

Article

Disaster Risk Reduction in Bushfire Prone Areas: Challenges for an Integrated Land Use Planning Policy Regime

Simone Ruane ^{1,2,*} , Mohammad Shahidul Hasan Swapan ¹  and Courtney Babb ¹

¹ School of Design and the Built Environment, Curtin University, Kent Street, Bentley, WA 6102, Australia; m.swapan@curtin.edu.au (M.S.H.S.); c.babb@curtin.edu.au (C.B.)

² Curtin University Sustainability Policy Unit (CUSP), School of Design and the Built Environment, Curtin University, Kent Street, Bentley, WA 6102, Australia

* Correspondence: simone.ruane@postgrad.curtin.edu.au

Received: 9 November 2020; Accepted: 14 December 2020; Published: 15 December 2020



Abstract: The need for an integrated approach to disaster risk reduction (DRR) is widely promoted across the contemporary disaster literature and policy discourse. In Australia, the importance of integrating bushfire management and land use planning systems is a growing priority as bushfire risk in urbanized areas increases. This paper examines the changing policy landscape towards an integrated DRR regime for land use planning and bushfire management in south-west Western Australia. The research is based on a qualitative analysis of policy documents and in-depth interviews with policy actors associated with this regime. The results identify several challenges of policy integration for an integrated land use planning and bushfire management DRR regime, including incompatible worldviews, sectorial objectives and knowledge sets. A lack of cross-sectoral understanding, different risk tolerances and instrument preferences also constrained integration efforts. Based on our findings, we argue that rule-based mechanisms, which establish a legal framework for integration, are necessary when different policy goals and worldviews prevail between policy sectors. However, we conclude by emphasizing the value of actor-based mechanisms for integrated DRR policy regimes, which enable ongoing cross-sectoral communication and policy learning and facilitate a systems-oriented perspective of disaster resilience in the built environment.

Keywords: disaster risk reduction; bushfire management; land use planning; policy integration; resilience

1. Introduction

Bushfires (also known as wildfires) are an intrinsic feature of the Australian landscape; however, as a result of changing climatic conditions, the southern regions are experiencing an increased incidence of extreme bushfire events [1]. The recent catastrophic bushfires, referred to as the “Black Summer” of 2019–2020, burned over 10 million hectares, mostly around the south-east of Australia, resulting in 33 deaths and the loss of more than 3000 homes [2]. These devastating impacts highlight the vulnerability of wildland urban areas (WUI), where human settlements are interspersed within or adjacent to bushland. Bushfires in WUI areas can have profound ramifications for human safety, property and other important values. Furthermore, urban development can increase bushfire risk, by changing the rates of ignition, modifying vegetation types, fragmenting landscapes and by introducing new forms of fuel [3,4]. These interacting variables raise many complex public policy questions regarding how to reduce the disaster risk of bushfire in the built environment.

Historical bushfires in southern Australia have demonstrated the detriment of past land use planning decisions, which allowed development within bushfire prone areas without incorporating

adequate protection measures [5]. Over the past decade, Australian states have undergone significant policy reforms of their planning systems to address this issue by strengthening bushfire considerations in planning controls and new development processes [6–8]. In Western Australia, this manifested with the release of the “Living in Safer Places” policy reform package of 2015 for planning in bushfire prone areas [9]. These reforms included the comprehensive redesign of instruments that cut across the bushfire management and land use planning sectors to reduce bushfire risk. While bushfire-related policies and instruments differ between Australian states, the overarching goal of bushfire planning instruments is to reduce disaster risk by locating settlements away from potential fire fuel hazards, and to incorporate design elements that support emergency response, asset protection, safe refuge and evacuations during a bushfire event [10].

Informing the policy reforms that have transpired across Australia is an emerging body of literature that illustrates why an integrated bushfire management and land use planning policy approach is crucial for disaster risk reduction (DRR) [5,11,12]. The foci of studies include the historical interactions between land use planning and bushfire management [13], implications of bushfire risk management for planning professionals [14], fundamental design principles for bushfire resilient urban planning [11] and other theoretical and practical issues of planning in bushfire prone areas [6]. It is emphasized that bushfire becomes a greater risk, and a potential disaster event, when it interacts with the built environment, threatening lives and properties [15].

Despite consensus for an integrated policy approach for bushfire DRR, in practice, integrating traditionally specialized policy sectors can be challenging given the various policy actors involved and their different organizational mandates and operational scales [6]. To date, few studies empirically examine the conditions that can enable and constrain policy integration in practice for this increasingly critical policy regime. This study contributes to the emerging field of knowledge for integrated bushfire DRR by using an in-depth qualitative case study approach to address the following research questions: firstly, how did the policy landscape in the case study area change towards an integrated policy regime for bushfire DRR? Secondly, what conditions enable and constrain an integrated DRR policy regime for land use planning and bushfire management? Thirdly, what mechanisms could help address some of the integration challenges and facilitate a more effective integrative policy approach? Using the content analysis method of process tracing, we first map out the sectorial background of policy integration of a land use planning and bushfire management regime that emerged in Western Australian during the late 1980s. Secondly, we draw on expert interviews to examine the factors that have challenged integrative policy measures for this regime. Finally, we present some mechanisms that could assist with addressing some of these challenges and facilitate a more effective integration approach for planning in bushfire prone areas policy. A better understanding of the factors that constrain and facilitate policy integration for land use planning and bushfire management could help inform the formulation of more effective bushfire DRR policy approaches into the future.

2. Theoretical Background and Conceptual Framework

2.1. Cross-Sectoral Synergies—Rise of an Integrated Approach to Disaster Risk Reduction

Since the 1990s, there have been increased calls for integrated policy approaches to address issues arising from public policy fragmentation and governmental silos [16,17]. Much of the earlier literature regarded integration as a necessary component of sustainable development [18,19] and focused predominately on the policy domains of natural resources and environmental management [20]. However, more recently, the need to move away from a top down, command and control regime associated with traditional emergency response and adopt an adaptive and integrated disaster risk reduction approach has received growing attention [21]. Advocates for integrated DRR argue for the involvement of multiple sectors and governmental levels, the inclusion of diverse forms of knowledge and the collective action of citizens, policy makers, experts and scientists across the full spectrum of disaster prevention, preparedness, response and recovery (PPRR) [22,23].

An integrated approach to DRR has featured as an imperative of several international policy agendas. Notably, the United Nation's Sendai Framework for Disaster Risk Reduction emphasizes the urgency of integrating DRR "within and across all sectors" of society [24] (p. 36). Further, the United Nations Sustainable Development Goals (SDGs) highlight the interrelationship between DRR and sustainable development and the importance of integrated policy strategies for sustainable DRR [25]. In Australia, reinforcing the international policy agenda, the National Disaster Risk Reduction Framework (2018) calls for integrated action across various sectors to achieve better solutions [26]. More specifically, the framework emphasizes as a national DRR priority that "[i]nfrastructure, land use and development planning and practices must be integrated, strategic and adaptive to avoid creating new disaster risk" [26] (p. 15).

2.2. Defining Policy Integration

Despite widespread support for integrated DRR, the term integration is broadly interpreted in the DRR literature and has been criticized for being ill-defined and an elusive ideal [27]. Furthermore, the concept of policy integration, a narrower term specifically concerned with intentional policy design for cross-cutting policy issues [28], has received minimal attention in the DRR literature. Only recently has policy integration been presented as a critical element of shifting from reactive emergency management to a DRR model that addresses the root causes of disaster risk [22] and as a necessary component of adaptive disaster governance [29].

Policy integration has been defined as a phenomenon whereby one or more interdependent policy sectors (also referred to in the literature as policy domains or subsystems) of a policy regime pursue shared or mutually supportive goals through the implementation of cross-cutting instruments and the cooperation of a network of policy actors [30]. Policy regimes can be conceptualized as overarching public policy objectives that entail the addressing of a particular problem or set of problems (for example, environmental protection, education, biosecurity and disaster risk reduction) [31,32]. Meijers and Stead [33] emphasize policy integration as the recognition of sectorial interdependencies and the collaborative attempts to pursue mutual consistency between policy sectors' various goals. While policy integration has been construed as an output or end state [34,35], other scholars maintain that policy integration is not inevitably a desired, static outcome, but a dynamic process of institutional change towards more cohesive policy regimes [28,36].

Integration within a policy regime can occur horizontally (occurring between different government agencies and departments at the same level) and or vertically (between the different levels of government and sectors of society) [37]. An integrated policy regime will often comprise a mix of both vertical and horizontal integration [16,33]. Furthermore, policy integration generally involves interest coalition subsystems comprised of non-government organizations and private actors, who function as knowledge brokers, peak bodies and political advocacy groups who are key to the decision-making processes and influence implementation [36,38].

It is important to note that although related notions of collaboration and coordination are intrinsic to policy integration, policy integration is a much more comprehensive term than these concepts. Collaboration and coordination refer more to the administrative structures that facilitate joint activities and holistic working between diverse sectors and agencies [17]. In contrast, policy integration generally entails the development of new policies [33] and the restructuring of governing arrangements associated with public sector reform [37]. More specifically, it is policy integration's focus on the creation or redesign of specific cross-cutting policy instruments, which merge the professional practice of sectors [17], which sets it apart from the broader objectives of collaboration and coordination.

2.3. Conditions that Enable and Constrain Policy Integration

A review of the policy integration literature examining policy regimes other than bushfire DRR outlined similar conditions that can facilitate or constrain reforms to strengthen policy integration. For example, in a study of a flood management regime in Switzerland, integrating the policy sectors of

land use planning, forest management and water protection, Metz, Angst and Fischer [29] showed that policy integration relies upon both legal frameworks (laws and regulations that institutionally mandate or incentivize integration) and actor-based coordination (administrative structures, working portfolios and communicative arrangements). While legal frameworks can promote effective actor-based integration, shared values and goals across the regime's subsystems are critical to its success. Another comparative study of transport policy in London and Berlin [16] suggested several integration mechanisms. These included governance structures based on legislative frameworks; network structures that facilitate communication and coordination of actors; procedural elements which include scheduling tasks and stakeholder engagement; instrumental elements such plans and policies; and, finally, broader enabling conditions, particularly the capability of actors to work in a cross-sectoral policy context [39,40].

Many authors concur that policy integration is strongly influenced by levels of political will and the governance mode of the time [41,42]. While much of the literature claims that policy integration is best supported by a networked governance mode [34,39], in the case of integrating urban form and road transport, Rode [16] argues that a hybrid form of governance, which combines both a networked governance approach with hierarchical centralization, may be more effective for policy integration. Interestingly, this author found that, in some cases, integration relied upon the reinstatement of a hierarchical, top-down approach [16].

What also emerges from the policy integration literature is that the success of integration appears to depend not only on administrative and structural mechanisms, but also largely on several "soft" elements including trust, a culture of collaboration, policy learning and an openness to new ideas and ways of working. It is suggested that these softer elements can be constrained by the diverging institutional logics and cultural worldviews of the various subsystems that comprise a policy regime, as these underpin how the different policy actors frame the problem at hand, their instrument preferences and their willingness to work collectively [43]. Based on a review of the literature, five key policy integration dimension categories were identified: a coordinated subsystem interaction, cultural compatibility, coherence of goals, cross-sectoral understandings and consistency of instrument mix. Table 1 presents a comprehensive overview of key conditions that can enable or constrain policy integration in practice under these categories.

Table 1. Conditions enabling and constraining policy integration.

| Dimension | Enabling Condition | Constraining Condition | Key Literature |
|-----------------------------------|--|--|---|
| Coordinated subsystem interaction | Political will and a government mode supportive of policy integration. | Lack of political support and a government favoring sector specialization. | Rode [16], Candel and Biesbroek [28], Rouillard et al. [44], Meijers and Stead [33], Briassoulis [34], Stead and Meijers [45] |
| | Effective administrative, financial and legislative structures. | Administrative fragmentation, insufficient resources and inadequate legislation. | Rode [16], Briassoulis [34], Rouillard, Heal, Ball and Reeves [44], Nordbeck and Steurer [19], Metz, Angst and Fischer [29], Stead and Meijers [45] |
| | A lead subsystem and other committed subsystems. | Lack of leadership and subsystem commitment. | Briassoulis [34], Meijers and Stead [33], Rode [16], Stead and Meijers [45] |

Table 1. Cont.

| Dimension | Enabling Condition | Constraining Condition | Key Literature |
|-------------------------------|--|--|---|
| Cultural Compatibility | Subsystems share similar worldviews. | Subsystems have diverging worldviews. | Briassoulis [34], Candel and Biesbroek [28], Metz, Angst and Fischer [29] |
| | Subsystems have a collaborative culture and willingness to share decision-making. | Subsystems prefer sectorial specialization and retaining decision-making power. | Metz, Angst and Fischer [29], Nordbeck and Steurer [19], Cumiskey, Priest, Klijn and Juntti [27], Stead and Meijers [45] |
| | Subsystems share a common understanding of the policy problem/s. | Subsystems frame the policy problem/s differently. | [27], Nilsson and Persson [46], Candel and Biesbroek [28], Stead and Meijers [45] |
| Coherence of sectorial goals | Congruent and compatible policy goals. | Incoherent goals and an absence of an overarching strategic vision. | Candel and Biesbroek [28], Metz, Angst and Fischer [29], Rouillard, Heal, Ball and Reeves [44], Candel and Pereira [39], Meijers and Stead [33], Cumiskey, Priest, Klijn and Juntti [27], Rayner and Howlett [20], Briassoulis [34] |
| | Subsystems' specific specialized responsibilities align with overarching policy regime goals. | Misalignment of subsystems' specialized responsibilities with overarching policy regime goals. | Meijers and Stead [33], Briassoulis [34], Cumiskey, Priest, Klijn and Juntti [27] |
| | All relevant subsystems of the regime are involved in developing policy goals. | Failure to involve all relevant subsystems in developing policy goals. | Stead and Meijers [45], Candel and Biesbroek [28] |
| Cross-sectoral understandings | Policy actors willing to engage with new knowledge, and information is shared across subsystems. | A reluctance of policy actors to embrace new knowledge, and information and data sharing is constrained. | Cumiskey, Priest, Klijn and Juntti [27], Briassoulis [34], Stead and Meijers [45] |
| | Various opportunities available for cross-disciplinary learning for actors. | Limited opportunities for actors to gain knowledge outside of their core discipline. | Metz, Angst and Fischer [29], Cumiskey, Priest, Klijn and Juntti [27], Metz, Angst and Fischer [29], Briassoulis [34] |
| | New knowledge and policy frames produced through instrument co-design and policy learning processes. | Instruments designed by the dominant subsystem with limited opportunities for policy learning and knowledge sharing. | Cumiskey et al. [27], Briassoulis [34], Rayner and Howlett [47] |
| Consistency of instrument mix | Policy instruments are compatible with the overarching policy goals. | Instruments are inconsistent and fail to address the overarching regime policy goals. | Rayner and Howlett [20], Briassoulis [34], Candel and Biesbroek [28], Trein, Meyer and Maggetti [17] |

Table 1. Cont.

| Dimension | Enabling Condition | Constraining Condition | Key Literature |
|-----------|--|--|---|
| | Instruments mix cuts across the subsystems and merges the professional expertise of subsystems. | The instrument mix is the result of policy layering and characterized by duplication, gaps and failure. | Candel and Biesbroek [28], Trein, Meyer and Maggetti [17] Howlett, Vince and Pablo del [37] |
| | Flexible instruments with review and monitoring mechanisms that allow for readjustment and adaptation. | Rigid policy instruments with inadequate review and monitoring mechanisms to enable readjustment and adaptation. | Meijers and Stead [33], Briassoulis [34], Stead and Meijers [45] |

In line with the overarching theoretical direction and identified criteria in Table 1, the following sections examine the integration of land use planning and bushfire management policy by presenting a case study from south-west Western Australia (south-west WA).

3. Materials and Methods

Over the last decade, Australia has experienced many bushfire events with catastrophic impacts that have highlighted the need to strengthen land use planning's role in bushfire risk reduction. In particular, an inquiry into a major bushfire in the Perth Hills in 2011 resulted in the Western Australian government introducing a whole government policy reform package, "Living in Safer Places", in 2015, to better integrate bushfire protection considerations into planning decisions at all levels [9]. It is now 5 years since the implementation of these policy reforms and a critical reflection on the developments of an integrated policy approach for land use planning and bushfire management in WA is warranted and timely.

While the recent policy reforms discussed in this paper apply to the whole state of Western Australia, the focus area of this study is south-west WA (The south-west of Western Australia defined herein refers to a geographical area broadly correlating with the South West Land Division, the South West Agricultural Region and the South West Australian Floristic Zone.) (Figure 1). South-west WA not only comprises around 80% of the state's current population [48] but is a highly bushfire prone geographical area with the frequency of high-intensity bushfires with catastrophic impacts predicted to increase as a result of climate change [49]. The selection of this case is also justified given the dearth of empirical research conducted to date examining the interactions between the bushfire management and land use planning in this geographical area.

This research employed a qualitative case study approach, which involved the analysis of both policy documents and semi-structured interviews. Taking European settlement in south-west WA (1826) as a starting point, an extensive desktop search of state library catalogues, archives of WA legislation, national bushfire inquiries and online information available for public agencies in south-west WA was undertaken and a comprehensive database of bushfire management and land use planning documents was compiled. Furthermore, experts from each of the key agencies involved were consulted with to suggest historical policy documents considered significant to this research.

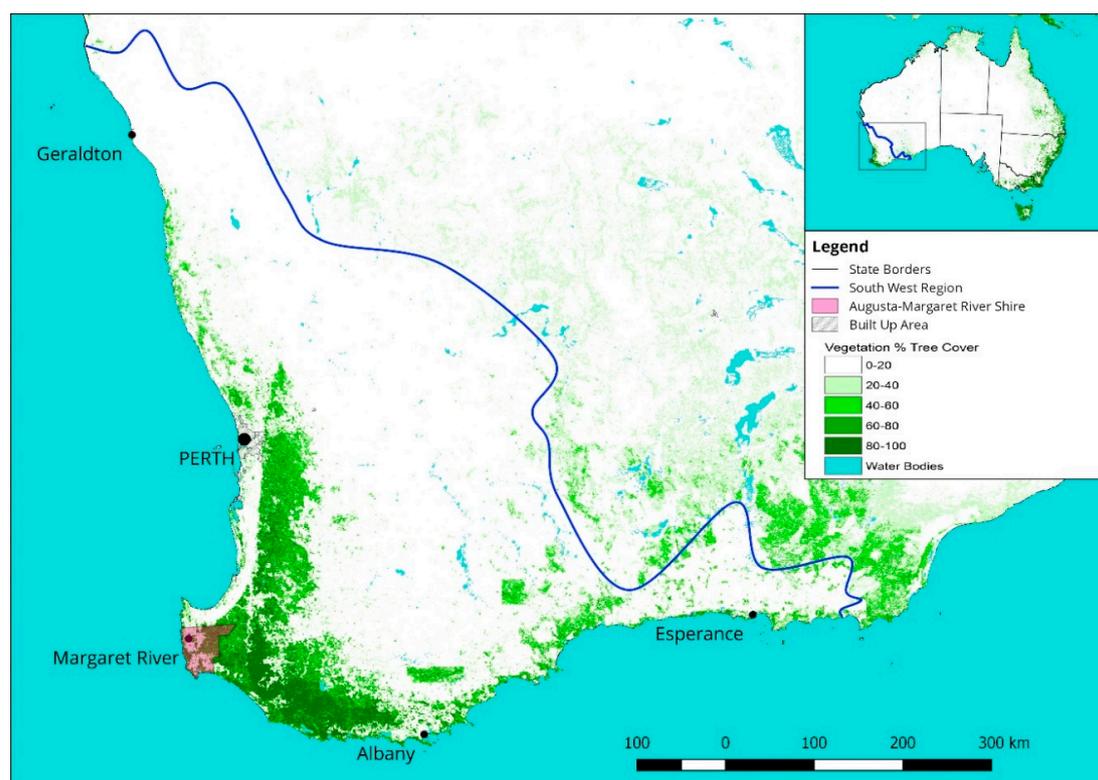


Figure 1. South-west Western Australia (Sourced from Ruane [50]).

Interviewee selection used both purposive and snowballing methods, culminating in twenty in-depth semi-structured interviews conducted over 2017–2020 with policy actors representing the integral subsystems of the case study policy regime (Table 2). In Australia, under a federal system of government, both land use planning and fire and emergency services are administered by state government agencies, with core responsibilities delegated to local government. Interviewees therefore included representatives from south-west WA local governments including the Shire of Augusta-Margaret River, the City of Kalamunda, the Shire of Mundaring and the City of Cockburn, and state government agencies involved in the policy development and or implementation of the recent planning in bushfire prone areas policy reforms. Furthermore, interviews with representatives from other non-government sectors, including private bushfire consultants and peak body the Western Australian Local Government Association (WALGA), who were considered an integral part of this policy regime, were also included to get a broad perspective. The interview schedule was framed around the research questions and sought to garner critical insight into the enabling and constraining conditions of policy integration associated with the policy reform package introduced in 2015 for planning in bushfire prone areas.

Table 2. Sector organization/policy subsystem and number of representatives interviewed.

| Sector Organization/Policy Subsystem | Number of Interviewees |
|---|------------------------|
| Department of Fire and Emergency Services (DFES) | 3 |
| Department of Planning Lands and Heritage (DPLH) | 2 |
| Western Australian Local Government Association (WALGA) | 1 |
| Bushfire Consultants | 4 |
| Local Government Planners | 6 |
| Local Government Senior Executive Staff | 2 |
| Local Government Environmental Managers | 2 |

Note: All local governments included in the study were located in south-west Australia (Figure 1) with designated bushfire prone areas.

The qualitative analysis of documents was approached using a case study method of process tracing to determine how the interactions between the bushfire management and land use planning policy sectors emerged and changed overtime. Process tracing focuses closely on determining the sequencing of events and identifying causal mechanisms that explain specific outcomes [51]. Drawing from historical institutionalism, the process tracing technique was used to identify path dependencies, critical junctures and other intervening variables that were considered drivers and impediments of change [51,52]. Interviews were recorded and transcribed, and statements were categorized and analyzed thematically using the conceptual framework presented in Table 1. The themes used for coding related to actor interactions, policy framing, sectorial and regime policy goals, cross-sectoral understanding and knowledge transfer and instrument preferences and perspectives. Particular attention was given to how the different dimensions of policy integration, which had been identified in studies of other policy regimes, were enabled or constrained in the case study subject. The results of the interviews are presented in Section 4 and critically discussed in relation to the findings of previous policy integration studies in Section 5.

4. Results

This section sets the context for an integrated policy regime for land use planning and bushfire management in Western Australia. Firstly, we present a historical account for the emergence of a policy regime referred to at the time as “bushfire protection”, highlighting key drivers and policy developments that instigated change and strengthened the integration of these traditionally autonomous sectors in WA. Following this, we analyze and discuss interviews conducted with policy actors representing the organizational sectors/policy subsystems who were involved in the development and or implementation of the 2015 bushfire planning policy reforms. More specifically, the interview analysis elicits key challenges of disaster policy integration for bushfire risk reduction arising in this particular case study.

4.1. *The Emergence of an Integrated Policy Regime for “Bushfire Protection”*

In 1983, Australia’s worst bushfire event at the time, Ash Wednesday, burned over more than 300,000 hectares in Victoria and South Australia, resulting in 75 deaths and the loss of more than 2000 homes [53]. Recommendations emanating from a Royal Commission investigation into Ash Wednesday emphasized land use planning’s critical role in bushfire risk reduction [54]. Following this catastrophic bushfire, Australia’s first national inquiry into bushfires drew attention to the inadequate attention state governments had given to bushfire risk in land use planning frameworks across Australia [55]. This report recommended that state and local governments apply land use planning controls for the design and siting of housing and introduce zoning mechanisms to guide development in bushfire prone areas [55]. Consequently, there was an acceleration of policy action in many Australian states to strengthen the integration of bushfire protection into their land use planning systems [56].

Following the lead of Australia’s south-eastern states, in 1989, WA’s State Planning Commission (the statutory authority for planning decision making for WA) in conjunction with the Western Australia Fire Brigades Board (WAFBB) (the governing authority for fire and emergency management) jointly released the “Planning for Better Bushfire Protection” guidelines [57]. This seminal publication, which encouraged the consideration of the bushfire hazard into rural-residential development, was the first attempt at operationalizing bushfire protection into WA’s planning system. This guidance instrument introduced a methodology for local governments, which relied upon the professional expertise of WAFBB, for undertaking bushfire hazard assessments to identify areas suitable for residential intensification. For areas identified as suitable for development, the guidelines recommended that bushfire protection measures, including vehicle access, water supply and strategic fire breaks, be implemented during the zoning and subdivision phase [57]. The release of this publication represents the emergence of a nascent policy regime for “planning for bushfire protection”. This regime relied upon the integration of the land use planning and bushfire management sectors through knowledge

sharing and the transfer of professional expertise across traditionally specialized and independent sectorial subsystems.

In the early 1990s, there were further attempts in WA to advance the weighting of bushfire protection in land use planning decision making. In particular, a higher-order strategic state policy on planning for hazards stated that local planning decisions should consider bushfire risk and include fire protection measures in bushfire prone areas [58]. During this period, however, our analysis found little evidence to suggest this policy goal and framing instrument was widely applied by WA local governments. However, in a highly bushfire prone forested region of south-west WA, the Shire of Augusta-Margaret River (Figure 1), the study identified pioneering bushfire protection measures integrated into a local planning instrument, in the form of a rural planning strategy [59].

Following the devastating Victorian Black Saturday 2009 bushfires, which resulted in 173 deaths and 2156 properties destroyed, the imperative of better integrating bushfire risk into land use planning decision making made its way up on the political agenda [5]. In WA, this resulted in the release of an updated, joint edition of the “Planning for Bushfire Protection Guidelines” between the Fire and Emergency Service Authority (FESA) (formally the WAFBB) and the Western Australian Planning Commission (WAPC, formally the State Planning Commission) [60]. Despite encouraging “local governments to adopt the guidelines as policy” [60] (p. 2), these guidelines continued to have no legislative effect [61].

The Perth Hill’s Fire in 2011, an extreme bushfire in the WUI of Western Australia’s capital city Perth, resulting in more than 500 homes being evacuated and 79 homes being destroyed, was a critical juncture for planning in bushfire prone areas in WA [61]. The need to redesign land use planning instruments to reduce bushfire risk was emphasized throughout the special inquiry report into this bushfire event [61]. In particular, concern was raised in the report that the key planning instruments for bushfire risk reduction were not legally mandated through WA’s land use planning system and that local governments had the discretion to declare bushfire prone areas and adopt the recommended measures in their local schemes and policies. It was noted that although local governments had been encouraged to designate bushfire prone areas within their districts, at the time of the Perth Hill’s Fire, only two out of 138 WA local governments had done so and thus were required to comply with the bushfire planning and construction requirements, despite south-west WA’s propensity for bushfire [61]. Hence, a core recommendation of the special inquiry report included transferring the authority for declaring bushfire prone areas from local governments to the state government and giving the “Planning for Bushfire Protection Guidelines” legislative effect [61].

As a result of the recommendations emanating out of the Perth Hill’s Fire special inquiry, a state-wide bushfire planning policy reform package, “Living in Safer Places”, was released in 2015 [9]. To give bushfire protection the highest level of planning control, these reforms entailed the development of a new State Planning Policy, “Planning in Bushfire Prone Areas” (SPP 3.7). This higher-level framing instrument provided guidance for land use planning decisions to address bushfire risk at all levels of planning, both strategic and statutory, to “have the effect of increasing community resilience” [62] (p. 1).

In summary, our historical review of policy developments revealed that the integration of bushfire management and land use planning policy did not emerge as a completely new policy regime in 2015. In fact, integration developed incrementally as the result of the learnings gained from several significant bushfire events, through to the recent planning reforms, which accelerated integrative policy action. Indeed, our analysis found that an integrated policy regime for planning in bushfire prone areas was first established in the form of non-binding guidance and recommended procedures in 1989, and that these early instruments laid down a path dependency for future policy integration developments.

4.2. The Challenges of Policy Integration for Planning in Bushfire Prone Areas

In the following sections, we present the key policy integration challenges that emerged from expert interviews. Using the conceptual framework presented in Table 1, we examine how the five core

dimensions of policy integration have been enabled or constrained in an integrated land use planning and bushfire management DRR regime for south-west WA.

4.2.1. Coordinated Subsystem Interaction

As outlined in Section 2, policy integration relies upon the interactions of two or more sectorial subsystems to address a boundary spanning problem, through the design or redesign of cross-cutting policy instruments [17]. As part of the whole of government “Living in Safer Places” policy reforms (2015), the state governing authorities for land use planning (DPLH and the WAPC) and the Fire and Emergency Services (DFES, formally FESA) remained the two key state governmental agencies in WA for an integrated policy regime now referred to as “planning in bushfire prone areas”. The interviewees provided critical insights into this dimension of policy integration. According to one of its representatives, the state’s planning department was best placed to be the lead agency to coordinate the development of a new planning policy for bushfire prone areas. It was noted by this interviewee that it was critical to convene a core working group that included representatives from the planning, fire and emergency and building sectors in the early stages of developing a new state planning policy for planning in bushfire prone areas (SPP 3.7) and an updated version of the policy guidelines. This also entailed significant consultation of DPLH, as the lead agency, with peak planning bodies and broader policy actors such as the Western Australian Local Government Association (WALGA) and the Urban Development Industry Association (UDIA). It was reported that the few local governments who had already designated bushfire prone areas prior to the reforms were also engaged to provide their input into the development of a new version of the guidelines. The extent of subsystem engagement (both formal and more broadly) was highlighted by interviewees as being more rigorous than for other public policy issues. It was commonly agreed that the success of integration for this regime was largely dependent on the engagement of the various subsystems who would ultimately be responsible for policy implementation.

In terms of development control, local governments continued to play a crucial role in operationalizing policies within their jurisdictions and remained as an integral subsystem of this bushfire planning regime. However, the legislative changes that were part of the 2015 reform measures changed the rules of the game for both the horizontal and vertical interactions between the regime’s sectorial subsystems. In particular, the responsibility for designating bushfire prone areas was transferred from local governments to the state through the Fire and Emergency Service (FES) Commissioner and as a result, a State Bushfire Prone Area Map was produced [63]. This binary map covers the whole state of WA, delineating bushfire prone areas which require further assessment for planning and development approvals [62]. Furthermore, DFES became the referral agency for new development applications that involved vulnerable, unavoidable and high-risk land uses in bushfire prone areas.

Interviewees highlighted the inclusion of bushfire consultants for additional technical expertise as a significant change to the regime’s governance structure. Notably, because of the 2015 reforms, bushfire consultants became an increasingly important private sector actor for this policy regime. As the majority of the state was declared bushfire prone, these changes increased the demand for bushfire hazard assessments and Bushfire Management Plans (BMPs) that were required to accompany development application proposals, providing an assessment of the bushfire risk for the site, and outlining how the development will comply with the bushfire protection criteria outlined in the policy guidelines.

4.2.2. Cultural Compatibility

Successful integration between diverse sector subsystems is greatly dependent upon an agreed problem framing, a sense of a common purpose between actors and an alignment of worldviews and institutional logic [28,29,31]. Overall, the view that bushfire DRR should be integrated within the planning system was common across all interviewees, regardless of what sector subsystem they represented. It was agreed that bushfire risk reduction was a responsibility of planning practice at

both a strategic and operational scale and that the recent reforms were necessary to address the failings of the preceding mix of policy instruments to meet the regime's overarching goal of reducing bushfire risk. For example, one interviewee asserted:

"bushfire risk should have been considered in all planning decisions ... but it wasn't ... No-one was enforcing it ... the guidelines talked about local government designating bushfire prone areas, which they didn't do" (DFES). This situation, according to another interviewee, "was increasing the vulnerability of communities at risk" (DFES).

In general, interviewees concurred that the policy reforms released in 2015 were a step in the right direction because, as one interviewee explained:

"... a lot of development in the past happened in vegetated areas where development should have NEVER ever happened from a bushfire point of view ... At least there's a check and balance now ... it's great for community protection" (Bushfire Consultant).

However, despite evidence of this agreed upon overarching strategic purpose, discussions with interviewees revealed a misalignment of core worldview perspectives and problem frames between the two main policy sectors of this bushfire DRR regime. Reflecting previous studies, actors that represented land use planning in this case study tended to frame bushfire management as a sustainability or socio-ecological issue [50,64] and favored solutions based on a human coexistence with bushfire [65]. Emerging from interviewees representing this sector was a strong narrative of balance and flexibility, i.e., the importance of addressing multiple objectives and balancing the many risks associated with urban development. While interviewees representing the land use planning sector supported a risk reduction approach, there was greater willingness to accept a higher level of risk and give equal consideration to other risks inherent in the built environment.

According to the literature, policy integration relies upon an institutional culture characterized by a willingness to engage in cross-sectorial collaboration and communication [33]. Our findings are broadly consistent with other studies [66–68], which suggest that the fire and emergency services sector in WA has retained a hierarchical institutional culture that is not considered conducive to collaborative policy approaches. Comments were made by several interviewees regarding the institutional culture of the fire and emergency management sector and how it was perceived as a significant barrier to an integrative policy approach. One interviewee noted:

"DFES have a very strong command and control structure. Similar to the army, similar to the police. People should obey their orders and they should do what they want" (Local Government Planner).

However, the culture and bias of the land use planning sector was also criticized by interviewees, described by some interviewees as being economically driven and politically influenced. Furthermore, the mantra of a "balanced" approach was challenged when the needs of the development industry were included in the mix:

the WAPC planning area is often quite pro-development ... the development industry, which is incredibly powerful, has a huge amount of influence on government, promotes land development as economic growth ... The state government certainly sees [land development] as a very strong economic driver for growth and for local governments it can be too (Local Government Planner).

Similarly, from the perspective of an interviewee representing the state fire and emergency services sector:

"There's a lot of vested interested in development, and preventing development at a local government level by designating any areas as bushfire prone [would result in] political backlash for [local governments], because [the developers] are often their local rate payers and voters" (DFES).

4.2.3. Coherence of Subsystem Goals

While discussions with interviewees indicated that the overarching goal of reducing the risk of “loss of life and property” was aligned at a general level, opinions conflicted at the conceptual, strategic and operational framing of policy objectives. From a state land use planning sector representative, the biggest challenge the cross-sectoral and intergovernmental working group faced was:

“to try and figure out what our shared goals would be. And that is ongoing . . . there’s goodwill there, but each agency is looking at its own patch.”

The fire and emergency sector’s overarching objective is to protect life and property, and the land use planning sector is to facilitate urban development and direct the distribution of different land use activities at various spatial scales. Simultaneously achieving both of these sectorial objectives without significant trade-off has proved difficult for the integrated policy regime examined. For a DFES interviewee, referring to the state’s planning sector: *“They’ve got a different role than us. They facilitate planning opportunities, tourism, and new development and so forth . . . and we’ve got a role to protect people, protect lives.”* From the perspective of a local government planner, the role of local governments is *“to achieve a justifiable, development outcomes that balance various risks.”* This need for planning to balance multiple and competing objectives was contrasted with DFES’s singular objective of protecting lives. A DPLH interviewee considered that this singular objective does not align well with *“the varying shades of grey, which is the planning system.”*

According to another state land use planning representative:

DFES’s role is to ensure that people and property are not put at any risk. For planning, though, in decision-making, we need to consider a whole raft of things. We need to consider the demand for housing. We need to consider risks including bushfire. But there’s a whole raft of risks, other environmental policies, and protection of vegetation is a key one for planners (DPLH).

For DFES, however, the issue regarding the accountability for loss of life and property in the case of a bushfire event was emphasized:

“[Planners] are not responsible for the response when things go wrong . . . they won’t be the ones that get pulled out in front of the coronial inquiry . . . It’s DFES and DFES’ leadership that will be held accountable. But the actual problem was caused through planning decisions” (DFES).

This perspective is consistent with Bosomworth [64], who found that the fire and emergency services sector tends to attribute much of the current bushfire problem to planning legacy issues that have permitted development to occur in bushfire prone areas. Furthermore, our study resonates with a more recent study by Bosomworth [69], who identified that unrealistic expectations that decisions made by the fire and emergency management sector must be infallible have resulted in a culture of “blame avoidance”, thus limiting experimentation and flexible decision making within the sector.

4.2.4. Cross-Sectoral Understandings

Policy integration requires cross-sectoral understanding, facilitated through knowledge sharing and information exchange, to achieve more coherent policy outcomes [27,29]. There were several perspectives offered by interviewees regarding the production and use of knowledge in policy work. Interviewees noted aspects of the reformed regime that supported the ongoing development of knowledge practices to support integration, highlighting the importance of regular meetings, working groups and networking seminars, particularly those provided by important boundary-spanning organizations such as WALGA. However, an incompatibility of knowledge sets was raised as a key barrier to effective policy integration by interviewees from the different sector subsystems. Identifying a challenge to integration relating to knowledge, one DPLH participant noted:

“So, we have planners with no bushfire experience and then we have DFES staff, who are the reverse, they have a lot of technical expertise in the fire space and not so much in the planning space.”

Several interviewees expressed that a lack of cross-disciplinary understanding, i.e., the understanding of other sectors' systems and processes, presented a significant challenge for policy integration in this case study. A DPLH interviewee noted: *“at the time (of policy development) there was very little knowledge in DFES of planning systems and processes, so it was a bit of planning 101 for the [working] group.”* There was some suggestion that ensuring more cross-disciplinary knowledge be included within university curricula could help remediate this issue. Talking about this issue, one interviewee asserted: *“there needs to be the integration of bushfire training and expertise in your planning course and in other courses, . . . and if you're training in bushfire science, you need to have some sort of post-grad in planning, so that you come out with experts in the field, both as consultants and as decision-makers.”*

Furthermore, several interviewees questioned the competency and knowledge base of other subsystems involved. In particular, with regard to DFES' role as a referral agency and their assessment of a development application's compliance with the bushfire performance criteria or alternative solutions to these, a local government senior planner reported:

So when I've questioned [DFES] on the assumptions and been told, 'you'll need this much amount of research to back that up before DFES will support that.' And when I asked them what research supports their current position, they have none . . . so you start to question the integrity of the whole thing.

This view was echoed by the bushfire consultants, with one who felt that:

DFES doesn't appear to have the expertise or resources to assess an alternative solution-so they can't approve it . . . DFES is always going to be risk averse . . . it's in their nature, they're never going to go out on a limb and say, “Oh look, we don't really understand this alternative solution, but yeah, it looks fine . . . go for it.”

Overall, interviewees from all subsystem sectors emphasized the importance of evidence-based practice for policy work that spans across the bushfire management and planning domains. In particular, our study resonates with previous studies that have found that the fire and emergency sector tends to frame bushfire as a technocratic, emergency risk management problem best dealt with using scientific and evidence-based DRR methods [64,70,71]. For example, one DFES interviewee stated:

“Let's have a scientific basis for our mapping or a new methodology and that's how we should proceed, not on any other basis.”

However, discussions with interviewees revealed a tension regarding who was best positioned to provide the technical bushfire evidence. From the perspective of a DFES interviewee, the quality of technical advice provided by bushfire consultants in their bushfire management plans for development proposals was substandard, and they believed that the bushfire planning consultant accreditation process should be more heavily regulated through a licensing system administered by a government body. Other interviewees, however, felt that the rational, evidence-based approach taken by the fire and emergency sector in their assessment of bushfire management plans was too *“black and white”*, limiting the opportunity for more flexible, alternative solutions for developments in bushfire prone areas, which adequately considers other risks and factors that underpin a resilient community.

In summary, our analysis revealed that interviewees from the different sectorial subsystems tended to draw on different sources of “evidence” to support their already embedded views on the bushfire problem and best solutions. These findings highlight that expert knowledge claims do not simply erase tensions between conflicting values and agendas [70].

4.2.5. Consistency of Instrument Mix to Address Policy Goals

It is reiterated throughout the policy integration literature that achieving a greater level of policy integration is dependent, not only on subsystem collaboration, but relies upon a supportive mix of cross-cutting policy instruments that address the regime's overarching policy goals [20]. The mix of instruments that were implemented as part of the 2015 policy reform package resulted in a centrally-driven and legally-binding framework for planning in bushfire prone areas in WA. While the majority of interviewees agreed a more consistent and mandatory approach was needed, some local government planning and bushfire consultant interviewees contended that the standardized bushfire instruments were indifferent to local variation and the needs of local government to balance a range of land use planning objectives. According to a bushfire consultant:

"They've brought it all back to central advice point. But what that also means is the people providing that advice are not familiar with the location."

Another challenge identified in the case study regime regarded the ownership of instruments, particularly evident within matters that concerned the implementation of policy. As one interviewee (DPLH) noted, the policy guidelines were "co-badged" between the state's key planning and fire and emergency agencies but were "turn(ed) into a state planning policy to give it the highest effects." While the policy integration literature emphasizes the importance of a lead or "parent" agency to steer the integration process [33], unanticipated power relations were identified in the new policy settings and mix of instruments by interviewees of this case study. According to a DFES interviewee:

the crux of the development of the policy, and the guidelines is that the policy is developed under the Planning Development Act . . . So, even though the guidelines are co-badged, it can be frustrating because it's not done under our regulation, it's not done by our agency, the state planning policy is not our policy. So, our ability to influence the content is curtailed.

Another DFES interviewee explained:

Our role is to assess the Bushfire Management Plan against the policy and the guidelines and provide advice—not back to the consultant, but to the decision maker—and it's advice only. So, it's not mandatory . . . We're just one referral agency and planning proposals get referred to other organizations, environment and so forth.

However, despite the limitations of the fire and emergency services sector legislative decision-making power regarding land use planning decisions, DFES largely defines the parameters of risk in which decisions regarding strategic planning and land development are now made. It was revealed by an interviewee from the peak body for local governments in WA (WALGA) that despite the "advice only" role of DFES, many local government planners are hesitant to go against the advice provided by DFES, even though they have the discretion to do so, for fear of going against any advice related to people's lives. This fact calls for a more coordinated and flexible mix of policy instruments to address such a complex but immensely important risk management sector.

5. Discussion

The first question of this study sought to determine how the policy landscape in the case study area changed towards an integrated DRR policy regime. Interestingly, the findings of our analysis found that while the recent 2015 "Living in Safer Places" policy reforms significantly accelerated the integration of the bushfire management and planning sectors, this integrated policy regime first emerged in 1989 following Australia's most catastrophic bushfire at the time and subsequent inquiry recommendations. As evident in other policy research, the "bushfire protection" regime was strengthened overtime through a series of small and gradual policy developments [72], what has been referred to as incremental adaptation for DRR [71]. Furthermore, the policy changes to strengthen the

integration of this regime continued to be based on recommendations of inquiries emanating from significant bushfire events and were also influenced by the growing trend towards a more preventative approach to DRR.

Our study substantiates previous institutional change research that demonstrates how once a particular institutional configuration of a policy regime is established, it generally becomes highly stable, resistant to change and path-dependent [73,74]. The results of this case study reveal that although the 2015 policy reforms accelerated institutional and policy change, these changes were not entirely novel, but were based on a redesign of existing instruments and assessment methodologies and relied upon already established institutional roles. Hence, the evolution of an integrated bushfire management and land use planning regime towards greater integration in the case of south-west WA represents what Streeck and Thelen [75] refer to as the result of layering, where new rule structures and instruments are gradually superimposed over existing ones. Our findings therefore support the claim by Rayner and Howlett [20] (p. 99) that the integration of a policy regime does not occur on a “clean slate” but is “embedded in pre-existing contexts where the relics of earlier policy initiatives are found in paradigms, institutions, practices and established actor networks.” The influence the Perth Hills Fire (2011) had on accelerating institutional change in WA to strengthen the integration of bushfire management and land use planning is consistent with other research indicating that the transformation of a policy regime is often the result of a crisis or destabilizing event [32], referred to as a critical juncture [74].

The second question of this study sought to identify conditions that enable and constrain an integrated DRR policy regime for bushfire planning which is intensively reported through the interview results. It is contended that integrative policy regimes are much more likely to be successful when policy actors and sectors agree on policy goals, share worldview values and have an aligned institutional logic [29,34]. Our findings suggest that the different historically embedded sectorial responsibilities of the various sectors and their diverging worldviews present a significant challenge for the integrated DRR planning regime between land use planning and bushfire management. In particular, a recurrent theme emerging from the interviews was that the underpinning values and culture of the fire and emergency services sector were not conducive to an integrated policy approach [71]. In contrast, the WA land use planning sector seemed to be notably influenced by a sustainable worldview perspective and versed in collaborative approaches [76] that seek to balance the various risks and the multiple objectives of urban development. However, despite this finding, there was concern raised that the WA land use planning sector’s greater risk tolerance, at both the state and local government level, is heavily influenced by broader factors of economic growth, political agendas and developer rights. Furthermore, significant tensions were identified regarding the legitimacy of actors positioned as bushfire experts, providing the technical advice to assist the regime in making appropriate “evidence-based” decisions. This tension was particularly notable between bushfire consultants and the state’s fire and emergency services lead agency (DFES) who repeatedly questioned each other’s competencies.

The dearth of knowledge that policy actors possessed outside of their core sectorial disciplines and a lack cross-sectoral understanding of other sectors’ organizational specialized objectives were also identified as key constraints to policy integration for the case study examined. In particular, it emerged that although the fire and emergency sector is positioned as a key referral authority for this regime, the sector was perceived to possess an inadequate understanding of how the planning system functioned and what it was trying to achieve. More frequent interactions within academic and professional domains to explore cross-cutting issues between fire management and land use planning are highly recommended by the participants. Such initiatives were noted as a possible mechanism in overcoming constraints in policy integration as well as formulating more context-sensitive solutions.

It was revealed that the instrument mix for bushfire protection through WA’s land use planning system prior to the policy reforms of 2015 relied primarily upon framing instruments that were not legally binding. These mechanisms were implied in the special inquiry into the Perth Hills Fire as being a policy failure. This failure was attributed by interviewees to the fact that very few local governments

had declared bushfire prone areas, and where they had, there were substantial inconsistencies in their approach [61]. It was suggested that WA local governments had been reluctant to designate bushfire prone areas due to political and economic reasons contributing to additional costs for new development. These findings correlate with other research that has found that property rights are a strongly protected value within Australian states' planning systems and that this strongly influences the sector's instrument preferences for the management of natural hazards such as bushfire [77].

Another important finding of our study was the presence of important administrative, structural and communicative instruments that enabled policy integration between the two key sectorial subsystems and between the other various policy actors involved in the integrated DRR planning regime. This included framing instruments that articulated overarching policy goals, legal instruments that dictated procedures and obliged specific subsystem roles and responsibilities and communicative instruments such as working groups, information and networking seminars and regular interagency meetings that facilitated dialogue and deliberation. It was indeed noted by interviewees that opportunities for communication on the design and revision of policy instruments and planning decisions for this regime went above and beyond those that characterized other integrated planning regimes due to the potential impact of bushfires on human life.

According to Howlett, Vince and Pablo del [37], instruments that centralize control over local policy issues can assist with supporting vertical integration and consistency, particularly when there are diverging political interests and shared values. However, Meijers and Stead [33] point out that efforts to increase integration through a higher degree of central control can have the consequence of reducing the flexibility that is often required to deal with the local context of complex policy problems. Our findings are in line with studies that identify an unresolved tension within the literature regarding the need to formalize policy integration through legally binding instruments such as regulation and coordinated centralized control, while still maintaining the flexibility, adaptability and local level context [44]. In agreement with Rode [16], we suggest that, particularly for DRR, policy integration requires a hybrid governance model of both networked and hierarchical and centralized and decentralized structures and processes that are supported by both legally-binding instruments that support consistency but are supplemented by communicative, actor-based instruments that allow for some flexibility, local consideration and adaptive decision making.

The final question of this paper sought to identify the different types of mechanisms that facilitate policy integration as applied to a DRR policy regime of bushfire management and land use planning. Figure 2 summarizes the process/mechanisms and normative policy outcomes stemming from the interviews and the case study findings to promote policy integration. The framework demonstrates how key policy integration dimensions are applied and perceived in south-west WA, as well as aspired policy outcomes towards an integrated policy regime for bushfire and land use planning. It was evident in the case study that policy integration relied upon a coordinated system of both horizontal and vertical integration. Furthermore, the reforms to strengthen policy integration between bushfire management and land use planning required increased interactions and a co-produced planning approval system between public and private actors (i.e., bushfire planning consultants on behalf of development proposal applicants) to implement the policy and provide evidence-based expertise to assist decision making.

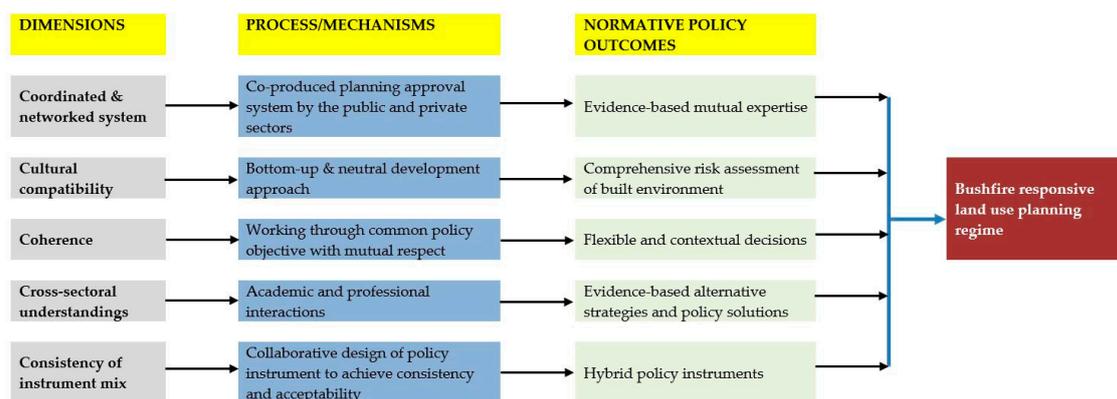


Figure 2. An overview of process and policy outcomes required for integrated bushfire and land use planning policy.

6. Conclusions

Through an empirical examination of a bushfire management and land use planning policy regime, applied to a case study area of south-west WA, this paper has contributed to an emerging body of research concerned with integrated DRR. This paper set out to identify: how the policy landscape in the case study area has changed towards an integrated DRR bushfire management and land use planning regime; the key enabling and constraining conditions of policy integration for this regime; and mechanisms that can facilitate policy integration in a DRR context.

We presented a framework (Figure 2) of five policy integration dimensions, process mechanisms and normative policy outcomes that can be used to promote policy integration. It is contended that policy integration is a process of institutional change and policy reform rather than a set of fixed policy arrangements [28]. The process and outcomes outlined for each dimension are inter-related and mutually inclusive.

In addition to essential resource-based mechanisms for policy integration including an appropriate level of funding, in-kind resources and the availability of qualified staff and training to implement integrative policy actions [27,28], our results confirm that a combination of both actor-based mechanisms and rule-based mechanisms [27,29] underpins the success of DRR policy integration. Actor-based communication and policy learning mechanisms such as working groups, on-going meetings, seminars and networking conferences were identified as critical enabling conditions for policy integration in this case study. Furthermore, it was suggested that additional policy learning opportunities could be facilitated by cross-sectoral secondments, joint-working arrangements, interdepartmental teams [27], cross-disciplinary university courses and other measures that support knowledge diffusion and a deeper cross-sectoral understanding.

Finally, our findings corroborate that of Metz, Angst and Fischer [29], who demonstrated that rule-based mechanisms in the form of a legal framework, which formalize and encourage actor interaction and delegate roles and responsibilities, are particularly important for policy integration for regimes characterized by diverging values and policy goals. Such rule-based mechanisms, including laws and regulation, statutory obligations, memorandums of understanding and cooperation agreements, standards, accredited assessments, information and data sharing protocols and procedural guidelines [27,43,44], have proven to be essential mechanisms for policy integration in this case study. However, we suggest that actor-based mechanisms that facilitate communication, policy learning and reflexivity across and within subsystems are critical to the success of an integrated DRR policy regime. Such policy learning mechanisms will support the diffusion of specific subsystem knowledge across sectors and between scientists, policy makers and other key policy actors, fostering the systems-orientated DRR perspective crucial for addressing the current and changing dynamics of complex disaster issues such as bushfire.

Author Contributions: This study was conceptualized by S.R. who also developed the methodology, collected and curated the data and prepared the original draft. M.S.H.S. contributed to the literature review, data analysis, discussion and conclusion. C.B. contributed to the literature review and data analysis. All authors contributed to developing the framework of five policy integration dimensions and their enabling and constraining conditions and identified process mechanisms and normative policy outcomes. All authors contributed to review and editing. All authors have read and agreed to the published version of the manuscript.

Funding: This research is supported by an Australian Government Research Training Program Scholarship.

Acknowledgments: The authors would like to acknowledge all the research interviewees who participated in this study.

Conflicts of Interest: There are no conflicts of interest.

References

1. Sharples, J.J.; Cary, G.J.; Fox-Hughes, P.; Mooney, S.; Evans, J.P.; Fletcher, M.-S.; Fromm, M.; Grierson, P.F.; McRae, R.; Baker, P. Natural hazards in Australia: Extreme bushfire. *Clim. Chang.* **2016**, *139*, 85–99. [[CrossRef](#)]
2. Davey, S.M.; Sarre, A. Editorial: The 2019/20 Black Summer bushfires. *Aust. For.* **2020**, 1–5. [[CrossRef](#)]
3. Gill, A.M. Landscape fires as social disasters: An overview of ‘the bushfire problem’. *Environ. Hazards* **2005**, *6*, 65–80. [[CrossRef](#)]
4. Bowman, D.M.J.S.; Balch, J.; Artaxo, P.; Bond, W.J.; Cochrane, M.A.; D’Antonio, C.M.; DeFries, R.; Johnston, F.H.; Keeley, J.E.; Krawchuk, M.A.; et al. The human dimension of fire regimes on Earth. *J. Biogeogr.* **2011**, *38*, 2223–2236. [[CrossRef](#)] [[PubMed](#)]
5. Kornakova, M.; March, A.; Gleeson, B. Institutional Adjustments and Strategic Planning Action: The Case of Victorian Wildfire Planning. *Plan. Pract. Res.* **2018**, *33*, 120–136. [[CrossRef](#)]
6. March, A.; de Moraes, L.N.; Riddell, G.; Stanley, J.; van Delden, H.; Beilin, R.; Dovers, S.; Maier, H. *Practical and Theoretical Issues: Integrating Urban Planning and Emergency Management: First Report for the Integrated Urban Planning for Natural Hazard Mitigation Project*; Bushfire and Natural Hazards CRC: Melbourne, Australia, 2018.
7. Browne, E.; Minnery, J. Bushfires and land use planning in peri-urban South East Queensland. *Aust. Plan.* **2015**, *52*, 219–228. [[CrossRef](#)]
8. Macintosh, A.; Foerster, A.; McDonald, J. Policy design, spatial planning and climate change adaptation: A case study from Australia. *J. Environ. Plan. Manag.* **2015**, *58*, 1432–1453. [[CrossRef](#)]
9. Buti, T. *Bushfire Planning and Policy Review: A Review into the Western Australian Framework for Planning and Development in Bushfire Prone Areas*; Government of WA: Perth, Australia, 2019.
10. March, A. Integrated Planning to Reduce Disaster Risks: Australian Challenges and Prospects. *Built Environ.* **2016**, *42*, 158–173. [[CrossRef](#)]
11. Gonzalez-Mathiesen, C. Nine design features for bushfire risk reduction via urban planning. *Aust. J. Emerg. Manag.* **2014**, *29*, 29–36.
12. March, A.; Rijal, Y. Interdisciplinary action in urban planning and building for bushfire: The Victorian case. *Aust. J. Emerg. Manag.* **2015**, *30*, 11–16.
13. Gonzalez-Mathiesen, C.; Ruane, S.; March, A. Integrating wildfire risk management and spatial planning—A historical review of two Australian planning systems. *Int. J. Disaster Risk Reduct.* **2020**, 101984. [[CrossRef](#)]
14. March, A.; Rijal, Y. Reducing Bushfire Risk by Planning and Design: A Professional Focus. *Plan. Pract. Res.* **2015**, *30*, 33–53. [[CrossRef](#)]
15. Gonzalez-Mathiesen, C.; March, A. Establishing Design Principles for Wildfire Resilient Urban Planning. *Plan. Pract. Res.* **2018**, 1–23. [[CrossRef](#)]
16. Rode, P. Urban planning and transport policy integration: The role of governance hierarchies and networks in London and Berlin. *J. Urban Aff.* **2019**, *41*, 39–63. [[CrossRef](#)]
17. Trein, P.; Meyer, I.; Maggetti, M. The Integration and Coordination of Public Policies: A Systematic Comparative Review. *J. Comp. Policy Anal. Res. Pract.* **2019**, *21*, 332–349. [[CrossRef](#)]
18. Visseren-Hamakers, I.J. Integrative environmental governance: Enhancing governance in the era of synergies. *Curr. Opin. Environ. Sustain.* **2015**, *14*, 136–143. [[CrossRef](#)]
19. Nordbeck, R.; Steurer, R. Multi-sectoral strategies as dead ends of policy integration: Lessons to be learned from sustainable development. *Environ. Plan. C Gov. Policy* **2015**, *34*, 737–755. [[CrossRef](#)]
20. Rayner, J.; Howlett, M. Introduction: Understanding integrated policy strategies and their evolution. *Policy Soc.* **2009**, *28*, 99–109. [[CrossRef](#)]

21. Djalante, R.; Holley, C.; Thomalla, F.; Carnegie, M. Pathways for adaptive and integrated disaster resilience. *Nat. Hazards* **2013**, *69*, 2105–2135. [CrossRef]
22. Wamsler, C.; Johannessen, Å. Meeting at the crossroads? Developing national strategies for disaster risk reduction and resilience: Relevance, scope for, and challenges to, integration. *Int. J. Disaster Risk Reduct.* **2020**, *45*, 101452. [CrossRef]
23. Paton, D.; Buergelt, P. Risk, Transformation and Adaptation: Ideas for Reframing Approaches to Disaster Risk Reduction. *Int. J. Environ. Res. Public Health* **2019**, *16*, 2594. [CrossRef] [PubMed]
24. UNISDR. *Sendai Framework for Disaster Risk Reduction 2015–2030*; United Nations International Strategy for Disaster Reduction: Geneva, Switzerland, 2015; Available online: <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030> (accessed on 1 November 2020).
25. UNISDR. *Disaster Risk Reduction and Resilience in the 2030 Agenda for Sustainable Development*; United Nations Office for Disaster Risk Reduction-New York UNHQ Liaison Officer: New York, NY, USA, 2015; Available online: https://www.preventionweb.net/files/46052_disasterriskreductioninthe2030agend.pdf (accessed on 1 November 2020).
26. Commonwealth of Australia. *National Disaster Risk Reduction Framework*; Affairs, D.O.H., Ed.; 2018. Available online: <https://www.homeaffairs.gov.au/emergency/files/national-disaster-risk-reduction-framework.pdf> (accessed on 1 November 2020).
27. Cumiskey, L.; Priest, S.J.; Klijn, F.; Juntti, M. A framework to assess integration in flood risk management: Implications for governance, policy, and practice. *Ecol. Soc.* **2019**, *24*, 4. [CrossRef]
28. Candel, J.J.L.; Biesbroek, R. Toward a processual understanding of policy integration. *Policy Sci.* **2016**, *49*, 211–231. [CrossRef]
29. Metz, F.; Angst, M.; Fischer, M. Policy integration: Do laws or actors integrate issues relevant to flood risk management in Switzerland? *Glob. Environ. Chang.* **2020**, *61*, 101945. [CrossRef]
30. Tosun, J.; Lang, A. Policy integration: Mapping the different concepts. *Policy Stud.* **2017**, *38*, 553–570. [CrossRef]
31. May, P.J.; Jochim, A.E. Policy Regime Perspectives: Policies, Politics, and Governing. *Policy Studies J.* **2013**, *41*, 426–452. [CrossRef]
32. Wison, C.A. Policy Regimes and Policy Change. *J. Public Policy* **2000**, *20*, 247–274. [CrossRef]
33. Meijers, E.; Stead, D. Policy integration: What does it mean and how can it be achieved? A multi-disciplinary review. In Proceedings of the Berlin Conference on the Human Dimensions of Global Environmental Change: Greening of Policies-Interlinkages and Policy Integration, Berlin, Germany, 3 December 2004.
34. Briassoulis, H. Policy Integration for Complex Policy Problems: What, Why and How. In Proceedings of the Greening of Policies: Interlinkages and Policy Integration, Berlin, Germany, 3–4 December 2004.
35. Underdal, A. Integrated marine policy: What? Why? How? *Mar. Policy* **1980**, *4*, 159–169. [CrossRef]
36. Jochim, A.E.; May, P.J. Beyond Subsystems: Policy Regimes and Governance. *Policy Studies J.* **2010**, *38*, 303–327. [CrossRef]
37. Howlett, M.; Vince, J.; Río González, P.D. Policy Integration and Multi-Level Governance: Dealing with the Vertical Dimension of Policy Mix Designs. *Politics Gov.* **2017**, *5*. [CrossRef]
38. Vince, J. Integrated policy approaches and policy failure: The case of Australia’s Oceans Policy. *Policy Sci.* **2015**, *48*, 159–180. [CrossRef]
39. Candel, J.; Pereira, L. Towards integrated food policy: Main challenges and steps ahead. *Environ. Sci. Policy* **2017**, *73*, 89–92. [CrossRef]
40. Howlett, M.; Rayner, J.; Goehler, D.; Heidbreder, E.; Perron-Welch, F.; Rukundo, O.; Verkooijen, P.; Wildburger, C. *Overcoming the Challenges to Integration: Embracing Complexity in Forest Policy Design through Multi-Level Governance*; IUFRO (International Union of Forestry Research Organizations) Secretariat: Wien, Austria, 2010; pp. 93–110.
41. Adelle, C.; Russel, D. Climate Policy Integration: A Case of Déjà Vu? *Environ. Policy Gov.* **2013**, *23*, 1–12. [CrossRef]
42. Candel, J.J.L. The expediency of policy integration. *Policy Studies* **2019**, 1–16. [CrossRef]
43. Da Costa Canoquena, J.M. Reconceptualising policy integration in road safety management. *Transp. Policy* **2013**, *25*, 61–80. [CrossRef]
44. Rouillard, J.J.; Heal, K.V.; Ball, T.; Reeves, A.D. Policy integration for adaptive water governance: Learning from Scotland’s experience. *Environ. Sci. Policy* **2013**, *33*, 378–387. [CrossRef]

45. Stead, D.; Meijers, E. Spatial Planning and Policy Integration: Concepts, Facilitators and Inhibitors. *Plan. Theory Pract.* **2009**, *10*, 317–332. [[CrossRef](#)]
46. Nilsson, M.N.; Persson, A.S. Framework for analysing environmental policy integration. *J. Environ. Policy Plan.* **2003**, *5*, 333–359. [[CrossRef](#)]
47. Rayner, J.; Howlett, M. Conclusion: Governance arrangements and policy capacity for policy integration. *Policy Soc.* **2009**, *28*, 165–172. [[CrossRef](#)]
48. Burrows, N.; McCaw, L. Prescribed burning in southwestern Australian forests. *Front. Ecol. Environ.* **2013**, *11*, e25–e34. [[CrossRef](#)]
49. Steffen, W.; Hughes, L.; Pearce, A. *The Heat is on: Climate Change, Extreme Heat and Bushfire in Western Australia*; Climate Change Council of Australia Ltd.: Sydney, Australia, 2015.
50. Ruane, S. Applying the principles of adaptive governance to bushfire management: A case study from the South West of Australia. *J. Environ. Plan. Manag.* **2019**, 1–26. [[CrossRef](#)]
51. Beach, D. It's all about mechanisms—What process-tracing case studies should be tracing. *New Political Econ.* **2016**, *21*, 463–472. [[CrossRef](#)]
52. Mahoney, J. Process Tracing and Historical Explanation. *Secur. Studies* **2015**, *24*, 200–218. [[CrossRef](#)]
53. Australian Institute for Disaster Resilience. Victoria and South Australia Ash Wednesday Bushfire, 1983. Available online: <https://knowledge.aidr.org.au/resources/bushfire-ash-wednesday-1983> (accessed on 3 September 2020).
54. Miller, S.; Carter, W.; Stephens, R. *Report of the Bushfire Review Committee: On Bush Fire Disaster Preparedness and Response in Victoria, Australia, Following the Ash Wednesday Fires 16 February 1983*; Government Printer: Melbourne, Australia, 1984.
55. House of Representatives Standing Committee on Environment and Conservation. *Bushfires and the Australian Environment*; Milton, P., Ed.; Australian Government Publishing Service: Canberra, Australia, 1984.
56. Norman, B.; Weir, J.K.; Sullivan, K.; Lavis, J. *Planning and Bushfire Risk in a Changing Climate: Final Report for the Urban and Regional Planning Systems Project*; Bushfire CRC: Melbourne, Australia, 2014.
57. State Planning Commission. *Planning for Better Bushfire Protection*; Government of WA: Perth, Australia, 1989.
58. State Planning Commission. *Policy for Development Control 4.2: Planning for Hazards and Safety*; Government of WA: Perth, Australia, 1991.
59. Shire of Augusta-Margaret River. *Shire of Augusta-Margaret River Rural Strategy*; Shire of Augusta-Margaret River: Margaret River, Australia, 1991.
60. State of Western Australia. *Planning for Bush Fire Protection Guidelines*, 2nd ed.; Western Australian Planning Commission and the Fire and Emergency Services Authority: Perth, Australia, 2010.
61. Government of Western Australia. *A Shared Responsibility: The Report of the Perth Hills Bushfire February 2011 Review*; Government of WA: Perth, Australia, 2011.
62. Western Australian Planning Commission. *State Planning Policy 3.7: Planning in Bushfire Prone Areas*; Western Australian Planning Commission: Perth, Australia, 2015.
63. DFES. *Map of Bush Fire Prone Areas*. Available online: <https://www.dfes.wa.gov.au/bushfire/bushfireproneareas/> (accessed on 1 November 2020).
64. Bosomworth, K. Climate change adaptation in public policy: Frames, fire management, and frame reflection. *Environ. Plan. C Gov. Policy* **2015**, *33*, 1450–1466. [[CrossRef](#)]
65. Moritz, M.A.; Batllori, E.; Bradstock, R.A.; Gill, A.M.; Handmer, J.; Hessburg, P.F.; Leonard, J.; McCaffrey, S.; Odion, D.C.; Schoennagel, T.; et al. Learning to coexist with wildfire. *Nature* **2014**, *515*, 58–66. [[CrossRef](#)] [[PubMed](#)]
66. Owen, C.; Brooks, B.; Curnin, S.; Bearman, C. Enhancing Learning in Emergency Services Organisational Work. *Aust. J. Public Adm.* **2018**, *77*, 715–728. [[CrossRef](#)]
67. Bosomworth, K.; Owen, C.; Curnin, S. Addressing challenges for future strategic-level emergency management: Reframing, networking, and capacity-building. *Disasters* **2017**, *41*, 306–323. [[CrossRef](#)]
68. Ruane, S. Using a worldview lens to examine complex policy issues: A historical review of bushfire management in the South West of Australia. *Local Environ.* **2018**, 1–19. [[CrossRef](#)]
69. Bosomworth, K. A discursive–institutional perspective on transformative governance: A case from a fire management policy sector. *Environ. Policy Gov.* **2018**, *28*, 415–425. [[CrossRef](#)]
70. Buizer, M.; Kurz, T. Too hot to handle: Depoliticisation and the discourse of ecological modernisation in fire management debates. *Geoforum* **2016**, *68*, 48–56. [[CrossRef](#)]

71. Heazle, M.; Tangney, P.; Burton, P.; Howes, M.; Grant-Smith, D.; Reis, K.; Bosomworth, K. Mainstreaming climate change adaptation: An incremental approach to disaster risk management in Australia. *Environ. Sci. Policy* **2013**, *33*, 162–170. [[CrossRef](#)]
72. Kickert, W.J.M.; van Der Meer, F.-B. Small, Slow, and Gradual Reform: What can Historical Institutionalism Teach Us? *Int. J. Public Adm.* **2011**, *34*, 475–485. [[CrossRef](#)]
73. Sorensen, A. Taking path dependence seriously: An historical institutionalist research agenda in planning history. *Plan. Perspect.* **2015**, *30*, 17–38. [[CrossRef](#)]
74. Capoccia, G. When Do Institutions “Bite”? Historical Institutionalism and the Politics of Institutional Change. *Comp. Political Studies* **2016**, *49*, 1095–1127. [[CrossRef](#)]
75. Streeck, W.; Thelen, K. *Beyond Continuity: Institutional Change in Advanced Political Economies*; Oxford University Press: Oxford, UK, 2005.
76. Healey, P. Collaborative Planning in Perspective. *Plan. Theory* **2003**, *2*, 101–123. [[CrossRef](#)]
77. Macintosh, A.; McDonald, J.; Foerster, A. Designing spatial adaptation planning instruments. In *Applied Studies in Climate Adaptation*; Palutikof, J.P., Boulter, S.L., Barnett, J., Rissik, D., Eds.; John Wiley & Sons: West Sussex, UK, 2015; pp. 34–42, ISBN 9781118845011.

Publisher’s Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).