The AIIMS Incident Control System in Major Australian Bushfires: A Comprehensive Analysis

Bushfires are among the most destructive natural disasters in Australia, and their effective management can mean the difference between catastrophe and control. The country's recent history has seen extreme bushfire events – notably the **Black Saturday** fires of 2009 and the **Black Summer** fires of 2019–2020 – that have tested the limits of emergency response systems. In such crises, an **Incident Control System (ICS)** provides a framework to bring order to chaos by organizing personnel, resources command.

Australia's nationally adopted ICS is the **Australasian Inter-Service Incident Management System (AIIMS)**, a standardized agency services use to plan and coordinate their response. This thesis offers a detailed examination of the AIIMS ICS in the context of major Australian bushfires, with a focus on how the system has been applied in real-world scenarios and how it could be improved for future events.

The analysis begins with an explanation of the AIIMS ICS framework – its origins, structure, and operating principles – establishing how it is designed to function in theory. It then delves into case studies of **Black Saturday 2009** and the **Black Summer 2019–2020** bushfires, evaluating how AIIMS ICS was implemented during these crises and what challenges emerged. The discussion highlights the **strengths (pros)** of AIIMS ICS in managing complex, fast-moving bushfire disasters, as well as the **limitations (cons)** that became evident, such as coordination breakdowns, communication issues, and organizational constraints. Drawing on these case studies and expert assessments, the thesis evaluates the overall effectiveness of the AIIMS ICS in major bushfire events, assigning a percentage score to quantify its performance.

Finally, it provides a set of practical, easy-to-implement **recommendations** to enhance the AIIMS ICS for future bushfire management, aiming to improve planning, inter-agency coordination, command structure, response efficiency, and public safety outcomes.

Throughout the document, the writing remains formal yet accessible, targeting service leaders and emergency managers to frontline firefighters and interested members of the public. By understanding how AIIMS ICS has functioned in Australia's worst bushfires – both its successes and its shortcomings – we can identify ways to strengthen our incident

management approach and better protect communities from the growing threat of extreme bushfires.

Understanding the AIIMS Incident Control System

Effective emergency response relies on a clear management structure that can coordinate many moving parts under pressure. The **Australasian Inter-Service Incident Management System (AIIMS)** is Australia's embodiment of that structure: it is the nationally recognized incident control system adopted by all states and territories for managing emergencies (Australasian Inter-Service Incident Management System - Wikipedia). AIIMS provides a common organizational model, terminology, and set of procedures that enable multiple agencies to work together seamlessly when disasters strike. To appreciate how AIIMS functions in bushfire scenarios, it is important to understand its origins, core principles, and operational framework.

Origins and Evolution of AIIMS

The AIIMS framework has its roots in the international development of incident command systems following devastating wildfires in the 20th century. The concept of ICS was originally developed in the United States in the 1970s (through the FIRESCOPE program in California) as a response to coordination failures in fighting large wildfires. Australian fire authorities took note of these advancements. In the 1980s, a series of deadly bushfires in Australia – including the **Ash Wednesday fires of 1983** – underscored the need for better coordinated incident management among the various fire and emergency services. Traditionally in Victoria, for example, the Forests Commission and National Parks managed fires on public land while the Country Fire Authority (CFA) handled fires on private land, often command structures and radio systems. This fragmentation led to confusion and 'crossovers' at the boundaries of jurisdictions.

A turning point came in 1984 when a Victorian fire officer, Kevin Monk, studied the U.S. incident management system on a Churchill Fellowship and brought back the ICS concepts to Australia. These ideas were adapted into a local model called the **Large Fire Organisation (LFO)**. The LFO introduced the principles of scalability (tailoring the size of the management structure to the size of the fire) and dedicated incident management teams, including roles such as Incident Controller, Operations, Planning, and Logistics officers.

The new approach was tested during significant alpine bushfires in 1985, proving its worth in coordinating a large deployment of ground crews and aircraft from multiple agencies. By the mid-1980s, there was growing support among Australian fire chiefs for a unified incident management system. In 1988, the Australian Association of Rural Fire Authorities agreed to adopt the principles embodied in the LFO and the U.S. ICS across Australia.

This led to the development of AIIMS as a national system in the early 1990s under the newly formed **Australasian Fire and Emergency Service Authorities Council (AFAC)**. The CFA and the (then) Department of Conservation, Forests and Lands jointly adopted AIIMS in 1991, aiming to bring all agencies under one coordinated control system with

common terminology. A formal multi-agency agreement in 1997 further cemented the commitment to AIIMS for joint firefighting operations in Victoria. However, adopting a new system across diverse services was not instantaneous; it took years of training and cultural change for AIIMS to be fully embraced nationwide. In fact, difficulties in training and utilizing AIIMS were noted in inquiries such as the Coronial Inquest into a 1998 fatal fire at Linton, Victoria, which identified a 'slow uptake' of AIIMS as a contributing factor in the tragedy. These lessons spurred agencies to redouble efforts in ICS training and doctrine.

Over time, AIIMS has continually evolved in response to lessons learned from major emergencies. **AFAC maintains the AIIMS doctrine**, updating it to reflect best practice. Notably, the catastrophic **Black Saturday bushfires of February 2009** prompted a significant revision of AIIMS. The Victorian Bushfires Royal Commission (VBRC) that investigated Black Saturday found shortcomings in information management and multi-agency coordination. One outcome was the addition of an explicit **Public Information** function into the AIIMS structure (as a fifth functional section) in the third edition of the AIIMS manual (2011).

This change, recommended by the Royal Commission, recognized that providing warnings and information to the public is as critical as operations or logistics during fast-moving disasters. The evolution of AIIMS continued with further refinements (a fourth edition of the manual was later developed in 2017) to address emerging challenges and incorporate concepts like intelligence, interoperability, and continuous improvement.

Today, AIIMS stands as a mature incident management framework shaped by decades of experience. It is an “all-hazards, all-agencies” system – meaning it is designed to be applicable to any type of emergency (bushfires, floods, cyclones, etc.) and to integrate all relevant agencies under a single management structure. From its origins in wildfire response, it has been adopted by police, health, and emergency services for various incident types. Some agencies have customized aspects of AIIMS to better fit their specific needs – for instance, police developed an **Incident Command and Control System (ICCS)** for terrorism that builds on AIIMS principles but alters certain structures.

Similarly, the State Emergency Service (SES) in Victoria adjusted AIIMS to manage major flood events, elevating intelligence-gathering to a higher prominence in the structure. These adaptations underscore that while AIIMS provides a common foundation, it is not a one-size-fits-all straitjacket. It is intended to be flexible and scalable, an attribute that has allowed it to remain relevant as the scale and nature of disasters change.

Structure and Principles of AIIMS ICS

At its core, AIIMS is built on **three key management principles**: **management by objectives**, **functional delegation**, and **span of control**. These principles guide how an incident management team (IMT) is organized and operates:

- **Management by Objectives:** From the outset of an incident, the Incident Controller (the person in charge) establishes clear objectives for managing the incident. These objectives are essentially the desired outcomes (for example, “protect lives and specified communities; contain the fire within X area by Y time; defend critical

infrastructure"). The IMT develops an **Incident Action Plan (IAP)** to achieve these objectives, and all personnel work toward the common plan. This approach ensures unity of purpose any time there should be only *one* set of incident objectives and one coordinated plan for the incident, even if multiple agencies are involved. The importance of a single, unified plan was strongly reinforced by the VBRC after 2009 – all agencies must "work to a common objective and one consolidated plan" to avoid fragmentation.

- **Functional Management (Delegation):** AIIMS divides the myriad tasks of incident management into **five functional areas**: **Control**, **Operations**, **Planning**, **Logistics**, and **Public Information**. Initially, for a small incident, one person (the Incident Controller) may handle all functions. But as an incident grows, the IC delegates these functions to other officers, forming an expanded IMT with specialists in each area. The **Control** function (always retained by the Incident Controller) is responsible for overall leadership and decision-making to resolve the incident. **Operations** is tasked with "doing the work" – directing frontline firefighting and field resources to implement the plan. **Planning** collects and analyses information, tracks the situation, and prepares the Incident Action Plan and incident predictions. **Logistics** provides support such as equipment, fuel, food, communications, and medical support to keep the operation running. **Public Information**, the newest functional area, is dedicated to issuing warnings, alerts, and information to the public and media, and liaising with communities affected by the disaster. By structuring the IMT into these functions, AIIMS guarantees that all critical aspects are addressed by someone. It also mirrors military-style organization, which emergency services find familiar: each function can have its own sub-units (for example, the Planning section often includes units for intelligence, mapping, and technical specialists; Operations can have Division and Sector Commanders managing crews on the ground). Functional management means the Incident Controller is supported by a team of up to four section chiefs (Operations, Planning, Logistics, Public Info) – together, they form the command or coordination group for the incident.
- **Span of Control:** This principle refers to the number of individuals or teams one supervisor can effectively manage. In fast-moving emergency environments, AIIMS doctrine considers that one person can effectively control about **5 subordinates** (plus or minus depending on complexity) before leadership and safety begin to suffer. To maintain a manageable span of control, the ICS structure is flexible: if a supervisor (say, the Operations Officer) has too many units reporting to them directly, they should delegate and create additional tiers of management. For example, on a large fireground, an Operations Officer Mathison Commanders who in turn manage several Sector Commanders, who then each supervise several crews. This cascades the command structure in a way that no one leader is overwhelmed by directly supervising too many others. Conversely, if an incident is downsizing, ICS allows collapsing those layers, so the structure doesn't remain top-heavy. Maintaining span of control is fundamentally about safety and clarity – it reduces confusion and prevents any one supervisor from losing oversight over their personnel. AIIMS explicitly incorporates this concept, which is one of the "fundamental truths" that have served the system well over time.

Underpinning these principles is the idea of **unity of command** – each person reports to one supervisor, and there is one Incident Controller in charge of the incident. This prevents conflicting instructions. Unity of command is such an important concept that post-2009 inquiries suggested making it an officially stated principle of AIIMS. Another important

feature of ICS is **common terminology**: by using standard terms for roles and resources (e.g. calling an incident leader "Incident Controller" regardless of agency, or using agreed radio call-signs), AIIMS avoids misunderstandings that can arise when different agencies have their own jargon.

Adaptability and scalability are often cited attributes of AIIMS. The system's design does not mandate a fixed size of team or specific structure; instead, it provides a template that can expand as needed. For a small grassfire that one brigade can handle, the Incident Controller might operate alone or with just one or two officers. For a campaign fire that lasts days and involves hundreds, AIIMS scales up to a full Incident Management Team with dozens of staff across the five functional sections, possibly operating from an Incident Control Centre (ICC) established near the fire. AIIMS can also contract again as an incident winds down. This scalability was demonstrated for instance during the extensive **Queensland floods of 2010–11**, where all functional sections were filled by separate individuals and sub-units, whereas a routine house fire might not require a formal planning or logistics officer at all. The ability to **"plug in" additional roles** is another aspect of adaptability – AIIMS allows adding advisors or units as required by the incident. For example, during complex bushfires, it is common to attach a **Fire Behavior Analyst** (FBAN) to the Planning section to predict fire spread, or to appoint a specialized **Aircraft Operations Officer** under Operations if many water-bombing aircraft are deployed. In the 2019–2020 fires, Victoria even appointed a **State Controller for Wildlife** to coordinate animal rescue efforts within the emergency response structure.– an innovative use of ICS that placed wildlife response under the broader incident management hierarchy.

In summary, AIIMS ICS provides a standardized chain-of-command and functional structure that every firefighter and emergency manager can understand. When a major bushfire ignites, agencies activate an Incident Management Team following AIIMS: one controller, supported by functional officers, all working to common objectives. Different agencies (rural fire service, metropolitan fire brigade, parks/wildlife service, police, etc.) integrate into this single structure rather than operating in silos.

Through clear objectives, defined roles, limited span of control, and common terminology, AIIMS aims to create an organized response even amid the chaos of a wildfire. The system's widespread adoption across Australia has greatly improved coordination; as one submission to the 2020 Bushfire Royal Commission noted, "all agencies utilise the Australasian Inter-service Incident Management System to manage operations," which means practices like aligning radio communication plans should be relatively straightforward since everyone is theoretically following the same playbook.

The reality, of course, is never quite that simple – and major bushfires have tested how well AIIMS works under extreme conditions. The following sections examine those real-world applications in detail.

AIIMS ICS in the Black Saturday 2009 Bushfires

Black Saturday – February 7, 2009 – stands as one of Australia's darkest bushfire days. Ferocious firestorms erupted across Victoria under record-high temperatures (over 46°C in Melbourne) and gale-force winds. A series of bushfires ignited or blew up that day, razing entire towns and claiming 173 lives. It was the deadliest bushfire event in Australian history,

and it challenged the state's emergency management systems to an unprecedented degree. At that time, AIIMS ICS had been in official us decades, and a structure of incident control centres and management teams was in place. However, the scale and intensity of the 2009 fires exposed significant shortcomings in how incident control was executed. Analysing Black Saturday provides crucial insights into both the strengths and the limitations of AIIMS ICS when confronted with a complex, chaotic disaster.

Overview of the Black Saturday Fires and Incident Management Structure

In the lead-up to February 7, fire agencies were on high alert due to the extreme weather forecasergency coordination system: local ICCs (Incident Control Centres) were designated in high-risk areas, and a State Coordination Centre (the Integrated Emergency Coordination Centre, iECC) in Melbourne was staffed to oversee the big picture. Under AIIMS, any significant fire would have an Incident Controller appointed and an IMT formed, and multiple IMTs would report up to regional and state levels for overall coordination. On Black Saturday, this structure was indeed activated.

For example, when the day's first major fire started at Kilmore East (north of Melbourne) around 11:45 am (due to a fallen power line), the initial incident controller (from CFA) began managing the response. As the **Kilmore East fire** rapidly grew, an Incident Control Centre at Kilmore was supposed to take charge of directing firefighting crews, coordinating with police for evacuations, and issuing warnings. Similar ICS arrangements were established for other large fires that day (such as the Murrindindi Mill fire near Marysville, the Churchill fire in Gippsland, and fires around Bendigo and Beechworth). In theory, AIIMS provided a framework so that each major fire had one Incident Controller and IMT, and those IMTs would operate in parallel, each focusing on their fire but sharing information up to the State coordination level.

However, *the speed and ferocity of the fires far exceeded the capacity of some incident management teams in the early hours.* The Kilmore East fire, for instance, blew up into a massive inferno that ran for dozens of kilometres in a matter of hours, eventually merging with another fire and storming through towns like Kinglake. This created a very chaotic situation for the Kilmore East ICC. The **Victorian Bushfires Royal Commission** later found that one of the main failures on that day was **poor coordination and information flow in the incident command system**. In other words, while an ICS structure existed on paper, in practice it did not function optimally: communication between the local ICCs, the regional centres, and the state centre was sluggish and sometimes incomplete, and vital information (such as fire location, s) did not reach the people who needed it in time.

A detailed study of management revealed concrete issues. Dr. Andrew Au's analysis of the command-and-control networks on Black Saturday notes that incident management suffered from a dysfunctional IMT, where the Incident Controller did not effectively assert control or disseminate information. During the event, information gathering and sharing were being handled not by the Kilmore ICC but by a centre (the Seymour RECC) located some distance away. The Seymour RECC became a critical hub for communications, as indicated by network activity—an unusual situation, since one would expect the ICC (not a regional office) to be the central node for such functions. The fact that an external node assumed the information dissemination role "suggests a dysfunctional team in which the Kilmore ICC does not sufficiently exercise its command while the function of information dissemination is left to the Seymour RECC." The Incident Controller at Kilmore lost effective control over

information management; the vacuum was filled ad hoc by others. This breakdown had real consequences: warnings to communities in the path of the fire were delayed or inadequate—a factor that the Royal Commission identified as contributing to the high death toll.

Information flow problems were not unique to that fire. Across several incidents that day, **communication between responders lagged behind the fast-changing situation**, and often the intelligence about fire behaviour was outdated by the time it reached decision-makers. The Royal Commission documented cases where **critical warnings and instructions failed to get out or were too slow**, partly due to the overwhelmed incident management structure. For example, many residents in harm's way received no official warning before fire hit, or the warnings they did get lacked specific guidance – an issue tied to the under-resourcing of public information functions on the day.

Despite these grave problems, there were also instances on Black Saturday where AIIMS ICS worked closer to its intent. Some Incident Management Teams did manage to get on top of the situation and coordinate effective operations. The Commission found that **where IMTs were well prepared, properly staffed, and experienced, they generally performed well even under extreme stress**. This contrast – success in some quarters, failure in others – highlighted an important lesson: the ICS framework itself can work, but only if the people and resources implementing it are ready and able to use it effectively. Unfortunately, on February 7, the scale of the disaster meant *many IMTs were initially overwhelmed and overrun by the fires*, especially in the first critical hours.

Coordination Challenges and System Failures

The Black Saturday experience exposed several weaknesses in how AIIMS ICS was applied, many of which were later addressed by changes in doctrine or practice. Key coordination challenges and failures included:

- **Delayed Incident Team Mobilization:** On days of extreme fire danger, it is crucial to have incident management teams in place *before* fires start, so they can respond immediately. On 7 February 2009, not all areas had fully pre-formed IMTs ready by the morning. The Royal Commission recommended that on Severe or Code Red fire danger days, **Level 3 IMTs (for managing major incidents) must be in position by 10:00 AM**. The lack of this readiness in some districts meant that when multiple nearly simultaneous ignitions occurred around noon, there was a scramble to assemble incident controllers and support staff. This cost precious time in the early response. Additionally, *not all personnel put in IC roles were adequately trained for such a severe scenario* – the Commission urged implementing uniform, accredited training for Level 3 Incident Controllers across agencies, to ensure a common high standard. It also emphasized having a **sufficient roster of experienced incident managers** to call upon, hinting that on Black Saturday there were too few people trying to manage too many emergencies.
- **Loss of Situational Awareness and Information Sharing:** The fast pace of the fires and some critical communication breakdowns led to loss of situational awareness at multiple levels. The Commission and analyses found that *"lack of communication between responders, slow circulation of often outdated information, and insufficient dissemination of information"* plagued the incident command system that day (Analysis of command and control networks on Black Saturday). One striking example was the **failure to convey accurate fire location and spread information**

to communities in danger. In several instances, local brigades and police on the ground knew a fire's impact was imminent, but the formal warning process (which had to go through an ICC and then to a central system to issue public alerts) was too slow. The AIIMS structure at the time did **not include a dedicated Public Information Officer at each incident** – public info was handled either by the Planning section or by a separate information unit at the region/state level. This proved inadequate.

The ICCs were so busy managing operations that communicating with the public fell through the cracks, as seen with the Kilmore East fire where the RECC ended up handling info dissemination. The consequence was tragic: dozens of people were caught by fire with little or no warning. This gap directly led to the aforementioned change in AIIMS after 2009 – **elevating Public Information to its own section** with the expectation that every IMT would assign someone to focus on warnings and media from the start. The Royal Commission made it clear that information to the public is a core part of incident management, not an afterthought.

- **Overwhelmed Command and Control:** In some locations, the sheer magnitude of the emergency overwhelmed the command structure. The Kilmore East ICC, for instance, had to deal with a fire front that was splitting and racing in multiple directions, causing new outbreaks far apart. Ideally, the ICC could delegate on the fly (setting up divisional commands or deploying field IMTs to different flanks), but the speed of events outpaced that process. One measure of this loss of control was noted in network analysis: during the most intense phase, local incident managers had relatively low "sociometric status" in the communication network, meaning they were not the main ones exchanging information compared to others. This indicates the ICC was partly sidelined from critical communication loops. *Unity of command* was compromised – instead of one clear chain, multiple centres and individuals started acting semi-independently to tackle pieces of the crisis.

  While improvisation is sometimes necessary, it also leads to confusion. Emergency management personnel later reflected that on that day, **the system effectively broke into pieces in some areas**, with ad-hoc coordination replacing the planned structure. Such fragmentation is exactly what ICS is meant to prevent, yet under extreme duress it happened.

- **Multi-Agency Integration Issues:** By 2009, CFA (which manages rural fire) and the Department of Sustainability and Environment (DSE, which managed forest fires on public land) were co-located in many ICCs and operating under unified control for joint fires – a major improvement over decades past. Even so, there were occasional friction points or ambiguities in roles. The Royal Commission noted the need to **appoint the most qualified and competent person as Incident Controller, regardless of their home agency**. This suggests that in some cases on Black Saturday there might have been hesitation or delay in transferring control between CFA and DSE officers as a fire crossed jurisdictions. Ensuring that agency "boundary issues" did not hinder decisive leadership was a lesson learned. Also, the involvement of Victoria Police in emergency management (for tasks like evacuations and roadblocks) had to mesh with the fire IMTs. There was some confusion about the **powers of the Police Commissioner vs. fire controllers during the crisis** (especially when considering evacuation orders, which at the time were not mandatory). VBRC

recommended clarifying the roles of police and the fire Incident Controller, and indeed later legislation was updated to give the fire controller more explicit authority to direct evacuations during such disasters. These examples show that even with AIIMS as a common framework, *organizational interfaces needed smoothing*. In 2009, those interfaces weren't always seamless.

- **Planning and Foresight Failures:** Another critique was that formal **Incident Action Plans were not produced fast enough or shared widely enough** in the early hours. An IAP is supposed to be developed for each operational period (often the first one within 2-4 hours of a major incident starting). The Commission found that timely planning was lacking; it recommended that **Incident Action Plans be developed within the first four hours of an incident and made available to state and regional coordination centres**. The absence of a quick written plan at some ICCs meant that even adjacent regions or the state centre didn't have a clear picture of the strategy (or lack thereof) for each fire.

  Moreover, some responders in the field reported inadequate briefing – they were sent to fight fires with little information on the overall plan or the big picture, which ties back to the chaos in the IMTs. Poor briefing and information sharing can jeopardize firefighter safety and effectiveness. Indeed, on Black Saturday some firefighters encountered extreme fire behaviour they hadn't been warned about, contributing to near-miss incidents. Better planning and information flow (even if verbal when written wasn't possible) might have mitigated some of this.

- **Safety Management Gaps:** Given the extreme conditions, it was remarkable that more firefighters were not killed or seriously injured on Black Saturday (though there were fatalities among responders in subsequent days). However, **safety protocols within ICS were strained**. The Commission heard that roles like Safety Officers – whose job is to monitor risks and advisories (such as extreme weather changes, or "Red Flag Warnings" about impending wind shifts) – were not consistently embedded in IMTs at the time. One recommendation was that **Safety Advisors be appointed to all IMTs during major fires** to ensure firefighter safety messages (like evacuation signals or pull-back orders) are properly relayed.

  On Feb 7, some firefighters only survived by sheer luck when fire fronts overtook them; later analysis by veteran firefighters noted it was *"good fortune, not good management"* that prevented greater loss of life among crews on the worst day. This critique implies that the safety management part of ICS – anticipating where crews could be in danger and pulling them out in time – failed in certain instances, and it was only happenstance that more tragedies didn't occur. The lesson was taken to heart with improvements in training (e.g., ensuring all Safety Officers in the state undergo fireground training and have tools to measure safety compliance).

In summary, Black Saturday showed that **AIIMS ICS as a system was pushed beyond its limits** in some areas. The framework itself was sound, but it was not executed effectively due to insufficient preparation, overwhelming fire behavior, and specific weaknesses in information and multi-agency coordination. The **Royal Commission's interim and final reports** homed in on these issues and spurred a series of changes aimed at strengthening ICS for future events. Among these were: formalizing the **Public Information** function in AIIMS (to give info dissemination the weight and resources it needs) ; enforcing the practice of **preemptive incident team staging on high-risk days**; creating more robust **training,**

accreditation, and succession plans for Incident Controllers so there's depth in expertise ; ensuring **local knowledge is included** in IMTs (a local brigade captain or municipal firefighter can provide invaluable intel about terrain and town layouts – the Commission said someone with local insight should be in the ICC to advise, so decisions aren't made in a vacuum) ; and improving technology and procedures for **resource tracking and mapping** (several recommendations addressed getting better real-time maps to IMTs and tracking where all crews are, since on Black Saturday resource accountability was sometimes lost).

It's worth noting that not everything about the Black Saturday response was seen as a failure. There were also **examples of the ICS working well**: some fires that day were contained relatively quickly by aggressive initial attack, thanks to good preparedness and communication at the local level. Moreover, the mere existence of AIIMS meant that, once the shock of the first day passed, agencies were able to organize enormous relief efforts under a unified structure in the days after (for example, coordinating hundreds of personnel for search, rescue, and relief through the State Emergency Response Plan).

The consensus, though, was that ICS needed refinement. AFAC's AIIMS Steering Committee had already been reviewing potential updates between 2003 and 2009 (such as whether to elevate the importance of information management), but **real change only occurred after Black Saturday's harsh lessons and the Royal Commission's push**. By late 2009 and 2010, agencies across Australia started implementing those lessons. AIIMS was revised (Third Edition 2011) to incorporate the new Public Information section and other adjustments. The emergency services also embraced a culture of more regular multi-agency exercises and scenario planning for worst-case fires. In the words of the AFAC President in 2011, *"Our greatest risk [in emergency services] is not climate change or technology but failure to adapt/innovate and drive continuous improvement... evolutionary change is preferred, however the odd revolutionary change may be needed"*.

Black Saturday was arguably a catalyst for both evolutionary and revolutionary changes in Australia's incident management doctrine.

AIIMS ICS in the 2019–2020 Black Summer Bushfires

A decade after Black Saturday, Australia faced another monumental bushfire crisis: the **Black Summer** of 2019–2020. This was a prolonged fire season of extraordinary scale, with fires burning in every state and territory over several months. Nationwide, at least 33 people lost their lives directly, over 3,000 homes were destroyed, and an estimated 18.6 million hectares (46 million acres) burned – an area larger than entire countries (Emergency Response to Australia's Black Summer 2019–2020: The Role of a Zoo-Based Conservation Organisation in Wildlife Triage, Rescue, and Resilience for the Future - PMC). New South Wales was hardest hit (the worst fire season in its recorded history), but Victoria, Queensland, South Australia, Western Australia, and Tasmania all experienced major fires. The Black Summer fires were unprecedented in many ways: they started earlier than usual (significant fires were already burning in spring), they were intensified by severe drought and heat, and they produced phenomena like massive pyrocumulonimbus firestorms. This was a true test of Australia's disaster management systems on a **national scale**.

By 2019, the AIIMS ICS was thoroughly ingrained in the operations of all Australian fire agencies. Many of the improvements recommended after 2009 had been implemented. For example, sophisticated public warning systems were now in place (including Emergency Alert phone messaging and improved community warning protocols, managed under the Public Information function), and multi-agency state control centres were standard. Yet Black Summer's vast scope put pressure on ICS in new ways – particularly in terms of sustaining a response over months, handling many large incidents simultaneously, and coordinating resources across state lines. The performance of AIIMS ICS during Black Summer demonstrates both how far the system had come since 2009 and where further gaps or stresses were revealed.

Nationwide Incident Management During Black Summer

When looking at Black Summer, one must understand that there was not a single "Black Summer fire" but rather **dozens of significant fires and fire complexes** burning concurrently. Each of these had its own Incident Management Team and structure under AIIMS. For instance, in New South Wales (NSW) some of the biggest incidents were the *Gospers Mountain mega-fire* (which merged several fires into one huge blaze northwest of Sydney), the *Currowan fire* on the south coast, and the *Green Wattle Creek fire* southwest of Sydney. In Victoria, major fires included those in East Gippsland (such as the *Mallacoota* fire that trapped residents and holidaymakers by the coast) and the *Alpine fires* on the NSW border. South Australia had the significant *Kangaroo Island* fire and the *Cudlee Creek* fire in the Adelaide Hills, among others.

Under AIIMS, each of these incidents would be managed by an IMT usually led by the jurisdiction's fire service (Rural Fire Service in NSW, CFA/Forest Fire Management in Victoria, CFS in SA, etc.), often with multi-agency representation (fire, parks, forestry, police liaison, SES, etc., all in the ICC). These IMTs operated out of emergency coordination centres or field headquarters near the firegrounds. **State-level coordination** was also activated: for example, NSW RFS operated a State Operations Centre in Sydney, and Victoria ran its State Control Centre (SCC) in Melbourne.

These state centres oversaw the broad allocation of resources, emergency warnings policy, and requests for interstate or federal assistance. AIIMS is inherently a **scalable system that can operate at multiple tiers**, and this was evident as local, regional, state, and even national coordination tiers were in play. In Victoria, the chain was clearly defined: local ICCs managed each fire, reporting to a State Controller at the SCC (Emergency Management Victoria) who had oversight of all fires statewide.. In NSW, the RFS Commissioner effectively served as the overall Incident Controller for the state's fires, with area commands under him.

One notable aspect of Black Summer was the extensive **interstate and international assistance** that was mobilized. Thanks to the common ICS framework (AIIMS), firefighters from different states and countries could be integrated relatively smoothly into local operations. In total, over **13,000 volunteer firefighters and 3,100 emergency services personnel from around Australia traveled interstate** to assist where the fire threat was greatest ([PDF] the impacts of the 2019-20 black summer bushfires on the wellbeing...). For example, when NSW was at its peak of fire activity in December, firefighters from Victoria, South Australia, Queensland, and elsewhere were deployed under NSW RFS command. Later, when fires flared in Victoria in early January, NSW crews and others reciprocated. The

mutual aid system was the largest in Australian history – and it hinged on everyone operating under AIIMS ICS. A firefighter from Queensland, arriving in NSW, could slot into a sector on the fireground or a division command in the IMT and know that the organizational structure is basically the same as back home. Likewise, **overseas teams** from New Zealand, the United States, Canada, and other countries were embedded during Black Summer. Many of these foreign crews were already versed in ICS (U.S. and Canadian teams use a very similar system), which made integration feasible. This interchange was in fact enabled by decades of ICS adoption: a major deployment of Australian firefighters to the USA in 2000 was only possible because AIIMS had become established nationally. Now the reverse was true – international support bolstered Australian efforts, with the common language of ICS bridging differences.

Coordination among so many IMTs and across borders was not without issues. **The need for a national picture and resource prioritization** became apparent. There is no formal "national Incident Controller" for bushfires; instead, the Australian Government activated support mechanisms upon state requests. During Black Summer, the **Prime Minister established a federal taskforce and for the first time ever invoked a compulsory call-out of Australian Defence Force Reservists** to assist in the bushfire response.

Military personnel were deployed to help with tasks like logistics, base camp support, aerial supply drops, and evacuation operations. Under AIIMS, the ADF liaisons were integrated at the state emergency centres to coordinate this support. For instance, **military liaison officers sat in the State Control Centre in Victoria and the State Operations Centre in NSW** to respond to requests from the fire IMTs (such as, "we need army engineers to clear this road" or "we need naval assets to evacuate people off the beach"). This marked an evolution in ICS usage – while traditionally the military is a separate command, here they were brought into the incident management framework as supporting agencies. The federal government also set up a **National Bushfire Recovery Agency** to lead recovery efforts, but during the active response phase, most operational decisions remained under state control, coordinated loosely at the national level.

A challenge noted in reviews was the **interoperability of communication systems**. Even though all agencies use AIIMS, radio networks and information systems can differ. There were efforts during Black Summer to share information systems (like fire prediction tools, mapping services) and to patch radio communications between agencies. In some instances, ad hoc solutions had to be found to allow interstate crews to talk to local crews on the fireground. An expert submission pointed out that *by now "there are no longer any technical or process issues to excuse" communication incompatibilities – since everyone uses AIIMS, it should be straightforward to align radio procedures and channels across agencies*. Yet it took leadership and prior planning to actually implement common communication plans.

In NSW, they have a system where each major fire is quickly assigned a **common radio channel accessible to all assisting units**, and the suggestion has been made that this principle be universally applied in Australia. During Black Summer, when resources were pouring in from everywhere, having such common channels and a **common operating picture** was invaluable, but not always achieved uniformly. The fires have since reinvigorated efforts to develop a **national common operating picture system**, which would allow all jurisdictions to share real-time incident data, resource status, and warnings on one platform. The concept is that if, for example, Queensland can see NSW's live fire situation

(and vice versa), they can better anticipate when help might be needed or when they can withdraw their assistance.

Operational Outcomes and Observations

Despite the extraordinary scale of Black Summer, many observers have noted that **the response was largely successful in preventing an even greater disaster**. The toll of 33 lives lost, while tragic, is often considered low given the enormous extent and ferocity of the fires (by comparison, Black Saturday's 173 fatalities came from fires that burned "only" around 450,000 hectares, whereas Black Summer fires burned over 18 million hectares). A massive number of people were evacuated or warned in time to escape – this can be credited in part to improved public information under ICS and better coordination with police for evacuations.

Fire agencies and their partners undertook **one of the largest evacuation operations in Australian history** on New Year's Eve 2019, when fires encircled the coastal town of Mallacoota in Victoria. The local IMT, realizing they could not stop the fire before it hit the town, focused on shelter and evacuation. With help from the Navy (two naval ships were sent to evacuate civilians by sea) and a convoy escorted by emergency services by land once roads reopened, thousands were safely extracted from Mallacoota in the days after the fire – no deaths occurred in that isolated community, a victory for disaster management. Similarly, in NSW, mass evacuation of towns on the South Coast was ordered ahead of the advancing inferno in early January, guided by predictions from fire behavior analysts in the IMTs. Such large-scale movements of people would have been far more chaotic without a clear incident management structure issuing the orders and coordinating traffic management, relief centres, etc.

The **Public Information function** that was added to AIIMS after 2009 proved its worth during Black Summer. Authorities issued **thousands of warning messages** via multiple channels (smartphone apps, text alerts, radio, television, social media) to keep communities informed. While not every message was timely or perfectly targeted, there was undoubtedly a huge improvement from 2009. Many residents have attested that warnings prompted them to evacuate or prepared them to shelter safely when fire came. The dedicated Public Information teams within IMTs and at state level worked around the clock to push out these alerts. A lesson from Black Summer, though, was the need for consistency in warnings across regions – the Royal Commission later recommended standardizing emergency warning terminology and levels nationally to avoid confusion as people moved or as interstate resources came in. For instance, the colors and warning categories in NSW versus Victoria had slight differences that could perplex the public. This is a relatively minor issue, but it shows ICS must interface well with public expectations and comprehension.

One area where ICS was strained was **resource management over an extended campaign**. The 2019–2020 season was not a single-day crisis but a rolling disaster that lasted months. This put enormous stress on personnel. Volunteer firefighters, in particular, were pushed to their limits, with many serving repeated 72-hour shifts, taking short breaks, then heading out again. Fatigue management became a serious concern within the ICS framework. AIIMS Logistics sections had to establish base camps and feeding schedules for thousands of firefighters, while Planning had to consider rotating crews out and requesting fresh crews from interstate. By and large, this was managed without systemic collapse – a testament to the planning that had improved since earlier disasters. However, it did expose that **the pool of**

highly trained Level 3 Incident Management Team members is finite, and when dozens of IMTs are activated simultaneously across multiple states, there's a risk of shortages of skilled personnel.

During Black Summer, states did share IMT personnel as well (for example, incident management specialists from WA or NT were flown to help staff NSW/Vic control centres when their own areas were quieter). This was coordinated through AFAC and demonstrates a benefit of everyone using AIIMS – an Incident Controller from one state can lead an incident in another state in an emergency, because they follow the same doctrine. Nevertheless, the fires highlighted the importance of having a deep bench of trained incident managers and support staff nationally, or developing surge capacities (perhaps by involving retired experts or training military officers in ICS to backfill certain roles).

Another challenge was **maintaining communications and data when infrastructure was destroyed**. The fires knocked out power grids and telecommunications on a large scale – for example, over 1,000 mobile phone towers or nodes were disabled across fire-affected areas. This had cascading effects: loss of phone and internet impacted both the public (who couldn't call for help or receive warnings in some cases) and responders (some remote ICCs had to rely on satellite phones and radio when landlines and cell networks failed). AIIMS ICS assumes functional communications; when those fail, improvisation is needed, such as deploying mobile radio repeaters or using runners to carry messages.

The Black Summer experience led to calls for hardening critical communications infrastructure and having backup systems in place (including portable generators for cell towers, satellite links for ICCs, etc.). In terms of ICS, it underscores that technology is a vital backbone for the system – no matter how well structured an IMT is, if they cannot talk to their crews or other agencies, coordination falls apart. In some of the Black Summer fires (particularly in the NSW South Coast on New Year's Eve), the destruction of communications infrastructure severely hampered the IMTs' situational awareness for a period.

Crews on the ground became isolated when radio networks went down, which is an extremely dangerous situation. Through ingenuity and support (like using fire trucks as mobile communications hubs), they managed to maintain some command and control, but it was far from ideal. These incidents are being studied to improve redundant communications planning in ICS (for example, pre-positioning mobile satellite units with IMTs in high-risk, low-infrastructure areas).

Despite these difficulties, numerous **success stories** emerged. Firefighters and incident managers saved countless homes and lives through well-coordinated operations. As one report summarized, *"Despite the 2019-2020 bushfire campaign being the biggest ever in NSW, a massive combined effort saved many lives and houses in very challenging circumstances. New technologies, better communications, more aircraft and new ways of doing things helped."*. This statement encapsulates how the response built on improvements since past disasters: better communications (partly via ICS's improvements, partly via tech like drones and real-time weather feeds), more aircraft (the use of large air tankers and myriad helicopters was coordinated via the Operations sections), and new ways of doing things (like the inclusion of animal rescue operations within the IMT structure, and proactive decision-making to evacuate early).

One interesting aspect was how ICS showed **flexibility in incorporating specialized roles and objectives**. For example, **wildlife rescue** became a notable component in some fires. In Victoria, a *State Controller – Wildlife* was appointed within the emergency management hierarchy to ensure that the response to injured wildlife and livestock was organized and resourced.. Under the AIIMS framework, this role coordinated with the Planning and Operations sections to facilitate wildlife triage units on the fireground.

As described in a post-season analysis, the structure in Victoria's SCC included that wildlife controller, and the incident IMTs had operations, planning, and logistics groups specifically assisting wildlife rescue efforts alongside the main firefight.. Such integration of a humanitarian/environmental objective (rescuing animals) into the command system for a fire incident demonstrates the adaptability of AIIMS – it wasn't just about putting out the fire, but also managing its consequences in real time.

Another example was the management of **multiple simultaneous mega-fires** in NSW. The ICS framework was used in an innovative way when several large fires merged or had overlapping operations. The RFS established what were essentially **Area Commands or Complex IMTs**. For the Gospers Mountain megafire (which merged five fires into one across a huge area), instead of keeping five separate IMTs, they eventually consolidated under one larger IMT to streamline decision-making. This is fully in line with AIIMS principles: when incidents merge, one Incident Controller must take over to maintain unity of command. The Operations sections combined, planning intelligence was pooled, etc.

However, managing something of that size under one IMT is herculean – at its peak, the Gospers Mountain fire had thousands of personnel allocated. The Incident Controller there had to delegate extensively, basically running multiple divisions as quasi-independent battles under a common strategy. It worked to an extent: by January, much of that fire was brought under control through coordinated backburning and containment that would have been far harder if the sectors were managed in isolation. Still, post-fire reviews suggest that we may need to formalize the concept of **"complex incident management" or "area command"** in our doctrine for these situations, to ensure adequate support and oversight when one IMT oversees an extremely large or multiple-fire event.

The U.S. has an "Area Command" concept for coordinating multiple incidents in a region; Australia has tended to handle it with the state-level coordination or by combining incidents under one IMT. Black Summer saw both approaches used – in some cases, separate IMTs with a higher-level coordination through the state, and in others, merging IMTs into one.

When the national Royal Commission examined the Black Summer response, it did not indict AIIMS or recommend replacing the ICS. Instead, it validated the importance of a strong incident management system and focused on enhancements to make it more robust. For example, the Commission's report emphasized improving **interoperability and resource sharing**, development of a **national common operating picture tool**, and better alignment of information to the public across agencies. These recommendations implicitly rely on AIIMS continuing as the foundational system – they aim to make the various ICS implementations across Australia more interconnected.

In conclusion, **Black Summer demonstrated the vital role of AIIMS ICS in coordinating a response to an unprecedented crisis**. The system's strengths – unified command, common structure, multi-agency integration – enabled the firefighting effort to be as effective as it

was. There is little doubt that without AIIMS, the response would have been chaotic and uncoordinated given the sheer number of players involved (hundreds of agencies and tens of thousands of personnel across the country).

That said, it also exposed new challenges: the need for better national-level support and communication integration, the strain on human and material resources during long campaigns, and the importance of continually adapting the system to future threats (like simultaneous mega-fires or climate-driven extremes). The Black Summer fires, like Black Saturday, became a catalyst for further improvements in Australia's emergency management, reinforcing a cycle of learning and refining the AIIMS ICS to meet emerging needs.

Strengths of the AIIMS ICS in Bushfire Management

The case studies above illustrate various outcomes, but they also allow us to generalize what **worked well** with AIIMS ICS in major bushfire events. Overall, the AIIMS Incident Control System has proven to be a **cornerstone of effective bushfire response** in Australia. Its design and principles confer numerous advantages when dealing with complex emergencies. Here we outline the key **pros or strengths** of AIIMS ICS in managing large-scale bushfires:

- **Clear Chain of Command and Unified Leadership:** AIIMS establishes a single Incident Controller (IC) who is in charge of the incident, providing clear leadership and accountability. This unity of command means everyone knows who is the ultimate decision-maker, preventing confusion that could arise if multiple agencies each tried to lead. In a bushfire, especially one that involves many fire brigades, police units, and others, having one designated controller is vital. For example, during Black Summer, each major fire complex had an IC coordinating all efforts, which helped avoid conflicting strategies. The IC has authority over all assigned resources, which fosters decisiveness. Unity of command is explicitly built into AIIMS doctrine (only one IC per incident) and has been underscored as essential in inquiry reports. This structure contrasts with earlier practices where different agencies might operate separate commands for the same fire – AIIMS eliminated that duplication, greatly improving efficiency.
- **Common Objectives and Plan (Management by Objectives):** AIIMS ensures that **all personnel work towards a shared set of incident objectives** and follow one Incident Action Plan. This alignment is crucial in complex operations. It focuses the efforts of diverse teams (firefighters, aircraft pilots, heavy equipment operators, police, etc.) on a coherent strategy. The Royal Commission reviews repeatedly highlighted that having *"all agencies working to a common objective and one consolidated plan"* is fundamental to effective emergency response. In practice, this means resources are applied in a coordinated way – for instance, ground crews and water-bombing aircraft reinforce each other rather than acting independently, because both are briefed on the same plan. Common planning under ICS also aids **adaptive management**: as objectives are met or conditions change, the IC and IMT can adjust the plan and seamlessly inform all sections, rather than each agency re-evaluating on its own.

- **Structured Functional Delegation (Organized Teams):** The five functional sections of AIIMS (Control, Operations, Planning, Logistics, Public Information) guarantee that all critical aspects of managing the incident are addressed by someone with a defined role. This prevents oversights. For example, in a big fire, it's easy for ad-hoc leaders to become consumed by the firefighting ("operations") and neglect planning ahead or supporting the crews. AIIMS, by assigning a dedicated Planning Officer and Logistics Officer, ensures those elements (forecasting incident development, arranging supplies, managing fatigue, etc.) get attention in parallel to firefighting.

  The **Operations section** focuses on tactics and deploying crews to firelines, **Planning** looks at weather forecasts, fire behavior predictions, mapping, and contingency plans, **Logistics** secures more trucks, fuel, food, shelter, and so on, and **Public Information** keeps the community informed and warned. This specialization within the team leads to greater overall effectiveness. It was noted that incidents where IMTs were fully staffed with capable people in these roles "performed well" even under pressure – a testament to the functional structure working when properly implemented. The **span of control** principle further enhances this by making sure no single supervisor becomes overloaded; delegating responsibilities across functions and sub-units maintains order even in large operations.

- **Scalability and Flexibility:** AIIMS ICS is inherently scalable – it can be expanded or contracted to suit incidents of any size. This flexibility is a major strength in bushfire management, because fires can start small and explode into mega-fires, or multiple fires can merge. Responders can start with a small ICS organization and rapidly build it out as an incident worsens.

  The system doesn't force a huge overhead on every incident; it **allows incremental growth**, adding positions as needed. During quieter periods, the structure can shrink back down. In Black Summer, we saw ICS scale up to an extreme: entire states ran multiple large IMTs, and the system even scaled to a quasi-national level with coordination between states (something ICS accommodated through well-defined state roles). The ability to incorporate **additional roles or adapt the structure** as needed also shows flexibility – for example, creating a **Wildfire Aviation Coordinator** under Operations when dozens of aircraft are involved, or adding that **Wildlife Officer** role in Victoria to address animal rescue.

  These adaptations do not break the system; they fit into it. AIIMS provides a common language and framework so that such changes remain interoperable with the rest of the structure. Flexibility also extends to **all-hazard use**: the same ICS that manages bushfires can be used for floods or cyclones, meaning emergency services personnel practice one system for all scenarios, which builds proficiency and cross-disciplinary support.

- **Multi-Agency and Inter-Service Integration:** One of AIIMS's greatest strengths is that it is **designed for multi-agency operations**. By agreement, all the key emergency services (rural fire, urban fire, park agencies, police, ambulance, SES, etc.) use AIIMS, which brings everyone together under one umbrella. This eliminates the silo approach and fosters teamwork. In major bushfires, this integration is critical: fire authorities work with police on evacuations and road closures, with forestry/environment departments on containment lines and backburns, with utilities

on restoring power, with relief agencies on sheltering evacuated residents – all these activities can be coordinated through the AIIMS structure by including liaisons or representatives of those entities in the IMT or at least in the emergency operations center. The **common terminology and procedures** mean less time is lost to miscommunication between agencies. A practical example is how **interstate and international crews** were seamlessly folded into operations in 2019–2020: because of AIIMS, they encountered familiar ICS forms, briefing structures, and command hierarchies, allowing them to contribute immediately.

Interoperability was highlighted in an expert submission which noted that since *"all agencies utilise AIIMS"*, there's really no technical barrier to aligning even their communications and protocols. In effect, AIIMS provides the glue that holds together a coalition of responders. This is a stark improvement from the 1980s when agencies often functioned separately at the fire scene. The routine practice now is that in a large fire, you will find a mix of personnel from various services sitting side by side in an ICC, making joint decisions – a direct result of having a unified system.

- **Efficient Resource Management and Prioritization:** With a structured ICS, resource requests and allocations follow a logical process. The Operations and Logistics sections manage the deployment and tracking of crews, vehicles, aircraft, and supplies in a systematic way, usually using incident management software and status boards. This reduces chaos and duplication – for instance, two sector commanders won't unknowingly call for the same additional tanker strike team because requests are funneled through the Ops chief. Likewise, scarce resources (like specialized firebombing aircraft or bulldozers) can be prioritized to where they are most needed based on the incident objectives rather than who yells loudest. During multi-fire crises, ICS at the regional or state level helps prioritize across incidents (through a state coordination team that evaluates each incident's needs).

  AIIMS also emphasizes **planning for relief and rotations**, so fresh crews replace exhausted ones. In Black Summer, although things were extreme, the ICS structure helped organize the rotation of thousands of firefighters from other regions, ensuring that fatigued local crews could rest. Additionally, ICS provides a framework for **pre-positioning resources** in anticipation of events (as recommended after 2009 to have IMTs ready by certain times on bad days). When done right, this means resources are already poised to respond, improving initial attack success. Overall, ICS imposes discipline on resource management which tends to yield more efficient use of the forces available.

- **Improved Communication and Information Flow (Internal and External):** AIIMS formalizes information flow by establishing an Incident Communications Plan and meeting/briefing schedules. Within the IMT, regular briefings ensure all functions share what they know. Between the IMT and field crews, there are structured reporting lines (Division commanders report up to Ops, who report to IC, etc.). Moreover, the inclusion of an Information unit or Public Information section means there is dedicated effort to gather and disseminate information both internally (situation reports, weather updates) and externally (community warnings). After adding the Public Information function post-2009, AIIMS now guarantees that *"provision of warnings, information and advice to the public"* is someone's primary job in the IMT. This has greatly improved public safety outcomes; for example,

during Black Summer, many thousands of people were alerted with enough time to evacuate because the ICS had people tasked with nothing but issuing warnings. Internally, efficient information flow contributes to safety and coordination. A study of Black Saturday showed how communication patterns in a well-functioning ICS have the Incident Controller and information officer as key hubs collaborating with regional centres and field units.

Where this happened (e.g., the Kangaroo Ground ICC in one fire was noted as having high information exchange and "collaboration ranking"), the response was more effective. ICS by design tries to create these communication networks rather than leaving it to ad hoc personal contacts. The result is better **situational awareness** up and down the chain. In turn, good info flow enables timely decisions – a critical factor in an environment where fire behavior can change in minutes.

- **Focus on Safety and Span of Control:** The ICS structure, by limiting span of control and adding roles like Safety Officers, inherently supports responder safety. Each supervisor can adequately monitor the welfare of their team because they're not stretched too thin. Safety Officers (when appointed) identify hazards and ensure safety protocols (like LACES: Lookouts, Awareness, Communications, Escape Routes, Safety Zones) are being followed across the incident. On multiple occasions, ICS has likely prevented tragedy by its structured approach – for instance, if a sector commander sees extreme fire behavior, they can quickly relay a Red Flag Warning up to the Safety Officer and Ops, who then pull teams out in a coordinated way, avoiding panic.

  The emphasis on not exceeding span of control also means if a situation escalates, more leaders are inserted into the structure so that, say, one division commander isn't trying to manage 20 crews by themselves in a chaotic bushfire. This was a lesson from earlier fires and has become doctrine in AIIMS. The value is a safer, more manageable operation. During the 2019–20 fires, although there were many close calls, relatively few firefighters were killed or seriously injured given the scope of the disaster – this speaks to an increased safety culture within ICS (reinforced after experiences like 2009). The **Safety first** ethos is now ingrained, as seen in the South Australian CFS doctrine that safety must be at the forefront of all activities , and AIIMS provides the mechanism (safety officers, briefings, etc.) to implement that ethos on the fireground.

- **Proven Track Record and Continuous Improvement:** AIIMS ICS has decades of use and has been battle-tested in countless incidents. Over time, it has **built institutional memory and expertise** among emergency services. Most incident managers and senior firefighters today have grown up with ICS as the norm. This familiarity means in a crisis, they instinctively organize along AIIMS lines rather than needing to invent structure on the fly. The system has shown again and again that it can manage incidents from a single house fire up to a multi-state catastrophe. Its success is evident in many operations – for example, the **quick control of a potentially disastrous fire in the Blue Mountains in December 2019** was credited to decisive action by an IMT that coordinated remote area firefighters and aerial water drops effectively, which is an ICS success story. Additionally, AIIMS has a built-in improvement loop: after major events, reviews are conducted and the system is tweaked (like adding Public Info after Black Saturday, or enhancing emphasis on

intelligence after Black Summer). This means the system gets stronger each time. The willingness of AIIMS custodians to adapt (with AFAC driving updates and agencies implementing them) is a strength because it avoids stagnation. The existence of national forums and training under AFAC ensures lessons from one jurisdiction are shared to all. This continuous improvement culture – *"drive a mantra of continuous improvement"* as AFAC's President said – has kept AIIMS effective amid evolving challenges.

- **Enhanced Public Confidence and Order:** When the public sees a coordinated response (one spokesperson, clear warnings, firefighters and police working in concert), it increases their confidence and cooperation. AIIMS contributes to this by avoiding mixed messages. For example, during Black Summer, daily press briefings in each state were typically led by one control agency (RFS in NSW with Commissioner Shane Fitzsimmons becoming a trusted figure, EMV Commissioner Andrew Crisp in Victoria, etc.), and these briefings consolidated information from the AIIMS structure. The public heard one coherent update rather than separate uncoordinated statements from different agencies.

  This consistency helps people trust and follow advice, such as evacuation orders. It also arguably reassures communities that the situation, while frightening, is being managed professionally. Public trust is intangible but incredibly important in a disaster – it can influence whether people panic or stay orderly. The ICS's ability to deliver clear public information and demonstrate multi-agency unity is a key factor in maintaining public order and safety.

In aggregate, these strengths of AIIMS ICS – clarity of command, unity of effort, organized functional management, flexibility, interoperability, efficient resource use, strong communications, safety emphasis, proven reliability, and public reassurance – have made it a foundational element in Australia's emergency response successes. The **massive combined effort that saved many lives and homes in the Black Summer fires** is a testament to what a well-executed incident control system can achieve under dire conditions. One can conclude that without AIIMS, events like Black Summer could have resulted in far greater loss of life and property. It is the backbone that allowed tens of thousands of responders to function as a cohesive force despite coming from numerous agencies and even different countries.

Limitations and Challenges of the AIIMS ICS in Bushfire Management

While AIIMS ICS provides a robust framework for incident management, it is not a panacea. Real-world deployments have exposed various **limitations, challenges, and weaknesses** in the system. Some of these are intrinsic to the structure of ICS or how organizations implement it, while others arise under extreme conditions that push any system to its breaking point. Understanding these **cons** of AIIMS ICS is crucial for identifying areas of improvement. Below, we detail the main limitations observed in major bushfire events:

- **Coordination Breakdowns Under Extreme Stress:** As seen on Black Saturday, the ICS can **break down in extreme, fast-moving situations**. When an incident grows faster than the command structure can be reinforced, the result can be loss of effective

control and coordination. For example, at the height of the Kilmore East fire (Black Saturday 2009), the intended chain of command faltered – the local ICC did not maintain control of information flow, and coordination efficiency suffered. Communication networks became chaotic, with some responders bypassing the ICC because they couldn't get timely info or orders. This kind of breakdown indicates that ICS, in practice, may not be able to scale up quickly *enough* for the most sudden-onset mega-fires.

There is an inherent lag in mobilizing a full IMT and establishing control; in those gaps, critical decisions or information exchanges may be missed. Essentially, ICS promises coordination, but if the personnel cannot keep up with the incident's escalation, **coordination efficiency degrades sharply**. Black Saturday's Royal Commission pinpointed poor coordination in the command system as a major failing, showing that ICS did not prevent a fragmented response in several instances.

- **Information Flow and Communication Challenges:** ICS is hierarchical by nature, and **hierarchies can create bottlenecks** for information flow. Important data has to travel up to the IMT and then decisions/orders travel back down. In rapidly evolving fires, this can lead to delays or outdated information guiding actions. If any link in the comms chain fails – a blocked radio channel, an overloaded incident controller, a power outage in an ICC – the flow of information can halt. Black Saturday revealed that critical information (like exactly where the firefront was and how fast it was moving) often did not reach decision-makers or the public in time.

  Similarly, on a very large fire, field personnel might have observations that take too long to reach the Planning section for analysis, meaning the plan could be based on stale info. There is also the issue of **interoperability of comms**: even though ICS advocates common channels and terminology, technical incompatibilities or lack of pre-planning can mean that responders from different agencies have trouble communicating (e.g., police and firefighters on different radio networks). This was pointed out again in 2020 – despite all using AIIMS, sometimes agencies still resorted to workarounds like swapping radios, which is not efficient. In summary, ICS relies on communications, but communications infrastructure and practices can be weak links.

  When they fail, the ICS structure doesn't automatically compensate; instead, people have to improvise, which may bypass standard procedure (leading to potential confusion). **Slow circulation of information** and **lack of shared situational awareness** were cited as issues in 2009 , and even in 2019–20 there were calls for a better common operating picture , indicating persistent challenges in achieving truly seamless information flow.

- **Potential for Rigidity and Bureaucracy:** If misunderstood or enforced too rigidly, AIIMS ICS can become **bureaucratic and inflexible**. The system is meant to be adaptable, but there have been cases where personnel treat the AIIMS manual as a strict set of rules or checklists, losing sight of the incident's unique needs. An AFAC article noted that *"without understanding, the system can, and on occasion has, become a rigid set of rules that do not readily support the 'all hazards – all agencies' model"*. This can manifest as IMTs being slow to deviate from plan even when conditions change, or adhering to a chain of command even when it might make sense

to communicate laterally. Some critics argue that ICS encourages a **top-down command style** that might discourage initiative from lower levels, which can be problematic if those lower levels have critical real-time information. Also, the emphasis on processes (forms, meetings at set intervals, etc.) can create **paperwork burdens** or delay action.

For example, the insistence on producing a written Incident Action Plan could theoretically slow down the response in the first few hours if the IMT focuses on documentation over action – this was why the Royal Commission urged that a basic plan be done quickly within 4 hours, acknowledging that earlier delays happened. In some instances, first responders have complained that ICS introduces *too much* formality in the heat of battle, with one firefighter quoted (in other research) saying that sometimes by the time an IC's plan comes down, the situation has changed, so "we just acted anyway." While structure is good, too much structure can be a hindrance if it's not applied with common sense.

- **Dependency on Key Individuals and Training Gaps:** ICS is only as good as the people filling the roles. A significant limitation is that **it demands skilled and experienced personnel, especially for leadership positions**, and those individuals are finite. When an under-qualified person ends up as Incident Controller or Operations chief, the whole response can suffer from indecision or mistakes. The 2009 fires exposed that not all Level 3 Incident Controllers in Victoria were trained or prepared for an event of that magnitude.

  Some had never faced a campaign fire but suddenly had to manage one. This variability in training and experience is a weakness – if a catastrophic fire happens in an area where top-notch incident managers are not available, ICS may not be implemented effectively. Although efforts are made to standardize training, the Royal Commission explicitly recommended a **"uniform, transparent accredited training and performance review program for Level 3 ICs"** to address inconsistencies. It also called for more traineeships to build depth in the roster , implying that at the time there was a shortage. During Black Summer, the sheer number of simultaneous incidents meant that some relatively inexperienced officers had to take on big roles, simply because the veterans were all tied up elsewhere.

  ICS doesn't inherently solve that; it's a framework, not a magic supply of experts. When expert shortage happens, the **effectiveness of ICS implementation suffers**, as decisions might be slower or misjudged. Additionally, heavy reliance on key individuals like the Incident Controller can be a single point of failure – if that person becomes overwhelmed or incapacitated, and delegation doesn't occur, the whole operation could stall.

- **Inter-Agency Cultural Differences and System Variations:** While AIIMS is meant to unify agencies, some differences persist that can hamper smooth cooperation. Various services might have slightly different ways of interpreting ICS roles or different internal protocols for similar functions. For example, as noted earlier, police in Australia use a modified ICS (ICCS) for certain operations, and not all police commanders are deeply versed in AIIMS. When a bushfire requires strong police-fire cooperation, these differences could cause friction – perhaps a police forward commander isn't clear on the AIIMS hierarchy and acts independently, or fire IMT

members are not used to integrating police intel and thus overlook it. Also, agencies sometimes **prioritize their own objectives** (understandably, a forestry agency might prioritize saving a plantation, whereas a rural fire service might prioritize defending houses; in ICS they should agree on priorities, but differences can surface).

If an agency feels the ICS plan doesn't cater to its jurisdictional responsibility, tensions can arise. Historically, before AIIMS, this was a huge issue; AIIMS largely solved it, but subtle forms remain. For instance, in multi-jurisdiction incidents (like a fire on the NSW-Vic border in 2020), questions can arise: which state's IC leads, or do they split the fire into two incidents with coordination? In one sense, ICS wasn't originally designed for an incident that two separate governance systems must manage together. So, sometimes **"unified command"** (where two agencies share control) is applied in such cases, which is a workaround that can lead to slower decision-making unless personalities mesh very well.

Differences in **equipment and terminology** can also still appear on the ground – e.g., NSW calls a certain tanker type "Category 1" while Victoria calls it something else; if not clarified, that could confuse logistics or ops officers. These issues are usually minor but become more pronounced when large numbers of outside personnel join in; any lack of uniformity in applying AIIMS can lead to hiccups.

- **Challenges in Mega-Incidents and Multi-Incident Scenarios:** AIIMS in its standard form is typically oriented to managing one incident. In a true **mega-disaster with many concurrent incidents**, as Black Summer presented, the system for coordination above the incident level is less clearly defined. States ended up coordinating multiple incidents through State Control Centres, but this introduces another layer that isn't as fleshed out in doctrine as the incident level. The Royal Commission noted that Australia's arrangements rely on cooperation and are largely non-statutory at the national level – meaning if you have dozens of big fires across multiple states, managing the overall allocation of national resources and attention relies on ad-hoc coordination (teleconferences between commissioners, etc.) rather than a standing ICS structure. In the US, they might declare a National Incident Management situation with FEMA oversight in extreme cases; in Australia, we improvised with inter-state resource sharing via AFAC and federal assistance on request.

  This is not so much a flaw in AIIMS as an external limitation – AIIMS did not originally encompass national coordination. The result during Black Summer was some **lack of clarity about prioritization** of resources between states until agreements were reached. For example, at one point both NSW and Victoria were in crisis and competing for the same water-bombing aircraft or for additional firefighters; decisions had to be made at high levels about how to split those. There wasn't a pre-built ICS solution for that scenario (though AFAC plays a coordinating role). This is partly why recommendations for stronger national mechanisms came out. So the **limitation of scale** is evident: ICS works excellently per incident and within a state, but when disasters cross boundaries or become so large that they strain the whole country, the framework for command & coordination beyond state borders was ad hoc.

- **Public Communication and Warning Limitations:** While adding the Public Information function was a big improvement, **challenges remain in effectively communicating with the public** in fast disasters. Sometimes ICS processes still produced **warnings that were too late or not sufficiently clear**. On Black Saturday, warnings failed disastrously (leading to reform); by Black Summer, they improved, yet some communities still complained of confusing messages or a lack of localized detail. Part of this is the difficulty of predicting fire behavior to know what to warn – not an ICS fault per se. But some is operational: crafting messages and getting them approved through the IMT chain takes time, and in dynamic situations warnings can lag.

  For instance, in NSW's South Coast on New Year's Eve, the fire situation changed so rapidly that evacuation orders and emergency warnings were chasing a fire that had already arrived. Moreover, the **coordination of warnings across areas** can be tricky; if multiple IMTs issue messages, ensuring consistency is hard (hence the recommendation to align terminology and levels nationally). Another issue is **information overload**: in big crises, dozens of warnings may be issued each day, potentially causing some public confusion or fatigue. Deciding what level of detail to provide is also a judgment call that ICS teams struggle with – too little detail and people don't know if it's for them; too much and message dissemination is slowed or people get overwhelmed.

  Essentially, the limitation is that ICS provides a channel for public info but doesn't guarantee its effectiveness – human factors and system capacity (like websites crashing due to demand) can hinder the final mile of communication.

- **Logistical and Resource Tracking Difficulties:** In very large operations, keeping track of all resources (personnel, appliances, aircraft) is a monumental task. ICS logistics and planning units use various tools to do this, but Black Summer showed some cracks. The **Kangaroo Island** independent review found that "information regarding which crews were on what appliances and where they were located was lacking" during the height of the fires. Losing that kind of information is dangerous – it means if things go wrong (like a burnover), commanders may not even know who is in trouble or where. It also complicates relief planning and accountability.

  This happened because the incident was large and dynamic, and maybe the systems in place (paper logs or basic computer systems) couldn't keep up. Even in NSW, volunteers from interstate were sometimes hard to account for until shifts ended and everyone checked in. In short, **real-time resource tracking is still a weakness**. The QLD IGEM report stressed the need for an incident resource management system that enables better registration and tracking of personnel and equipment as an essential element for safety and efficiency.

  Without advanced tech, an IMT might rely on manual check-ins, which can fail in the fog of war. So ICS as practiced may lag in technology adoption – a limitation that is gradually being addressed but was evident in 2019–20. Logistical coordination across dispersed bases also taxed ICS; for instance, supply chains for food and fuel in isolated firegrounds (like on KI when the ferry was disrupted) needed extraordinary measures. ICS helped organize those, but physical constraints still caused issues (not enough rest facilities, etc.). Essentially, ICS doesn't eliminate the **hard practical**

limits of logistics; it just helps manage them, but extreme situations can still see logistics falter (like crews not getting meals on time or sleeping in trucks for lack of planning – which did occur occasionally in the peak of Black Summer).

- **Fatigue and Scale of Deployment Management:** Managing the wellbeing of thousands of responders over months was a big challenge in 2019–20. ICS has provisions for rehab and rotation (via Logistics and plans), but the **scale and duration** went beyond normal operations. Volunteers in particular were stretched thin, raising questions about sustainability. ICS relies on member agencies to supply fresh crews; if those agencies run low (as they did), ICS can't conjure more people. The limitation here is external – volunteer fatigue is a broader issue – but it impacted ICS performance since some IMTs became short-staffed or had to operate for prolonged periods with the same personnel, risking burnout and errors. There's also evidence of **mental health toll** on responders from sustained emergency operations ([[PDF] the impacts of the 2019-20 black summer bushfires on the wellbeing...]), which ICS has only recently begun to formally acknowledge (through post-incident aftercare, counseling services, etc.).

  If a system doesn't account for human limits, it eventually falters. Thus, one could say ICS in Black Summer was right at the edge of the human capacity of its responders. This manifests in small ways: a fatigued planning officer might miss an important weather update, or a tired crew might not hear a radio call – leading to potential safety issues. While not a flaw in ICS's design, it's a limitation in practice that the system did not have a built-in solution for such widespread, long-lasting deployment beyond mutual aid (which was done to the maximum). It flags that *preparedness levels and surge capacity* need to increase alongside ICS for future extreme seasons.

- **Technology Integration and Intelligence Processing:** Modern disasters generate a lot of data – satellite images, drones, fire modeling outputs, social media reports, 000 calls, etc. ICS must process intelligence to be useful, but in some cases the **intelligence function was overwhelmed**. AIIMS historically folded intelligence (i.e., information gathering and analysis) into the Planning section. There have been discussions about separating it or giving it more emphasis. After 2009, some jurisdictions started to elevate "Intelligence" as a distinct unit reporting to Planning or even directly to the IC.

  The Wikipedia note wondering if promotion of Intelligence (as well as Public Info) in AIIMS would prove effective in 2019–20 indicates attention to this. We don't have a final verdict, but likely, *some IMTs struggled to digest all available intel.* For example, multiple predictive models might show different fire spread projections – which does the Planning chief trust? Or field observers and remote sensing might give conflicting reports of fire edge location. In a chaotic environment, sometimes the IMT didn't have a clear picture. At times the **public had better real-time info (via social media) than the IMT**, which is a dangerous inversion.

  The limitation here is that ICS processes for validating and synthesizing intelligence can lag or be too conservative, especially when there's a deluge of data. Also, some ICS staff may not be trained in the latest tech (like interpreting satellite fire mapping), causing a disconnect. These factors mean that ICS decision-making might not always be fully informed, or conversely, it might get paralyzed by too much conflicting

information. The systems need upgrading to handle modern information loads – something recognized by recommendations to get a national common operating picture with real-time data for all agencies.

In sum, **AIIMS ICS, while fundamentally sound, has shown a number of limitations in application**. Key among them: difficulties maintaining coordination and info flow under extreme, fast conditions; the risk of rigidity or slow bureaucratic processes hampering swift action; dependence on well-trained personnel and the consequent vulnerability when they are overstretched; lingering inter-agency differences that can cause friction; challenges in handling simultaneous large incidents and scaling beyond traditional boundaries; shortcomings in ensuring timely public communication at all times; logistic and resource tracking shortfalls in very large deployments; responder fatigue and mental strain in long campaigns; and the need to better integrate burgeoning sources of intelligence into the planning cycle.

Recognizing these cons is not to undermine the value of ICS – indeed, without ICS the problems would likely be far worse – but to highlight where the system and its implementation need improvement. Many of these issues have been or are being actively addressed by fire and emergency services through training, new technology, procedural changes, and policy reforms. The next section will evaluate how effective AIIMS ICS has been overall in major bushfires, weighing these pros and cons, and provide an overall effectiveness rating, before moving on to specific recommendations for enhancement.

Effectiveness of AIIMS ICS: Overall Evaluation and Rating

Given the analysis of the AIIMS Incident Control System's performance in Australia's major bushfire events, we can attempt to gauge its **overall effectiveness**. This is admittedly a complex assessment – how does one measure the effectiveness of a management system in disasters that are all unique? However, by considering outcomes (lives saved or lost, property impacts mitigated or not, coordination successes or failures) and expert evaluations, we can form a qualitative and quantitative judgment.

On balance, AIIMS ICS has proven to be a **highly effective system**, without which the toll of disasters like Black Saturday and Black Summer would likely have been significantly worse. That said, it is not 100% effective; there have been notable failures in implementation that hampered the emergency response. Many inquiries and expert reviews have essentially concluded that ICS is *the right approach*, but it needs to be applied properly and continually improved.

If we were to put a **percentage score** on AIIMS ICS effectiveness in managing major bushfires, this thesis assesses it to be on the order of **80% – i.e., roughly "80% effective."** In other words, the system achieves about 80% of its potential (coordinating agencies, providing structured response, etc.) in large-scale bushfires, while about 20% of the needed coordination/information or other elements are sometimes lacking due to the limitations discussed. This figure is a reasoned estimate based on case study evidence and expert commentary, which we will justify below.

Justification of the Effectiveness Rating

- **Successes and Strengths Dominate Overall:** The evidence from the Black Summer fires suggests that **the unified effort under AIIMS saved many lives and properties** that might have been lost under a less organized approach. A post-season analysis by an independent bushfire group noted that despite the unprecedented scale of the fires, *"a massive combined effort saved many lives and houses in very challenging circumstances"*, aided by better communications and new ways of operating. This points to a largely effective response framework. Similarly, the Department of Home Affairs observed that during Black Summer, the Commonwealth's support complemented "the effectiveness of state government response and recovery efforts" , implying that the state-led ICS-based response was effective and just needed augmentation.

  These outcomes suggest a high level of effectiveness – if we consider that the situation faced was nearly cataclysmic, the fact that most threatened communities survived and the majority of assets were defended is a strong endorsement of ICS. Had AIIMS ICS not been effective, the loss of life and property would likely have been closer to worst-case scenarios (imagine Black Saturday's fatality rate applied to Black Summer's geographic scale – fatalities could have been in the thousands, which thankfully did not occur).

- **Track Record of Continual Improvement:** The ICS has demonstrated an ability to learn and adapt, which is a hallmark of an effective system. After the 2009 fires revealed serious issues, the changes implemented (like the new Public Information function, better training, etc.) demonstrably improved performance in 2019–20. For example, the addition of dedicated public information officers in IMTs directly addressed the prior gap, leading to vastly more extensive and timely public warnings during Black Summer.

  The outcome was that, although the fires were larger, far fewer people died, and many who survived credit warnings and clear advice for their escape. One could say ICS in 2009 was, hypothetically, maybe 50–60% effective (given the massive breakdowns in some areas), whereas by 2020 it might have risen to ~90% effective in terms of structure (with the main limiting factor being external, like the overwhelming scale). The truth likely lies in between, around 80%. The **improvement over time** is evidence of effectiveness because it shows the system can respond to critiques and shore up weaknesses (a static or ineffective system would either not change or the changes wouldn't yield better results).

- **Case Study Balance – Black Saturday vs. Black Summer:** In Black Saturday, ICS use had significant flaws – coordination was poor in some instances, and the Royal Commission's findings were quite critical. If we evaluated ICS effectiveness just on that day, we might have said it failed in critical aspects, perhaps earning a middling score. However, even on Black Saturday, some fires were managed well and the ICS concept itself wasn't thrown out; rather, they fixed it. By Black Summer, while challenges remained, the general consensus is that the emergency services did about as well as one could expect under extraordinarily difficult conditions, using all tools available including ICS. For example, the **Royal Commission into National Natural Disaster Arrangements (2020)** did not find fundamental fault with the AIIMS

structure – it reinforced the need for strong incident management and improved support systems, but it did not suggest replacing ICS (which it likely would have if ICS was fundamentally ineffective).

The Commission even noted that all firefighting agencies use AIIMS, enabling easier alignment of procedures like communications. This suggests that ICS was seen as largely working and being the correct approach. If we consider that in 2009 ICS perhaps failed to prevent 173 deaths, whereas in 2019–20 ICS contributed to limiting deaths to 33 despite far larger fires, it implies a substantial increase in effectiveness. We translate that to our scoring by assigning ICS an overall effectiveness of around 80%, acknowledging that 2009 was a low point and 2020 was a high point in implementation. In other words, ICS might have gone from maybe 50% effectiveness in 2009 to around 90% in 2020, averaging to ~70%, but given the weighting of improvements, we lean higher to ~80%. These are subjective numbers, but they illustrate the trajectory.

- **Expert Evaluations:** Many practitioners and experts have expressed that AIIMS ICS is fundamentally the right system, just needing refinements. Commissioner Greg Mullins (Fire & Rescue NSW) and others have voiced challenges with applying AIIMS to certain complex scenarios but still operate within that framework.

  The fact that agencies all still use AIIMS and have not sought to replace it with a different command system is a vote of confidence. Reports like the AFAC Independent Operational Reviews or those by Inspector-General Emergency Management often list recommendations to *improve* ICS rather than scrap it, indicating it's mostly effective. For instance, the IGEM (QLD) review of bushfire lessons compiled many recommendations (like those from VBRC) that aimed to fine-tune ICS – such as including local knowledge, improving info dissemination – implying the core is sound but needs tweaks.

  If ICS were only marginally effective, we'd see calls for a different approach altogether, which haven't materialized. The **consensus in emergency management literature is that ICS is the best practice model for incident management**, even if there are execution issues. That consensus itself is evidence of perhaps an 80-90% effectiveness perception among experts.

- **Remaining Shortfalls (the ~20% gap):** To justify why we don't rate ICS higher than 80-85%, we point to the documented shortfalls: information and coordination failures did contribute to avoidable outcomes (particularly in 2009). The VBRC concluded that *"lack of coordination in the incident command system"* significantly affected response efficiency , which likely cost lives. That indicates at least in that event, ICS fell far short of ideal. Also, even in 2019–20, some coordination issues persisted, such as resource tracking problems in SA and communications breakdowns on the South Coast. If ICS were 100% effective, we would expect no such issues – clearly not the case. Thus there's a portion of outcomes that better ICS implementation (or a stronger ICS) could have improved.

  For instance, some community members still did not receive warnings or got them too late – possibly indicating that even with Public Info officers, the system didn't reach everyone in time. Also, the extraordinary stress on personnel reveals that ICS

struggled to maintain its performance over an extended period – effectively, by the later part of the season, many IMTs were fatigued and possibly less sharp. Each of these factors suggests that ICS in practice has perhaps a 10-20% "inefficiency" or "ineffectiveness" under extreme conditions, which aligns with our estimate.

Bringing those points together, an **80% score** for AIIMS ICS effectiveness in major bushfires seems justified. It conveys that the system works the majority of the time (and has undoubtedly reduced harm), but it also leaves room that in perhaps 20% of situations or aspects, it has fallen short. This is in line with expert sentiment that while ICS is indispensable, there are noticeable gaps that need to be addressed.

It is also useful to contextualize this score: a perfect 100% effective system is an ideal that likely can never be reached in disaster management due to unpredictability and human factors. A 80% rating denotes a very good system with room for improvement. If one were to compare internationally, the U.S. experience with ICS (through FEMA's National Incident Management System) also shows strengths in multi-agency response but similar criticisms about large disasters (like Hurricane Katrina) where ICS didn't initially function perfectly – often attributed to poor implementation rather than concept, as in Australia.

So our evaluation is that **AIIMS ICS is a strong and largely effective framework** for handling bushfire emergencies, substantially better than the fragmented approaches of the past, but it is not infallible and must continue evolving to address its weak points.

To sum up: **AIIMS ICS has enabled Australian emergency services to manage extremely complex bushfire disasters with a high degree of success (roughly 80% effectiveness), but about 20% of potential efficiency or coordination is still being lost due to limitations in communication, training, resource strain, and other factors.** The goal moving forward is to close that gap – to make the system as close to 100% effective as possible. In the next section, we provide recommendations that directly target those identified weaknesses, aiming to boost the performance of AIIMS ICS in future bushfire events.

Recommendations to Improve AIIMS ICS in Bushfire Management

Drawing on the analysis of AIIMS ICS performance and its identified pros and cons, this section outlines a series of **practical, actionable recommendations** to enhance the system's use in bushfire management. These recommendations are intended to be realistic and easy to implement by fire and emergency services organizations (or related authorities), and they focus on improving planning, coordination, communication, and overall incident response effectiveness. Implementing these suggestions would help address the limitations discussed and further increase the AIIMS ICS's effectiveness (ideally moving that 80% closer to 100% in future events). Here are the recommended measures:

1. **Strengthen and Standardize Incident Controller Training and Accreditation:** Ensure that all Level 3 Incident Controllers (and other IMT leaders) across Australia are trained to a *uniform high standard* and regularly assessed. A nationally accredited training program, as recommended by the VBRC , should be fully implemented so

that whether an IC comes from the rural fire service, parks, or urban fire brigade, they have the same core competencies and understanding of AIIMS.

This program should include scenario-based assessments of leading large, multi-agency fires. Additionally, establish a formal **mentoring and traineeship pipeline** for new ICs. During quieter seasons, less experienced officers can shadow veteran Incident Controllers in exercises and smaller incidents. This will build a deeper bench of qualified ICs. By boosting training and accreditation, we mitigate the risk of variable performance – every Incident Controller in a major bushfire should be capable of implementing AIIMS effectively under pressure.

2. **Pre-establish Incident Management Teams on Extreme Fire Danger Days:** Don't wait for fires to start before standing up the IMTs. As a matter of policy, on days forecast as **Severe, Extreme, or Code Red (Catastrophic) fire danger**, fully staffed Level 3 IMTs should be on duty by mid-morning in at-risk areas. This includes having an Incident Controller, Ops, Planning, Logistics, Public Info officers, and support staff ready in the ICCs of fire-prone districts. The VBRC specifically urged that IMTs be in place by 10:00AM on Severe/Extreme days. Pre-forming teams means that the moment a fire starts, the management structure is already operational – they can attack the fire aggressively in its initial phase, order resources early, and issue public warnings at the earliest sign of trouble.

   This practice can dramatically improve initial attack success and prevent small fires from becoming infernos. Some regions already do this (NSW RFS often pre-deploys IMTs on bad days), but it should be consistent nation-wide. It is a relatively low-cost measure (essentially some overtime or standby pay) for potentially huge gains in response speed.

3. **Embed Local Knowledge in Incident Management Teams:** Every IMT managing a fire should include an advisor or liaison with strong local knowledge of the area. The Royal Commission recommended having someone with local insight as part of the IMT , and this is vital. Local rural brigade captains, landowners, or council fire managers can provide intelligence on local terrain, access roads, water points, and community nuances that outsiders may not know. A **Local Liaison Officer** role can be created (if not already) under the Planning section or directly advising the IC, whose job is to input local context into decisions and to liaise with local community leaders.

   This will help avoid missteps like sending crews down impassable tracks or misunderstanding which areas are high priority to protect. It also improves community trust, as locals see one of their own is involved in command. Implementing this is straightforward: when an IMT is formed, quickly identify a local brigade leader or SES unit controller, etc., and bring them in as an advisor. Some states do this informally; it should become standard practice.

4. **Improve Multi-Agency Communication Systems and Protocols:** One of the easiest immediate gains is to fix communication interoperability issues. **All agencies should adopt a common approach to radio communications at incidents.** Specifically, when multiple agencies respond to a fire, they should all operate on a shared radio network or have bridged networks, and there should be pre-assigned common

channels for tactical, command, and logistics communications. As an example, California uses an incident-wide common channel for all responding units ; Australia should mirror this uniformly. AFAC (as the national council) can coordinate a plan for common radio channel usage and ensure all services have the frequencies programmed and procedures in place.

Additionally, develop **national protocols** for inter-agency communication terminology to avoid any confusion (most of this exists, but any remaining differences should be reconciled). Another piece is ensuring compatibility of equipment: providing caches of spare radios that can be handed out to assisting crews, or using gateways that patch disparate radio networks together during joint ops. Given the statement that "there are no longer technical or process excuses" for poor comms because everyone uses AIIMS , this is truly a matter of will. In short, mandate and facilitate *universal communications interoperability*. This will improve situational awareness and safety immediately.

5. **Leverage Technology for Real-Time Information and Resource Tracking:** Adopt and deploy modern incident management software tools that enable a **Common Operating Picture (COP)** and real-time tracking of resources. The goal is that all agencies working on a fire can see the same up-to-date map of the incident, including fire perimeters, locations of crews and vehicles, and status of resources. As recommended in multiple forums, Australia should implement a national or at least state-level COP system.

   This could be a web-based platform (hosted by a national body like Emergency Management Australia in partnership with AFAC) where each incident creates a situation board accessible to authorized users across jurisdictions. For resource tracking, invest in simple GPS tracking for strike team vehicles and apps for crews to check in/out. There are existing systems (some agencies use mobile data terminals and apps like EM-COP or Beacon). What's needed is... to pair those technologies with training and usage in the field.

   For example, deploy **GPS tracking units** on firefighting vehicles and even personnel in strike teams, so their locations update live on the incident map, aiding both operations and safety (knowing where crews are relative to the fire). Use **drone and satellite data** integrated into mapping software to give near-real-time intelligence on fire spread. Some jurisdictions already use systems like **Fire Predictive Services and EM-COP** (Emergency Management Common Operating Picture) – these should be funded and made interoperable across states. The Royal Commission recommended exactly this: a technological solution for a shared situational awareness tool, developed nationally.

   Such a COP would allow all IMTs and coordination centres to see each other's incidents, resource deployments, and emerging risks in real time. In practice, implementing this means investing in common software (perhaps extending an existing platform) and ensuring every IMT has the hardware (large screens, reliable internet or satellite links) and training to use it. It's a significant undertaking but would greatly enhance coordination and reduce the information delays and mismatches that have plagued past responses. Moreover, improve **dispatch and resource management systems** so that when a crew is assigned to a task or moved,

everyone who needs to know is automatically updated (this could be as simple as mobile apps that crew leaders update when moving sectors, feeding into the ICC's system).

By embracing these technologies, AIIMS ICS would overcome many of the manual process limitations – ensuring that information dissemination and resource tracking (two big weaknesses identified) are vastly improved.

6. **Enhance Public Communication Strategies and Consistency:** Continue to improve how IMTs communicate with the public before and during bushfires. First, **simplify and standardize warning messages** across all states, so there is no confusion if people move or if agencies from different regions issue alerts. The 2020 Royal Commission recommended a common approach to emergency warning information to avoid cross-border confusion. Implementing this means aligning the color-coded warning systems and language nationally (e.g., what Victoria calls "Evacuate Now" NSW might call "Leave Immediately" – such differences should be reconciled). Second, **speed up the warning process**: use technology to push warnings faster (automated triggers from fire prediction models, for instance) and empower local ICs to issue warnings without too much red tape. Often, frontline leaders know a situation is bad before the formal predictions catch up; ICS should trust and act on their judgment with immediate public messaging, even if it's a preliminary warning.

   The Public Information Officer in each IMT should have clear authority and channels to get messages out swiftly. Agencies should also make better use of **multiple channels** – not just text alerts, but local radio, community Facebook groups, and siren systems where available – to ensure redundancy. Furthermore, **integrate evacuation planning with public info**: warnings need to contain clear instructions (not just "watch and act" but "leave via X road to Y evacuation center now"). Drills and community education can support this: if people know what to do when they get a warning, they'll act more calmly.

   On the communication consistency front, ensure that when interstate crews or commanders come in, they know the local warning protocols so that in community meetings or media interviews they don't convey conflicting advice. A national public information handbook under AFAC could codify these practices. In short, make public warnings more user-centric: clearer, sooner, more unified, and actionable. This will save lives and reduce last-minute panics.

7. **Improve Incident Action Planning and Foresight:** Require that **Incident Action Plans (IAPs) be produced and updated more frequently during fast-changing bushfires**, and ensure they're shared with all relevant levels (region/state) promptly. The recommendation is to have at least an initial IAP within the first 2–4 hours of a major fire, even if it's rough, and then update it every operational period (which might be every 8 or 12 hours in a campaign fire). To do this effectively, use templated IAPs that can be quickly filled in (most agencies already use templates; perhaps simplify them for the first operational period plan). Encourage **dynamic planning**: planning officers should run short prediction cycles constantly and feed new info to Ops without waiting for formal planning meetings.

It might be useful to introduce a **rapid planning team** concept – a small subset of the Planning section that is forward-looking, focusing on "what will happen in the next 1-3 hours" to complement the formal IAP which might cover the next day. This could help in fast-moving fires to anticipate sudden wind changes or spotting events and advise the IC to adjust tactics on the fly. Another part of better planning is **contingency planning**: ensure the IMT always has a "Plan B" and "Plan C" for worst-case scenarios (like fire breaks containment or a second fire starts). In Black Saturday, when the unexpected happened, some IMTs were caught off-guard; we want to avoid that by forcing a habit of contingencies.

State-level controllers should also ensure IAPs from different fires are synchronized if needed (for example, if two fires might merge, the IMTs should be planning jointly for that event). Tools like **simulation modeling** can be more widely used – e.g., run a quick Phoenix RapidFire or Spark simulation to visualize potential spreads and incorporate that into the plan. Ultimately, crisper and more frequent planning cycles will make ICS more responsive and proactive rather than reactive.

8. **Emphasize Responder Safety and Welfare in ICS Operations:** While firefighting is inherently risky, there are ways to further mitigate risks through ICS. One recommendation is to **embed a dedicated Safety Officer in every Level 3 IMT** (and even at divisional levels for very large fires) from the start of operations. This person (or team in big incidents) should have the sole task of monitoring conditions, verifying that crews are adhering to safety protocols, and issuing safety advisories. The South Australian review noted the importance of Safety Officers and suggested expanding their training.

   All Safety Officers should be trained not just in safety management but also in wildfire behavior so they can anticipate dangerous developments (like spotting the formation of a pyro-cumulonimbus cloud which precedes an extreme event, and then warning crews). Another aspect is **responder welfare**: instruct Logistics to prioritize setting up crew rehab areas, ensuring water, food, and rest are provided in a timely manner even during the heat of battle. Fatigue management must be enforced – an example practice: use a **12-12-12 guideline** (no more than 12 hours firefighting in 24, 12 hours rest before next shift, and after maybe 12 days rotate out long-distance crews).

   During Black Summer, some firefighters soldiered on to exhaustion; ICS leaders should proactively pull crews off the line before they become a liability to themselves. Introducing **fresh rotation schedules** and having extra crews on standby to swap in is key (this ties back to having depth of personnel via mutual aid). The Safety Officer can work with Operations to make sure no crew stays in the field too long without relief. Also, mental health support should be integrated: after very traumatic events (like a crew burnover or civilian fatalities), bring in peer support or counselors quickly for the responders, even as the incident continues.

   A practical recommendation is for agencies to deploy **Critical Incident Stress Teams** to base camps of big fires for any firefighters who need it. All of this recognizes that protecting the protectors is crucial: an ICS that looks after its people will perform better. And finally, review all "near miss" and safety incidents in

debriefs (e.g., if a crew had to deploy fire shelters, treat that as a major incident) and feed those lessons into future training.

9. **Formalize "Surge Capacity" and Interstate Resource Sharing Arrangements:** Black Summer showed the value of interstate aid and also the need for national coordination. As fires seasons become longer and overlap between states, we need a more structured approach to surge capacity. Therefore, **strengthen AFAC's national resource sharing protocols** by creating an easily activatable national pool of incident management personnel and firefighting strike teams.

   AFAC already coordinates interstate deployments, but we can streamline it: maintain a database of available Type 3 IMTs and specialized resources (bulldozers, aircraft, etc.) that can be quickly requested and dispatched via a national coordination center. Perhaps establish a small **National Incident Coordination Centre** (NICC) under Emergency Management Australia in Canberra that, during mega-fires, can monitor needs and broker assistance between states proactively. This center can support multiple AIIMS incidents by allocating incoming international help and ensuring no state is left short.

   It aligns with recommendations for greater national disaster coordination. In practice, implementing this means signing agreements between states about sharing costs and liabilities of resources, and running national-level exercises to practice deploying a large number of resources across borders. Also, consider **Australian Defence Force integration**: develop standing protocols for how military assets are requested and managed under AIIMS (e.g., have military liaison officers trained in AIIMS and pre-identified for each state's SCC).

   The aim is to make requesting 50 extra fire trucks or a battalion of soldiers almost as straightforward as requesting a nearby town's assistance – a routine part of ICS when needed. By formalizing surge capacity, we reduce the ad hoc nature of big reinforcements. This ensures that when one region's IMT is overloaded, reinforcements (both personnel and equipment) arrive faster and slot in with minimal friction, sustaining the operation.

10. **Institutionalize Continuous Improvement and Lessons Learned:** Finally, create a stronger feedback loop so that every fire season's lessons are captured and acted upon. After each major incident or season, conduct multi-agency **after-action reviews (AARs)** that specifically evaluate how AIIMS functioned: What went well? What problems arose in command, coordination, communications, etc.? Develop a system to track the implementation of review recommendations.

    AFAC, for instance, can maintain a national **"lessons learned" database** accessible to all agencies. The findings from inquiries like the VBRC or the 2020 Royal Commission should be revisited regularly to ensure all recommended changes are embedded (some recommendations, e.g., better info dissemination, are ongoing efforts). Each agency should have a **lessons management team** that ensures training and procedures are updated in line with those lessons (as Queensland IGEM emphasized, lessons management is key to continuous improvement). Also, increase the frequency of **joint exercises and simulations**: do annual large-scale bushfire scenario exercises involving multiple agencies and even multiple states. These drills

can test new procedures (like the common operating picture system or interstate team integration) in a practice setting, so issues are ironed out before the real event. For example, run a simulation of a "Black Summer 2.0" where simultaneous fires in NSW, Vic, and SA require national coordination – use that to practice NICC operations and communications interoperability.

Similarly, incorporate community feedback sessions post-incident to learn how warnings and public info can improve from the citizen perspective. In summary, build a robust learning culture: ICS was never meant to be static. Encourage innovation (like trialing new tech or tactics) within the ICS framework, and when something works, adopt it formally. Commissioner Lee Johnson's quote resonates here: *"failure to adapt/innovate"* is the biggest risk. So, the recommendation is to formalize adaptation – make it someone's job at the state and national level to constantly refine AIIMS based on the latest experiences and research (for instance, factoring in climate change projections into planning scenarios). If we continually improve the system, we ensure it remains fit for purpose even as fire threats evolve.

These ten recommendations, summarized:

- **Training & Accreditation:** Standardize high-level IC training nationally.
- **Pre-form IMTs on high risk days:** Have teams ready to go early.
- **Local knowledge in IMTs:** Include local experts in incident planning.
- **Better comms interoperability:** Use common radio channels & protocols.
- **Use technology & COP:** Real-time maps and resource tracking shared by all.
- **Stronger public warnings:** Standardize, simplify, and speed up alerts.
- **Quicker, dynamic planning:** Fast IAPs and constant forward-looking updates.
- **Focus on safety & welfare:** Safety officers in IMTs, manage fatigue proactively.
- **Surge capacity & mutual aid:** Formalize national resource sharing and military support.
- **Continuous improvement:** Post-incident reviews and regular multi-agency drills to update ICS practices.

By adopting these measures, fire and emergency services in Australia can enhance the AIIMS ICS, making a strong system even stronger. The goal is to make future bushfire responses safer, more efficient, and more effective at protecting lives, property, and the environment. Given the trajectory of climate and fire risk (longer fire seasons, more extreme fire weather), these improvements are not just ideal but necessary. The Black Summer Royal Commission warned that such extreme events are likely to recur with increasing frequency. Therefore, implementing these recommendations is urgent to ensure that AIIMS ICS – as the backbone of bushfire response – is fully capable of meeting the challenges of the future.

Conclusion

In the face of Australia's worsening bushfire threat, a well-honed incident management system is indispensable. The **Australasian Inter-Service Incident Management System (AIIMS)** has served as that critical framework, enabling thousands of responders from multiple agencies to come together and tackle some of the nation's most devastating fires. Through the lens of history – from the coordinated firefights that subdued the **Ash**

Wednesday blazes, to the hard lessons and reforms after **Black Saturday 2009**, to the massive inter-agency campaign during the **Black Summer 2019–2020** – we see that AIIMS ICS has continually proven its worth. It provides the **organizational backbone** that turns a collection of individual efforts into a unified force.

This thesis has examined AIIMS ICS in both theory and practice, highlighting how its principles of unified command, functional delegation, and coordinated planning have been applied in bushfire scenarios. We observed that when AIIMS is implemented well, outcomes improve: communities receive timely warnings, firefighters operate with clear direction and support, and different agencies synchronize their efforts towards the common goal of controlling the fire and protecting the public. In many instances across Black Summer, for example, the system worked as intended, and the benefit was evident in lives saved and properties defended.

At the same time, no system is without flaws. The extreme nature of Australian mega-fires has exposed **organizational and operational weaknesses** that can hinder even the best-laid plans. Communication breakdowns, delays in decision-making, insufficient sharing of information, and the sheer magnitude of disasters have at times overwhelmed incident control structures (as tragically seen on Black Saturday). These incidents remind us that ICS is a tool – powerful, but reliant on the humans and technology that wield it. When those elements falter, the tool can appear to fail.

However, one of the most encouraging aspects of Australia's approach is its commitment to **learning and improvement**. The AIIMS ICS of today is not the same as that of 20 years ago; it has adapted, incorporating recommendations from inquiries and user feedback. The addition of the **Public Information** function after 2009, the widespread adoption of **common terminology and liaison roles**, and the efforts to strengthen national coordination post-2020 all demonstrate a sector willing to evolve. This continuous improvement mindset is, in fact, part of what makes AIIMS successful – it is not static or complacent.

In evaluating AIIMS ICS's overall effectiveness, we assigned it a score of roughly **80%** – reflecting a generally high level of performance with room for enhancement. This is a testament to the solid foundation AIIMS provides, while also acknowledging that critical gaps (the other ~20%) must be addressed. The recommendations outlined – from better training and technology integration to improved communication and safety practices – offer a roadmap to bolster the system. Most of these recommendations are straightforward and *achievable in the short term*, relying on will and relatively modest resources rather than on any revolutionary invention. They align closely with what numerous post-incident reports have called for: better preparedness, better information management, stronger interoperability, and more investment in people and tools.

Implementing these improvements will not only refine AIIMS ICS but also enhance the **resilience of Australian communities** to bushfires. Incident control systems might seem abstract to the general public, but their impact is very concrete – it's the difference in how quickly a fire truck gets to your street, or whether you receive a warning in time, or how effectively agencies coordinate an evacuation. A robust ICS means a safer public and more effective emergency services.

Importantly, while this document focused on Australia's system, the AIIMS ICS experience offers insights to the world. As climate change amplifies wildfire risks globally, many

countries are grappling with how to manage larger, more intense fire disasters. The principles and adjustments in AIIMS – such as emphasizing public information and inter-agency unity – could inform other ICS models (like those in the U.S. or Canada). Conversely, Australia can also learn from others, keeping an eye on international best practices in incident management. The dialogue between systems, much like the exchange of firefighting personnel, ultimately contributes to better outcomes for all.

In conclusion, the AIIMS Incident Control System remains a **cornerstone of Australia's bushfire response capability**. It has shown itself to be largely effective in organizing complex operations and has undoubtedly mitigated the impacts of disasters that might have been far worse without it. By addressing its shortcomings through targeted improvements, AIIMS ICS can reach even higher levels of performance. As we face a future of potentially more frequent and ferocious bushfires, investing in a strong incident control system is not just prudent – it is imperative. The safety of communities and responders will depend on how well we can plan, coordinate, and execute emergency responses. AIIMS ICS, refined and strengthened, is the best tool we have to meet that challenge, ensuring that Australia is as prepared as possible to withstand the firestorms of the future.

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🤖 Human-AI Collaboration in Creating the AIIMS Incident Control System eBook

The eBook titled *AIIMS Incident Control System in Major Australian Bushfires* exemplifies a synergistic collaboration between human expertise and artificial intelligence (AI). This partnership aimed to produce a comprehensive, accurate, and accessible resource on incident management during significant bushfire events in Australia.

🤝 Human-AI Collaboration in eBook Creation

Human Expertise:

- **Content Development:** Subject matter experts provided in-depth knowledge on bushfire management, ensuring the inclusion of relevant case studies, operational procedures, and strategic insights.
- **Editorial Oversight:** Editors reviewed and refined the content to maintain clarity, coherence, and alignment with established emergency management protocols.

AI Contributions:

- **Drafting Assistance:** AI tools facilitated the initial drafting of sections by organizing information, suggesting structures, and generating preliminary text based on provided prompts.

- **Consistency Checks:** AI algorithms helped in maintaining uniform terminology and formatting throughout the document.

This collaborative approach mirrors initiatives like Stanford's CoAuthor project, which explores human-AI collaborative writing to enhance productivity and creativity.

📘 About the eBook

The eBook delves into the application of the Australasian Inter-Service Incident Management System (AIIMS) during major bushfires in Australia. It offers insights into incident control structures, coordination mechanisms, and lessons learned from past events. The integration of AI in its creation underscores a commitment to leveraging technology for effective knowledge dissemination.

By combining human judgment with AI capabilities, the eBook serves as a valuable resource for emergency management professionals, policymakers, and researchers interested in bushfire response strategies.