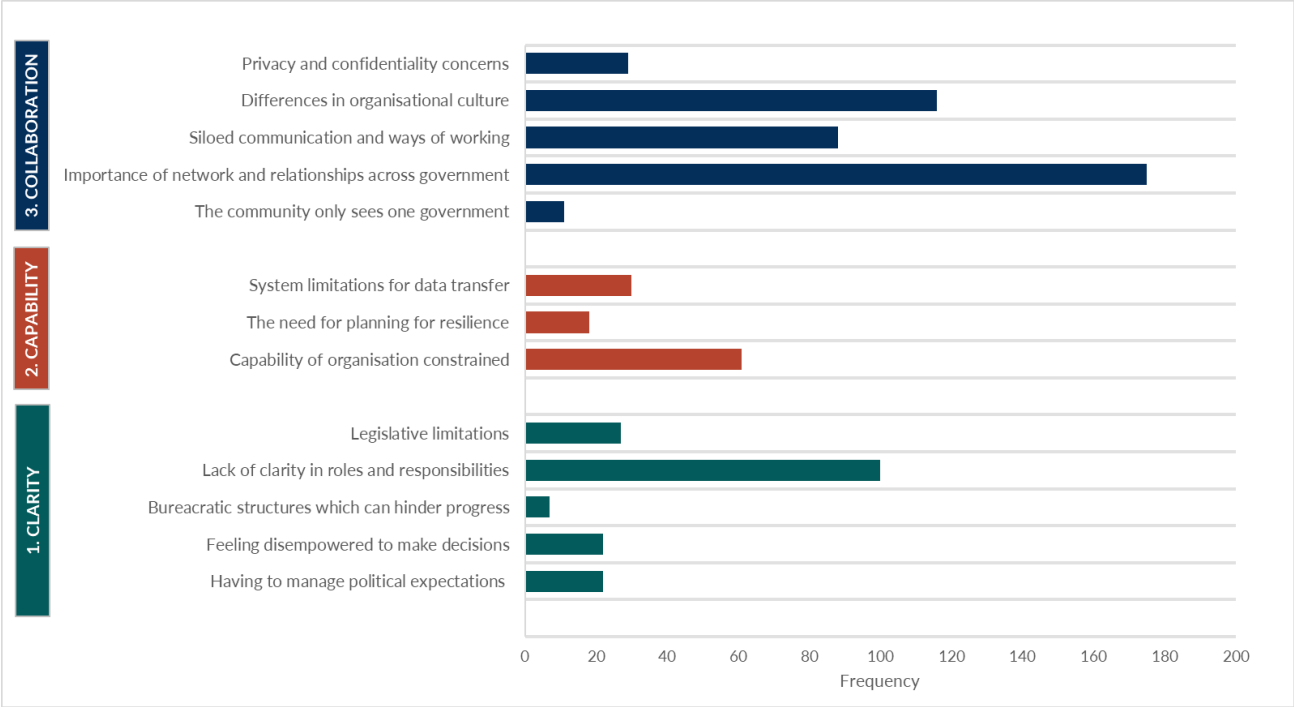
Figure 4

The connection between clarity, capability and collaboration



The chart below identifies how they were expressed by interviewees, highlighting both explicit and implicit factors raised, and the frequency that these were discussed.

Table 2 – Thematic summary of codified responses



Interview responses did not suggest that one area was more important than another, but rather that there were many important *implicit* factors relevant within each of these findings that would drive more effective disaster recovery. Higher frequency of issues raised were a reflection of matters that were universally recognised across all interviews, with lower frequency issues raised being more specific to certain agencies.

Key Finding 1

CLARITY: Disaster recovery requires multi-agency involvement

The importance of multi-agency participation in disaster recovery was acknowledged across all interviews, with the implementation of the State Recovery Coordination Group (DFES, 2024) and the dedicated recovery domains referred to positively by interviewees who noted it was a step towards enhanced collaboration and communication.

When analysing the different knowledge sharing requirements presented by interview participants from the response and recovery phases of disaster events, it became clear that barriers existed in the sharing of knowledge required to manage the complexity of recovery. Participants identified that DFES’ ability to coordinate the collection and sharing of the required information needed to inform strategic decision making in recovery, was not at the level it could be compared to its knowledge sharing ability in the response phase. DFES participants also identified challenges in information being shared by other agencies to inform its coordination activities.

Several challenges raised by respondents include:

- limited awareness by DFES of the scope of work undertaken by other agencies and therefore the value those agencies can contribute
- that the legislative environment, despite defining accountabilities during disaster recovery, has its limitations in defining roles and responsibilities of partnering agencies
- non-DFES agencies feeling disempowered or not having an authorising environment to operate effectively
- agency accountabilities to different Ministers, who are each invested in the recovery of affected communities, but from different policy portfolios. Each Minister expects coordinated action across the public sector.

"DFES' siloed approach results in missed opportunities for collaboration and knowledge sharing, leading to inefficient recovery efforts." – interview participant

"Challenges in engaging with other government agencies and navigating conflicting policies hinder effective recovery efforts." – interview participant

Interview participants were clear that clarity in knowledge sharing is essential for ensuring that disaster recovery efforts are well-coordinated and that all stakeholders have a shared understanding of priorities, processes, and data. However, lack of clarity, particularly in roles, responsibilities and accountabilities, often leads to confusion and misaligned priorities, which delays recovery efforts or misses opportunities to provide more strategic value in rebuilding affected communities.

The need for suitable technology to support clarity through knowledge sharing is clear and DFES interview participants stated that the department is actively exploring technical options for how this information will be shared. However, following analysis of interview data, the research team questioned whether even with the right technical solutions in place, the internal cultures and structures within DFES and other government departments would enable this knowledge sharing to happen.

While acknowledging governance arrangements and reporting structures, developing policies and procedures, and implementing a system solution are important explicit factors for disaster recovery, interview participants expressed that actions needed to go beyond these artefacts to truly embed stronger connections across the agencies involved and drive greater value and outcomes for affected communities.

In particular, several interview respondents identified that a siloed approach from DFES resulted in missed opportunities for collaboration and knowledge sharing that created inefficiencies in recovery. DFES interview participants conversely identified that information was withheld by other organisations and not openly shared due to privacy and confidentiality concerns. One example presented was that if DFES is unaware of how community needs have evolved post-disaster, due to a lack of shared information from social service agencies or local governments, its recovery efforts will misalign with what is actually needed.

These observations highlight the issue that when departments fail to share insights, best practices, and lessons learned, the decision-makers lack critical information to see the full picture needed to form effective recovery strategies. In addition, agencies are not clear of what is expected of them, or are not empowered, to take the necessary actions required to support the community.

"This lack of integration and learning from previous experiences can delay effective responses, increase costs, and ultimately prevent communities from being rebuilt better." – interview participant

"If you're not clear on the decisions you've made in response, they have a trickle down effect into what that community is needing in recovery." – interview participant

These findings also identified potential opportunities that enhanced clarity through knowledge sharing can bring:

1. **Leveraging collective knowledge for better decisions:** When agencies are empowered to actively share information through integrated platforms, it enables more informed and timely decision-making. This collective intelligence helps optimise resource allocation and improves community outcomes.
2. **Strategic alignment for sustainable recovery:** Clear communication of policies and priorities across agencies creates opportunities to align recovery efforts toward long-term community resilience rather than just immediate fixes. This alignment helps agencies work together toward shared strategic goals.
3. **Continuous improvement through shared learning:** Systematically sharing lessons learned between agencies creates opportunities to refine recovery strategies and prevent recurring issues. This institutional knowledge transfer assists agencies to develop more effective approaches over time.

These are resonated within the literature, with bushfire impacted community members from New South Wales and Tasmania, and community members who experienced deadly floods and cyclones in Queensland having previously expressed concern around government organisations simplifying and compartmentalising the impact of disasters in recovery when in fact the impacted communities wanted a more nuanced and complex discussion on their approach to recovery (Moreton, 2018).

Having greater clarity brings a more nuanced and mature approach to disaster recovery. It enables strategic, informed decision-making by ensuring that all stakeholders have access to the data, insights, and lessons learned that they need to inform coordination, accelerate recovery efforts, and set long-term priorities that benefit communities. Without it, recovery efforts will continue to be misaligned, delayed, or ineffective in addressing the real needs of affected populations.

Key Finding 2

CAPABILITY: Not all agencies are established for recovery

The research revealed a significant opportunity to enhance recovery effectiveness through capability development. While agencies demonstrated strong technical and operational capabilities, interviews highlighted how strengthening implicit skills – including relationship building, collaborative and coordinating behaviours, knowledge-sharing mindsets, and aligned organisational values – could transform recovery outcomes for communities.

This opportunity for capability enhancement becomes particularly important given that disaster management is often not considered a 'business-as-usual' function, with funding only provided on a time-limited basis for discrete disaster recoveries. The organisational structures of these agencies are not designed to embed this function, making it challenging to retain experienced staff and build the capabilities of the agency for disaster recovery.

The research team concluded that data collected during the interview phase reflected that government agencies view capability through an explicit skill set lens rather than recognising, valuing and promoting the implicit skills needed for successful development of knowledge sharing capabilities.

Respondents' initial focus on capability narrowed in on needing the necessary resources, infrastructure and policies required for good knowledge sharing. This included integrated data systems, aligned reporting mechanisms and interoperability between data systems to support real time knowledge sharing. Respondents did not initially discuss implicit capability requirements in interviews until prompted to consider if there were any implicit capabilities that were required to impactfully operationalise information into action.

Through the interviews, respondents were able to identify a range of implicit capabilities which would support knowledge sharing in recovery. These included the ability to build a culture of open communications and trust between agencies, the development of collaborative mindsets, leadership which fosters inclusive cultures where staff feel psychologically safe in sharing knowledge, investment in training focused on building collaborative behaviours and interpersonal skills, and a culture of flexibility and adaptability where staff can share knowledge across various levels of organisations and adapt processes in real time to reflect stages of recovery. Interviewees also noted that there were opportunities to develop the implicit capabilities during 'peace time' prior to an event occurring, and build this resilience during planning and preparation stages.

The research team concluded that the respondents initial focus on explicit capability requirements rather than the implicit capability requirements, represents a blind spot for government organisations involved in recovery. This conclusion reinforced the research team's view that while DFES and other agencies concentrated efforts on better information sharing systems will help, they will not achieve maximum benefit unless there is also significant development of implicit capabilities which will support the operationalisation of this improved knowledge-sharing platform.

Further document analysis confirmed that the requirement for implicit capabilities to support knowledge sharing is acknowledged (Valachamy et al, 2022) but little evidence of a tool or plan to build implicit capabilities in organisations was evident.

Key Finding 3

COLLABORATION: The community only sees one 'government'

Interviews highlighted significant potential to enhance recovery outcomes through improved inter-agency collaboration. Building stronger partnerships between agencies would enable more effective cross-sector communication and coordinated service delivery for affected communities.

A shared commitment to community wellbeing emerged as a powerful foundation for collaboration, with all agencies expressing strong motivation to achieve positive outcomes for disaster-affected areas. This common purpose provides a compelling platform for strengthening cross-government partnerships.

Two key factors currently influence the effectiveness of inter-agency collaboration:

1. **Differing organisational cultures shape how agencies approach their work.** DFES' highly effective command and control structure, essential for emergency response, contrasts with the more consultative, co-design approaches typically used by other agencies
2. **The importance of trust** underpins successful collaboration, particularly when sharing sensitive information and making critical decisions in uncertain environments. While trust takes time to establish through shared experiences, it underpins the open communication and confident decision-making essential for effective recovery operations.

Interviewee responses highlighted a range of attempts to foster improved collaboration between agencies, but identified a lack of coordination between DFES and other agencies which resulted in fragmented recovery efforts.

Suggestions for resolving this included explicit solutions such as a coordinated framework or taskforce for organisations to come together to share knowledge and priorities to develop a unified strategy for recovery in impacted communities. Interviewees also suggested changes which involved an implicit approach with a breaking down of silos through greater collaboration to prevent duplication of effort, ensuring a more coordinated and efficient recovery. There was also reinforcement for building collaboration through training to develop best practice for knowledge sharing and joint decision-making processes which support community outcomes.

Interviewees described poor collaboration as agencies not sharing or applying their individual lessons learned from previous disasters to inform improved collective recovery operations in the future. This creates a barrier to effective disaster recovery outcomes with errors and inefficiencies from previous recovery processes repeated by other agencies due to a lack of sharing and structured collective learning.

This lack of focus on lessons learnt is still occurring despite the 2020 Royal Commission into National Natural Disaster Arrangements finding that organisations involved in disaster management had failed to adequately learn from lessons identified in more than 240 previous enquiries across the country (Commonwealth of Australia, 2020, p. 502).

Kapucu's (2005) research on inter-organisational coordination in emergency response management recognises that 'in complex and turbulent environments, organisations frequently develop formal or

informal relationships in order to work together to pursue shared goals, address common concerns, and/or attain mutually beneficial ends' (p. 35) and that 'effective response and recovery operations require collaboration and trust between government agencies at all levels and between the public and nonprofit sectors' (p. 46).

This research reiterates what was expressed in interviews – the importance of preparing for disasters during 'peace time' and strengthening the capacity of government by investing in the networks and relationships required to foster greater collaboration and trust across government agencies when it is called upon.

The unseen bridges

After analysing the data collected in the interviews which correlated with our document reviews, the research team concluded that DFES and other government agencies involved in recovery activities with disaster impacted communities, need to provide greater clarity, improve capability and enhance collaboration to mature their knowledge sharing.

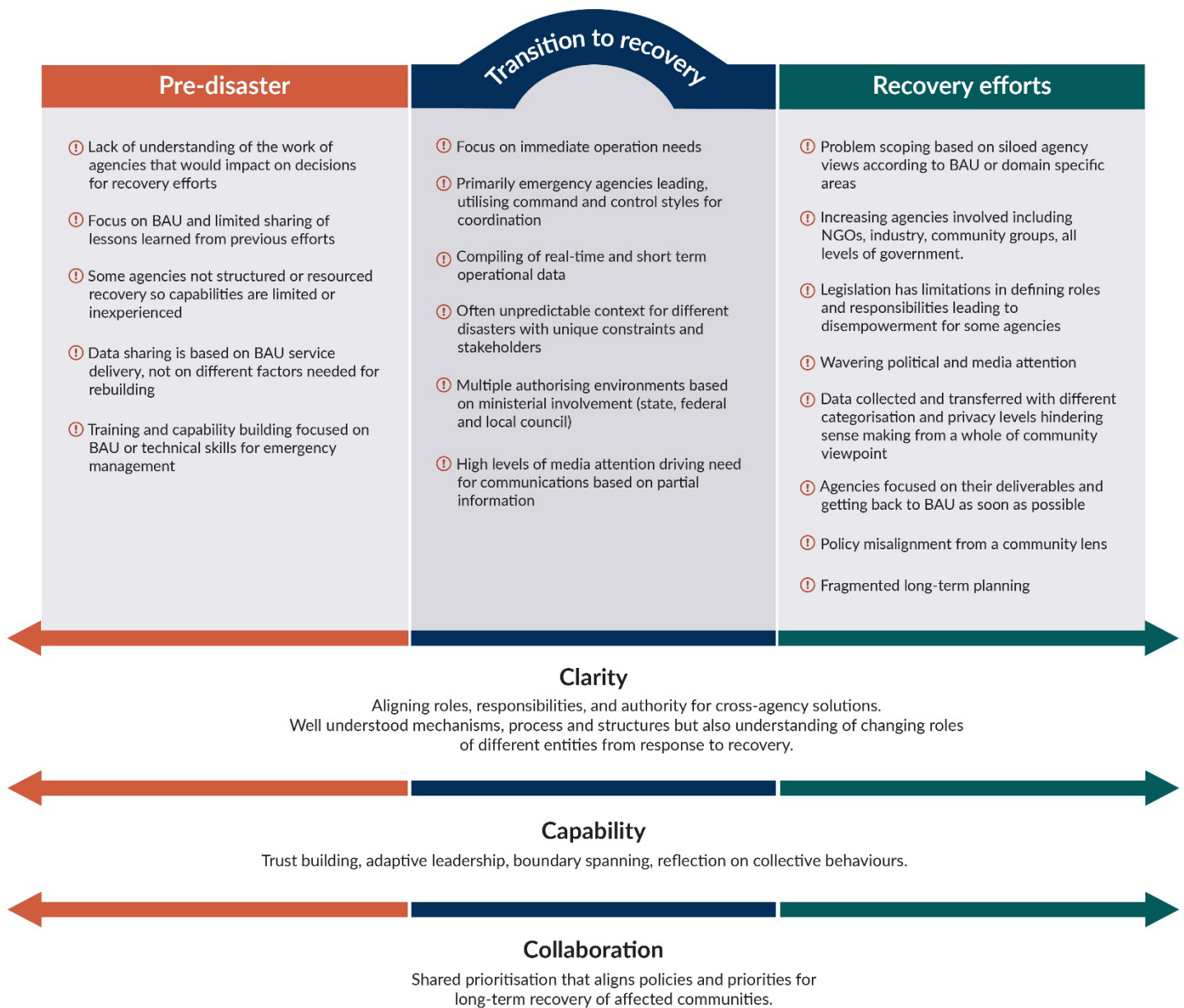
The requirements for sharing knowledge in the disaster response phase is focused on immediate operational needs with fewer agencies involved in delivering short-term, rapid and tactical data. The foundations for information sharing in the response phase are well established with emergency services organisations, with precision in the information and knowledge needed to inform their operations. In considering interview data it became clear that some of these foundations would be useful in the recovery phase, even though the knowledge sharing requirements are different and focused on a broader group of government departments providing data to inform slower, more complex and policy related planning.

Our focus narrowed to how the solid foundations of response could best span across the transition into the recovery phase by utilising improved knowledge sharing practices to build clarity, capability and collaboration. This was crystallised in the concept of **unseen bridges** – which can intentionally span the across chronological phases of disaster recovery (pre-recovery, transition to recovery and recovery efforts) by connecting multiple agencies together through knowledge sharing.

Figure 5 illustrates the **challenges** identified through the interviews with sharing of knowledge across the different phases of disaster recovery.

Figure 5

Strengthening the unseen bridge: Challenges



Boundary spanning

The research team considered the practical steps needed for organisations to build the unseen bridges between departments, by connecting agencies through a culture of knowledge sharing to deliver greater clarity, capability and collaboration to benefit communities. This is necessary to create a more solid foundation that mirrors the secure and well-established foundations of the response section of the bridge.

Strengthening the **culture of knowledge sharing** practices through greater clarity and focus on implicit skills will ensure the risk of continued gaps in knowledge sharing and service delivery during recovery are mitigated and in turn, contribute to progressing more impactful and explicit systems, frameworks and skillsets.

Collectively, a process for enacting these findings aligns closely with the boundary spanning concepts identified through the document analysis and literature review. They present an opportunity to **mature capability** across the public sector consistent with these themes.

The challenge of managing systemic multi-agency disaster recovery efforts require collaboration between stakeholders that have a shared intent but differing enabling and constraining realities. The importance of establishing trust between key agencies and an understanding of the context and culture in which others function is acknowledged as a substantial challenge but an essential element of effective partnerships that will improve collaboration to maximise outcomes for the community.

More transparent information sharing is acknowledged as a practical action to **improve inter-agency collaboration and efficiency**. The role of a knowledge broker, who works across group boundaries to connect bureaucratic silos in information critical situations is identified as a significant opportunity for improved outcomes (Ali et al, 2019). This function is referred to in literature as boundary spanning, the attempt to reach beyond individual organisation boundaries to coordinate broader capacities in the most effective and efficient manner to jointly solve problems (Kalkam, 2020). Individuals charged with this role are referred to as boundary spanners.

Developing capabilities in complex decision-making to direct practice and process (Ali et al, 2019; Rubin and Barbee, 1985), realising opportunities to proactively build social capital (Hishida and Shaw, 2014; Kapucu, 2006) whilst developing and deepening partnerships (Mitchell, 2006) are prioritised in literature as **required capabilities for boundary spanners** rather than disaster-specific technical expertise.

Models to realise the opportunities of a boundary spanner's role recognise the complexity of the task and have looked to develop and refine the required knowledge, skills and structures within individual actors and organisations ('t Hart and Sundelius, 2013). Solution focused coaching models (Lam, 2022), identification of non-technical skill categories in high-risk occupations (Flin et al, 2008) and a focus on the role of creativity in complex problem solving (Brooks et al, 2019) supplement efforts to identify transferable process theories that could be applied to disaster management (Marjanovic and Hallikainen, 2013).

Literature identifies the concept of boundary spanning objects (artefacts) as tools available to support the boundary spanner (person) in their role and consolidate shared perspectives

between organisations and references the governance mechanisms that promote or inhibit realisation of their potential (Cumble and Sankar, 2012).

Consideration of the practical impact of formal boundary spanning objects such as organisational flow charts, meeting minutes and agency partnership agreements during an unfolding disaster and their potential role in prompting and strengthening the relationships required for improved boundary spanning is deepened by the notion of a boundary spanning object *in use* as discussed by Yenni et al (2017).



Image: Disaster assistance in Bunbury and Dardanup communities impacted by a storm on 1-2 June 2024, WA (Source: DFES)

06

Recommendations

Recommendations

The recovery phase following a natural disaster offers unique challenges that require a coordinated and collaborative effort between key stakeholders within all levels of government. This research report clearly identifies that DFES is expected to play a crucial leadership role in government disaster recovery efforts. This includes the appointment of a State Recovery Coordinator to lead decision-making and coordination across multiple agencies and stakeholders during the transition both to and through recovery.

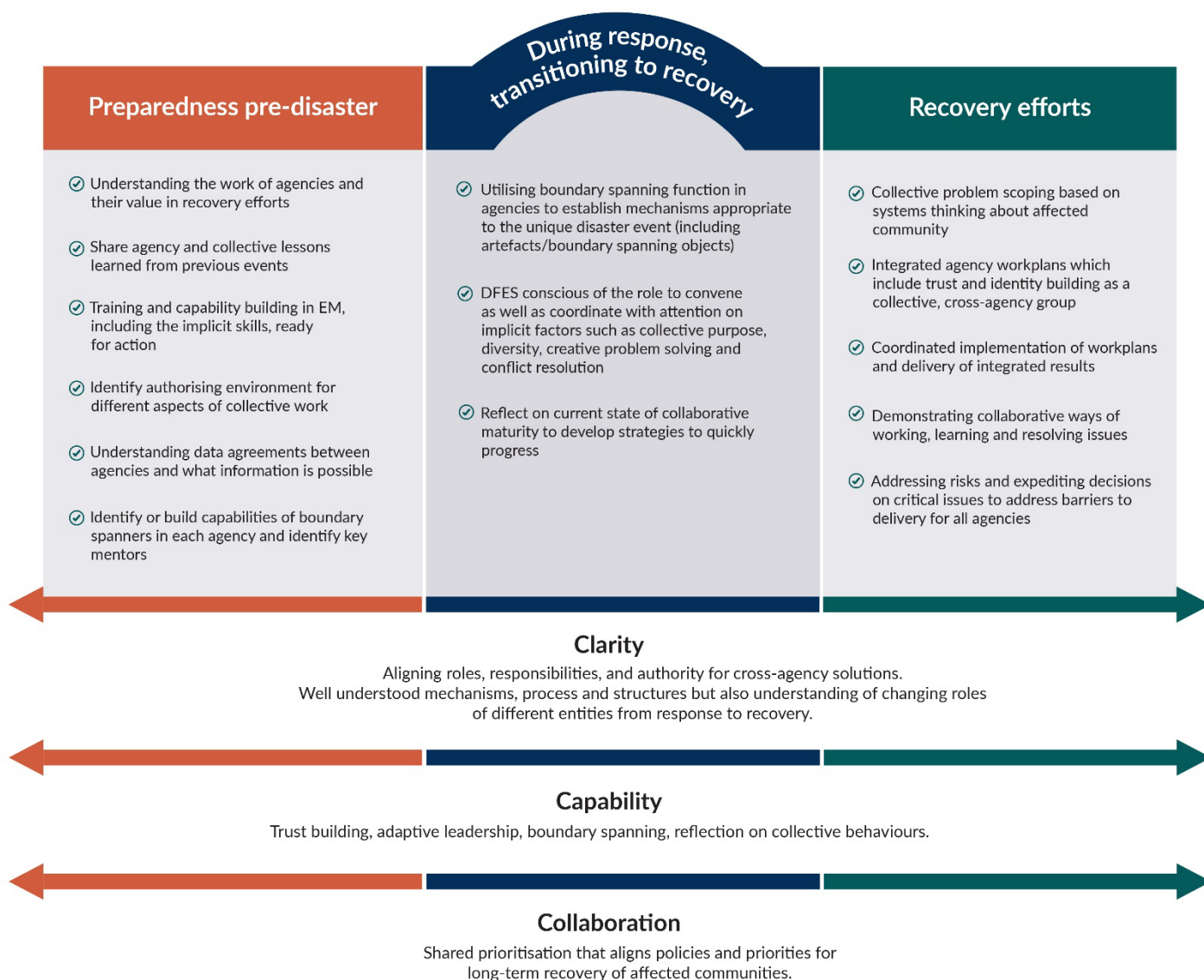
The findings of the research clearly show that suboptimal information sharing and coordination between government agencies impact the desired outcomes. Literature on adaptive processes in emergency management emphasises the need for flexibility, continuous learning and collaborative decision-making (Comfort et al, 2010). Effective emergency management requires a multi-faceted approach encompassing explicit technological solutions that are supported by implicit factors such as organisational culture, leadership and inter-agency relationships (Kapucu and Garayev, 2016). Interviews conducted across a range of government stakeholders during this research project indicated that reluctance of stakeholders to share the right information and failure to collaborate effectively undermines the recovery process and impacts the ability to successfully rebuild communities, physically and emotionally, following a disaster event.

Current efforts to mitigate this risk do not pay sufficient attention to the implicit elements that underpin the effective implementation of explicit tools. Without maturing approaches to the way cross-agency recovery work is strategically and operationally planned and conducted, the impact of technological and revised organisational documentation will fail to address this risk and expose the WA Government and community.

The recommendations are based on the foundations of clarity, capability and collaboration and are represented in Figure 6 across the recovery timespan – from preparation, to during the response phase and into long-term recovery.

Figure 6

Strengthening the unseen bridge for better knowledge sharing



DFES' role in coordinating disaster recovery demands sophisticated knowledge sharing and coordination capabilities. These recommendations address the critical gaps identified through research and stakeholder consultation, focusing on the interplay between explicit enablers (frameworks, systems and processes) and implicit enablers (organisational culture, leadership and relationships). The recommendations include immediate actions for implementation within 12-18 months and medium-term actions to complete within 18-24 months. Each recommendation forms part of an integrated approach to improve DFES' coordination of recovery efforts.

Immediate actions – to be implemented in 12-18 months

Recommendation 1 – Continuous Improvement Focus

DFES develops and implements a comprehensive *Strategic and Operational Knowledge Sharing and Coordination Maturity Framework* for disaster recovery operations (see Figures 7, 8 and 9).

Timing: 12-18 months

Lead: DFES Recovery, Strategy and Policy group with State Recovery Coordination Group

NOTE: These frameworks should be implemented across all established Recovery Domains – Social, Built, Economic and Environment – to ensure comprehensive coverage of recovery efforts.

Strategic Framework Considerations – see Figure 7

- a. Establish clear maturity levels for knowledge sharing and coordination capabilities with specific benchmarks and indicators
- b. Develop assessment tools that:
 - measure current capabilities
 - track progression through maturity levels
 - identify areas for improvement
 - monitor implementation effectiveness
- c. Incorporate both strategic and operational elements that:
 - align with existing emergency management frameworks
 - support cross-agency coordination
 - enable a flexible response to different disaster scenarios
 - facilitate continuous improvement
- d. Establish regular review mechanisms that:
 - assess framework effectiveness
 - capture lessons learned
 - incorporate stakeholder feedback
 - enable framework evolution
- e. Ensure framework components address:
 - information coordination
 - standardised knowledge sharing processes
 - coordinated action protocols
 - strategic integration methods
 - optimised collaboration practices

Operational Framework Considerations – see Figures 8 and 9

- f. Ensure framework components address:
 - information coordination
 - standardised knowledge sharing processes
 - coordinated action protocols
 - strategic integration methods
 - optimised collaboration practices.
- g. Establish consistent reporting mechanisms that:
 - document operational maturity levels
 - track progress across domains
 - highlight cross-domain dependencies
 - facilitate knowledge transfer
- h. Develop integration protocols that:
 - connect strategic and operational frameworks
 - ensure vertical alignment
 - enable horizontal coordination
 - support continuous improvement

Rationale

The Strategic and Operational Maturity Frameworks directly address the identified gaps in clarity and capability across agencies involved in disaster recovery. By providing structured improvement milestones and clear protocols for information sharing, these frameworks enable agencies to systematically enhance their collaborative capabilities and surface barriers that currently limit community outcomes. The inclusion of attention to both the strategic and operational enablers and a structured process to embed maturation within existing ways of working and across different hierarchical layers of agency organisations reinforces the intent of this recommendation.

The frameworks acknowledge the complex realities of disaster recovery operations in Western Australia, where each event's unique circumstances require both strategic oversight and operational flexibility. This dual approach reflects the research findings that effective recovery requires both explicit structures and implicit enablers working in harmony.

Implementation through the State Recovery Coordination Group leverages existing governance structures while fostering the development of improved cross-agency relationships identified as crucial in the research. Regular assessment and reporting mechanisms ensure that both strategic and operational improvements become embedded in organisational practice, leading to more mature knowledge sharing between agencies involved in state recovery efforts.

Figure 7

Strategic Knowledge Sharing and Coordination Maturity Framework

Maturity Strategic Cross Agency Leadership					
	Information coordination	Standardised knowledge sharing processes	Coordinated action	Strategic integration	Optimised collaboration
Maturation continuum description	Ad hoc and intentional knowledge sharing based on personal relationships and informal networks.	Standardised processes are introduced but not consistently used. Data and insights are shared however communication siloes between agencies remain.	There are clear protocols between agencies and agreed processes in knowledge sharing, joint planning and decision-making creating more alignment of objectives between key stakeholders. Data and insights are better shared through more integrated systems.	Knowledge sharing and coordination fully integrated into disaster recovery operations. Real-time data is accessible by all key-stakeholders and informing strategic decision-making while protecting sensitive information. Long-term recovery planning is in place and agreed on by all key agencies.	Continuous improvements to implicit and explicit processes are in place. DFES and partner agencies working harmoniously to share knowledge and coordinate action both during recovery and between events. Decision-making is agile, data-driven, and focused on long term recovery outcomes.
Challenges and impacts to overcome at this stage	No standard processes in place, which can reduce shared communication of information and build silos that may hinder or duplicate decision-making across agencies.	Incompatible tools and platforms that are not integrated between agencies. Engagement between agencies is improved but there remain gaps that are highlighted during recovery.	Agencies have different priorities or strategies. Continued reliance on various processes for knowledge sharing that are not integrated or easily accessible by other agencies. Communication is improved but gaps remain.	Maintaining this approach may still identify gaps between agency approaches and their commitment to continuing to collaborate this way in the long term based on conflicting priorities and changes in government.	Maintaining successful and meaningful collaboration between agencies. Staying ahead of new challenges as disaster recovery continues to increase and new events occur.
Recommended actions to progress maturation at this stage	Put in place basic communication tools such as regular meetings, and a centralised stakeholder contact matrix including roles and responsibilities to which all agencies have access.	Develop standardised processes for information sharing that all key agencies can access and/ or are invited to participate in; including meetings, accessible communication channels and storage of key information.	Introduction of regular inter-agency coordination meetings before, during and post disaster to improve communication and leverage insights from lessons learnt from previous events. Development of a centralised, accessible knowledge repository.	DFES implements accessible technological solutions (e.g. AI-driven analytics, real-time data dashboards) to enhance decision-making. Formalise long-term recovery frameworks across agencies.	Develop a culture of continuous improvement with regular review and updating of coordination and collaboration strategies as new challenges and solutions are presented.

Figure 8

Operational Knowledge Sharing and Coordination Maturity Framework

			Indicators of Maturation – A roadmap for continuous improvement			
Recovery Domain and Dimensions	Agencies engaged	Dimension interdependencies	Well intended co-operation	Co-ordinated action	Strategic integration	Optimised Collaboration
Dimensions are the core work relevant to the domain	Select agencies from Domain list relevant to each dimension	Identify interdependencies of dimension with other Domains/ Dimensions	Maturity Description - Agencies have independent processes focused on task achievement - There is recognition that sharing of information will increase impact and efficiency, however effectiveness is inconsistent and not embedded in practice	Maturity Description - Clear protocols between agencies and agreed processes in: - knowledge sharing - joint planning - decision-making - Data and insights are shared through more integrated systems	Maturity Description - Knowledge sharing and coordination fully integrated into holistic disaster recovery operations - Real-time data is accessible by all agencies engaged in the Dimension - Knowledge sharing informs strategic decision-making	Maturity Description - Decision-making is agile, data-driven, and focused on long-term recovery outcomes - The outcomes of improving decision making are reflected on through collective ownership as a shared responsibility

Figure 9

Sample – Social Domain Maturity Framework

Social Domain	Agencies engaged	Dimension interdependencies	Well intended cooperation	Coordinated action	Strategic integration	Optimised collaboration
Sample dimensions have been identified as provocations. Please delete or add as needed	Department of Communities Department of Education Department of Justice Department of Health Department of Local Government, Sport and Cultural Industries Mental Health Commission		Maturity Description - Agencies have independent processes focused on task achievement - There is recognition that sharing of information will increase impact and efficiency, however effectiveness is inconsistent and not embedded in practice	Maturity Description - Clear protocols between agencies and agreed processes in: - knowledge sharing - joint planning - decision-making - Data and insights are shared through more integrated systems	Maturity Description - Knowledge sharing and coordination fully integrated into holistic disaster recovery operations - Real-time data is accessible by all agencies engaged in the Dimension - Knowledge sharing informs strategic decision-making	Maturity Description - Decision-making is agile, data-driven, and focused on long-term recovery outcomes - The outcomes of improving decision making are reflected on through collective ownership as a shared responsibility
Food			Evidence Challenges Enablers	Evidence Challenges Enablers	Evidence Challenges Enablers	Evidence Challenges Enablers
Medical and health services			Evidence Challenges Enablers	Evidence Challenges Enablers	Evidence Challenges Enablers	Evidence Challenges Enablers

Recommendation 2 – Capability Focus

DFES establishes a structured cross-agency capability development program focused on building knowledge sharing and collaboration skills.

Timing: 12-18 months

Lead: DFES in partnership with Public Sector Commission

Consideration should be given to:

a. implementing training in collaborative leadership that focuses on:

- facilitating inter-agency cooperation
- managing competing priorities
- building trust across agencies
- fostering collaborative decision-making

b. developing crisis communications capabilities including:

- clear and timely information sharing
- effective stakeholder engagement
- consistent messaging across agencies
- adaptive communication strategies

c. building data literacy and analytical skills through:

- technical systems training
- data interpretation workshops
- information management practices
- quality assurance processes

d. fostering boundary spanning capabilities by:

- identifying, developing, and implementing boundary spanners
- creating cross-agency networks
- establishing liaison roles
- building sustainable relationship management skills

Rationale

All agency representatives acknowledged they could identify the aspects they could be doing better but none could clearly identify how to progress. The development of a comprehensive cross-agency professional learning plan will help unfreeze the current state to promote change and consolidation before refreezing (Lewin, 1947).

Collaborative leadership training focused on facilitating inter-agency cooperation will significantly improve trust-building across agencies. This approach helps align strategic objectives and manage competing priorities more effectively. By promoting collaboration as a key leadership expectation and as a remedy to hierarchical and siloed leadership approaches, agencies will cultivate leaders who confidently and curiously seek out and share information.

Effective communication is identified as an essential element underpinning success during the recovery phase (Australian Red Cross, 2022). Training leaders and staff to deliver clear, accurate, effective and simple communication in a timely way will foster a shared culture of impactful communication within DFES and between agencies.

Building capabilities to support implementation of explicit elements enables implicit skills to evolve. As the demand for real-time information grows, DFES must enhance its technological capabilities. Training staff in the use of digital platforms and coordination tools is crucial for improving the ability of DFES to access and share timely information with key stakeholders. Training in data analysis and interpretation will bolster staff capability to make informed decisions during recovery efforts. This enhanced skillset will empower staff to confidently access crucial information and discern which stakeholders require specific data, thereby supporting a more effective recovery effort.

The capability building of boundary spanning skills and dispositions across all agencies will cultivate a common language and mode of operating. This is a step towards overcoming the cross-agency cultural barriers that currently inhibit effective collaboration and mitigate the impact of siloing which creates individual and narrow output-related measures of success. Commitment to an effective and efficient cross-agency, community-focused and community-rooted system response will enable DFES to foster a shared concept of what success means whilst still enabling individual agencies to maintain the focus of their individual agency identity and respond to downward hierarchical pressures.

Medium-term actions – to be implemented in 18-24 months

Recommendation 3 – Collaboration Focus

DFES implements a systematic approach to building and maintaining strategic networks across partner agencies.

Timing: 18-24 months

Lead: DFES with State Recovery Coordination Group

Consideration should be given to:

- a. establishing formal liaison positions that:
 - facilitate regular communication
 - coordinate joint activities
 - share critical information
 - maintain strong relationships
- b. creating regular inter-agency forums for:
 - relationship building
 - knowledge sharing
 - collaborative planning
 - problem-solving
- c. developing structured networking opportunities through:
 - joint training exercises
 - shared planning sessions
 - communities of practice
 - professional networks
- d. implementing trust-building initiatives including:
 - shared projects
 - collaborative decision-making
 - joint risk management
 - mutual capability building
- e. embedding boundary spanners in partner agencies to strengthen cross-agency relationships

Rationale

Established positive relationships are the cornerstone of successful knowledge sharing across all platforms and contexts in disaster recovery. This research report has shown that strong relationships between key agencies and stakeholders form the foundation of effective coordination and collaboration in disaster recovery. While technology and processes are important, the development of robust networks and trust is paramount. These networks are pivotal during a disaster and into recovery, however it is beneficial to strengthen the foundations prior to the immediacy of emergency management. These interpersonal elements foster strong connections between recovery teams that in turn consolidate trust and the sense of security in affected communities, ultimately building a more resilient disaster recovery management framework. In addition to more explicit processes such as regular inter-agency meetings and joint training and exercises, which DFES is already putting in place, embedding boundary spanners into partner agencies will build trust and better connections.

Recommendation 4 – Culture Focus

DFES develops and implements a strategy to enhance organisational culture supportive of knowledge sharing and collaboration.

Timing: 18-24 months

Lead: DFES Executive Leadership Team

Consideration should be given to:

- a. reviewing and adapting internal structures to:
 - support collaboration
 - facilitate information flow
 - enable quick decision-making
 - promote knowledge sharing
- b. establishing clear expectations for:
 - knowledge sharing behaviours
 - collaborative practices
 - inter-agency engagement
 - information management
- c. developing recognition systems that:
 - reward collaborative behaviour
 - encourage information sharing
 - promote boundary spanning
 - support cultural change
- d. implementing change management processes including:
 - leadership modelling
 - change champions
 - progress monitoring
 - feedback mechanisms

Rationale

As DFES enhances its technical solution for inter-agency information and knowledge sharing, strengthening organisational implicit structures is equally crucial. These include organisational culture, capability development, and relationship management. These foundational elements underpin operationalisation of these formal processes and are crucial for achieving optimised collaboration.

Analysis of stakeholder interviews and documentation reveals that organisational culture plays a critical role in disaster recovery effectiveness. When knowledge-sharing and coordination processes mature beyond technical solutions, they create the foundation for the implicit enablers identified through stakeholder interviews. Integration of these processes across agencies addresses the siloed approaches currently limiting recovery efforts. Enhanced cross-agency accessibility and transparency directly counter the cultural barriers identified in the research, fostering the trust and collaborative relationships essential for effective recovery operations. This cultural transformation enables agencies to move from the command-and-control dispositions suited to emergency response toward the collaborative approaches required for successful long-term recovery.

Implementation Principles

The following principles have been developed to assist DFES to put in place the recommendations in this report:

1. Implement recommendations as an integrated package
2. Establish regular progress monitoring and reporting
3. Maintain flexibility to adapt to changing circumstances
4. Prioritise strong stakeholder engagement
5. Clearly communicate changes and expectations
6. Conduct regular effectiveness evaluations
7. Allocate resources in a sustainable manner

Implementing these recommendations will strengthen DFES' disaster recovery coordination and knowledge sharing capabilities. The recommendations address both explicit and implicit enablers essential for an effective transition from immediate response to long-term recovery. Clear frameworks, enhanced capabilities and stronger collaborative relationships will improve Western Australia's disaster recovery coordination. Explicit structures create the visible mechanisms for coordination, while implicit elements provide the essential foundational support that ensures effective implementation and sustainability. Adoption across immediate and medium-term timeframes must be prioritised to achieve better outcomes for communities through coordinated, multi-agency recovery efforts.

07

Conclusion

Conclusion

This research project has explored how the Department of Fire and Emergency Services (DFES) in Western Australia can enhance its knowledge-sharing capabilities with key government agencies during the critical transition from disaster response to long-term recovery. The findings highlight the significant role that 'implicit' enablers play in fostering effective collaboration and strategic decision-making in the complex disaster recovery environment.

While DFES has made substantial progress in developing technical solutions and formal (explicit) structures for disaster management, considerable opportunities for improvement remain in areas such as organisational culture, leadership approaches, inter-agency relationship development and informal networks. Bringing these implicit factors to the forefront is crucial in enabling effective knowledge sharing and collaborative decision-making, particularly during the challenging transition from immediate response to long-term recovery.

Fostering the adoption and development of boundary spanning skills and dispositions have emerged as a key strategy for addressing the identified issue of insufficient knowledge-sharing capacity and capability within DFES. By developing boundary spanning skills across their workforce and valuing individuals who can work across organisational boundaries to connect bureaucratic silos in information-critical situations, DFES can significantly improve its ability to coordinate broader agency capacities and jointly solve problems with partner agencies.

The recommendations provided offer a comprehensive approach to addressing these challenges. The development of both strategic and operational knowledge sharing and coordination maturity frameworks provide a clear roadmap for DFES and its partner agencies to systematically improve their collaborative capabilities. This strategic framework serves as a boundary spanning object, fostering shared understanding and promoting cross-agency cooperation. The focus on workforce development and training addresses the need for enhanced skills in collaborative leadership, crisis communications, technology use and data literacy, all essential capabilities for effective boundary spanners. The focus on workforce development and training addresses the need for enhanced skills in collaborative leadership, crisis communications, technology use and data literacy, all essential capabilities for effective boundary spanners, are enacted within refinement of the operational matrix which serves a 'boundary spanning object in use' purpose.

Building better connections through network development and trust-building initiatives recognises the importance of strong interpersonal relationships in effective disaster recovery management. The recommendation to review DFES' foundational implicit structures emphasises

the need for organisational change to support and sustain these improvements, creating an environment where boundary spanning can thrive.

Implementing these recommendations has the potential to significantly enhance DFES' ability to coordinate and lead effective disaster recovery efforts across Western Australia. By improving knowledge sharing with key government agencies, DFES can better inform strategic decision-making, leading to more comprehensive and sustainable support for affected communities. This, in turn, can contribute to increased community resilience and more effective use of resources to support recovery efforts.

The findings of this research have broader implications for emergency management practices across Australia and internationally. As disasters become more frequent and complex, the need for effective knowledge sharing and coordinated recovery efforts becomes increasingly critical. The focus on the unseen 'implicit' enablers and the concept of boundary spanning provides valuable insights that can be applied in various disaster management contexts.

In conclusion, this research has addressed a critical need in Western Australia's emergency management landscape. By focusing on how DFES can better share knowledge with key government agencies during the transition to long-term recovery, it contributes to more effective strategic decision-making and, ultimately, to the building of more resilient and empowered communities. Connecting distant partners, these knowledge sharing pathways provide the essential structural support that strengthens the entire emergency recovery system. Implementing the recommendations outlined in this report can significantly enhance DFES' capacity to fulfil its crucial role in leading effective disaster recovery, contributing to improved outcomes for government and communities in WA. Like unseen bridges connecting distant partners, these knowledge sharing pathways provide the essential structural support that strengthens the entire emergency recovery system.

08

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Appendices



Image: Ex-Tropical Cyclone Ellie destruction (Source: The West Australian)

Appendix A – Glossary

Terms	Description
Boundary Spanning	A resource, tool or mechanism that connects internally and externally across organisational boundaries to facilitate information flow
COAG	Council of Australian Governments – the peak intergovernmental forum in Australia overseeing policy reform of national significance and which require co-operative action by Australian governments. More recently, this has become known as National Cabinet.
DFES	Department of Fire and Emergency Services in Western Australia – the lead agency responsible for coordinating disaster response and recovery efforts across the State.
Disaster Recovery	The support of emergency-affected communities in the reconstruction and restoration of physical infrastructure, the environment, and community, psychosocial, and economic wellbeing (from s3 <i>Emergency Management Act 2005</i> (WA))
Disaster Response	The combating of the effects of an emergency, provision of emergency assistance for casualties, reduction of further damage, and help to speed recovery (from s3 <i>Emergency Management Act 2005</i> (WA))
Emergency Management Act 2005	An Act to provide for prompt and coordinated organisation of emergency management in WA.
Explicit Enablers	Visible, structural elements that mostly take the forms of technical systems, legislation, best practices and compliance and reporting protocols.
Implicit Enablers	Less formal cultural elements of how people relate, learn and organise. Implicit enablers are less tangible, more dynamic and harder to measure and shift.
Long-term Recovery	The phase of disaster recovery that is focused on rebuilding affected communities over an extended period of time.
Pre-disaster	The period of time before a disaster occurs (sometimes referred to as ‘peace time’) where planning and preparation for recovery efforts occur.
Recovery efforts	The period of time where agencies undertake disaster recovery work which extends across short, medium and long-term horizons.

State Recovery Coordinator / State Recovery Controller	An appointed individual responsible for state-level involvement in disaster recovery when the severity of an event exceeds local capacity.
Strategic and Operational Knowledge Sharing and Coordination Maturity Framework	A framework that outlines different levels of maturity in knowledge sharing and collaboration to guide DFES and partner agencies in improving their capabilities over time.
Transition to recovery	The period of time during an emergency situation where agencies shift efforts from immediate disaster response to recovery.
International Emergency Management Agencies or Disaster Recovery Groups	
FEMA	Federal Emergency Management Agency (United States)
NEMA	National Emergency Management Agency (New Zealand)
Public Safety Canada	Public Safety Canada / Sécurité Publique Canada (Canada)
Reconstruction Agency	An agency established to coordinate reconstruction activities related to national disasters (e.g. earthquakes, tsunamis and nuclear disasters) (Japan)
Recovery Coordinating Group	A group that is established / stood up to manage and co-ordinate the recovery process and may be at a regional or local level (depending on the scale and nature of the emergency) (UK)
State Recovery Coordination Groups	
DBCA	Department of Biodiversity, Conservation and Attractions
DFES	Department of Fire and Emergency Services WA
DLGSC	Department of Local Government, Sport and Cultural Industries
DOCs	Department of Communities
DPC	Department of Premier and Cabinet
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage

DTWD	Department of Training and Workforce Development
DWER	Department of Water and Environmental Regulation
Education	Department of Education
Finance	Department of Finance
Health	Department of Health
JTSI	Department of Jobs, Tourism, Science and Innovation
Justice	Department of Justice
MHC	Mental Health Commission
MRWA	Main Roads WA
SBDC	Small Business Development Corporation
Tourism WA	Tourism WA
Transport	Department of Transport
Treasury	Department of Treasury
WARDA	WA Regional Development Australia

Appendix B – State Recovery Coordination Groups

Pre-formed State Recovery Coordination Groups

