

Common Operating Picture Gaps Across the Disaster Management Cycle a Geoai-Enabled Dashboard Framework for Disaster Coordination

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ABSTRACT: Effective disaster management depends on the ability of multiple agencies, jurisdictions, sectors, and community partners to develop a shared operational understanding of rapidly changing conditions. Yet major disasters continue to expose Common Operating Picture (COP) gaps, where information about hazards, infrastructure disruption, resource availability, community needs, and recovery progress remains fragmented across separate systems and organizations. This article uses a qualitative document based conceptual analysis to examine COP gaps across the disaster management cycle and develop a GeoAI-enabled dashboard framework for disaster coordination. The analysis synthesizes emergency management doctrine, disaster risk governance guidance, official disaster review documents, situational awareness theory, GeoAI scholarship, dashboard-based decision support literature, and multiagency information sharing research. The findings show that COP gaps are not limited to emergency response. They also affect preparedness, recovery, and mitigation by limiting shared risk intelligence, resource visibility, lifeline monitoring, social vulnerability assessment, and recovery progress tracking. The article develops a seven-component framework that integrates geospatial risk intelligence, real time incident information, resource and logistics visibility, infrastructure and community lifeline monitoring, social vulnerability and community needs assessment, recovery progress tracking, and decision support analytics. The article contributes to disaster management scholarship by reframing the COP as a cycle wide, human led decision support capability rather than a response phase information display. It also clarifies that GeoAI should support, not replace, emergency management doctrine, interagency trust, ethical data governance, and accountable decision making.

KEYWORDS: Common Operating Picture; GeoAI; disaster management; qualitative document analysis; emergency operations center; multiagency coordination; resource allocation; decision support; situational awareness

INTRODUCTION

Disasters create decision environments marked by uncertainty, time pressure, damaged infrastructure, limited resources, and high public consequences. In these conditions, emergency management depends on more than the capacity of individual agencies. It depends on the ability of multiple organizations to develop a shared operational understanding of what is happening, where impacts are occurring, who is affected, which resources are available, and which priorities require immediate action. This shared operational understanding is commonly described as a Common Operating Picture.

A Common Operating Picture is central to modern emergency management because complex disasters rarely fall within the responsibility of one agency or jurisdiction. Local emergency management offices, state and federal agencies, fire and police services, emergency medical services, hospitals, public works departments, transportation agencies, utility providers, nonprofit organizations, private sector partners, and community organizations may all hold different pieces of critical information. If those pieces remain disconnected, decision makers may act on incomplete, delayed, or conflicting information. The result is not only a communication problem, but an operational gap that can affect coordination, resource allocation, public warning, infrastructure restoration, and recovery planning.

Emergency management doctrine recognizes the importance of this issue. FEMA's National Incident Management System identifies communications and information management as a core component of incident management and emphasizes systems that support shared situational awareness and a Common Operating Picture across command and coordination structures (Federal Emergency Management Agency [FEMA], 2017). This doctrinal position is consistent with situational awareness theory, which explains that effective decision making in dynamic environments requires the ability to perceive relevant information, understand its meaning, and anticipate how conditions may change (Endsley, 1995). In disaster operations, emergency managers need more than separate data streams. They need integrated, interpretable, and actionable information that supports coordinated decisions.

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Official disaster reviews illustrate why this problem remains important. During Hurricane Katrina, federal and congressional investigations identified serious failures in communications, situational awareness, and command and control across federal, state, and local response structures (The White House, 2006; U.S. House of Representatives, 2006). Australia's 2019 to 2020 Black Summer bushfires showed similar coordination and disaster risk information challenges in a different governance context, with the Royal Commission into National Natural Disaster Arrangements calling for stronger national coordination, improved disaster risk information, and better decision support (Royal Commission into National Natural Disaster Arrangements, 2020). These documents are used in this article as illustrative official evidence, not as formal case studies.

COP gaps should not be treated only as response phase communication failures. In preparedness, fragmented information can weaken hazard analysis, evacuation planning, resource pre-positioning, healthcare readiness, infrastructure risk assessment, and identification of vulnerable communities. During response, incomplete or delayed information can reduce situational awareness, slow resource allocation, and complicate coordination. During recovery, limited visibility over debris removal, housing needs, infrastructure restoration, assistance requests, contractor activity, and community lifeline stabilization can delay community recovery. During mitigation, lessons from prior disasters may not be effectively translated into location based risk reduction priorities.

This article develops a GeoAI-enabled dashboard framework for reducing COP gaps through a qualitative document based conceptual analysis. GeoAI refers to the use of artificial intelligence techniques with geospatial data to identify spatial patterns, support prediction, improve risk analysis, and strengthen location based decision making. The article does not present GeoAI as a replacement for human judgment, interagency trust, or emergency management doctrine. Instead, it positions GeoAI-enabled dashboarding as a decision support approach that can help agencies collect, integrate, visualize, interpret, and use disaster information more effectively.

Research Questions

RQ1: What is a Common Operating Picture in disaster management, and how does it support coordinated emergency operations?

RQ2: What are Common Operating Picture gaps, and how do they influence situational awareness, multiagency coordination, resource allocation, and decision making across the disaster management cycle?

RQ3: How can a GeoAI-enabled dashboard framework strengthen multiagency coordination, resource allocation, and decision support in disaster management?

LITERATURE REVIEW

Common Operating Picture and Coordinated Emergency Operations

The Common Operating Picture is a central concept in emergency management because disaster operations require multiple agencies to coordinate under uncertainty, time pressure, and incomplete information. FEMA's National Incident Management System identifies communications and information management as a core component of incident management and emphasizes accurate, timely, and accessible information for operational decision making (FEMA, 2017). From this perspective, the COP is not simply an information display. It is a coordination mechanism that supports shared situational awareness, resource management, command functions, and interagency decision making.

Australian emergency management doctrine similarly emphasizes shared information, coordinated planning, and interoperability across agencies and sectors. The National Disaster Risk Reduction Framework describes disaster risk as a shared and systemic challenge requiring coordinated action across governments, communities, businesses, and individuals (Australian Government, 2018). The Australian Disaster Resilience Handbook Collection promotes nationally agreed principles, shared language, and coordinated emergency planning practices across jurisdictions and organizations (Australian Institute for Disaster Resilience [AIDR], 2020). These sources support the same core principle found in NIMS: effective disaster management depends on shared understanding and coordinated action across institutional boundaries.

Situational awareness theory helps explain why a COP matters. Endsley (1995) argues that situational awareness in dynamic systems involves perceiving relevant information, understanding its meaning, and projecting future conditions. A COP supports situational awareness when it helps decision makers move from separate pieces of information toward a shared understanding of operational priorities. However, a dashboard does not automatically create common situational understanding. Steen-Tveit and Munkvold (2021) emphasize that common situational understanding also depends on role awareness, trust, mutual respect, and communication tools.

COP Gaps, Information Fragmentation, and Lifeline Visibility

COP gaps occur when agencies cannot develop a shared and actionable understanding of the disaster environment because information is incomplete, delayed, inconsistent, inaccessible, or poorly integrated. These gaps may result from damaged communications infrastructure, incompatible information systems, unclear reporting procedures, weak data standards,

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organizational silos, restricted information sharing, or limited interagency trust. In practice, information may exist but remain fragmented across systems, organizations, jurisdictions, and operational levels.

Information sharing is a persistent challenge in multiagency disaster response. Bharosa et al. (2010) identify obstacles to sharing and coordinating information during multiagency disaster response, including barriers at community, agency, and individual levels. These barriers matter because disaster management requires organizations with different authorities and professional norms to coordinate under time pressure. When information is not shared or interpreted collectively, agencies may duplicate efforts, overlook urgent needs, delay requests, or allocate resources based on incomplete knowledge.

FEMA's Community Lifelines approach is relevant to COP development because it organizes disaster impacts around essential community functions, including safety and security, food, hydration, shelter, health and medical services, energy, communications, transportation, hazardous materials, and water systems (FEMA, 2023). This approach supports a more operational COP because it shifts attention from isolated agency activity to the condition of critical services that communities need to survive and recover. However, lifeline information still requires timely collection, geospatial visualization, interagency sharing, and decision support.

GeoAI, Dashboards, and Disaster Decision Support

Geospatial information is fundamental to disaster management because hazards, exposure, vulnerability, infrastructure, and resources are spatially distributed. GeoAI extends traditional geospatial analysis by applying artificial intelligence methods to spatial data, remote sensing, sensor feeds, administrative data, and other location-based information. Janowicz et al. (2020) describe GeoAI as spatially explicit artificial intelligence that supports geographic knowledge discovery, while VoPham et al. (2018) explain that GeoAI can process large geospatial datasets and generate spatially relevant insights.

In disaster management, GeoAI can support pattern recognition, predictive modeling, damage detection, exposure analysis, accessibility assessment, resource prioritization, and recovery monitoring. Its value depends on integration into emergency management practice. Analytical outputs are useful only when they are timely, interpretable, trusted, and connected to operational decisions. Li (2024) highlights the importance of explainability, reproducibility, and trustworthy geospatial findings in GeoAI research, which is critical when analytical outputs may influence public warnings, resource allocation, infrastructure restoration, and recovery support.

Dashboards are relevant because they can organize complex information into a visual and operationally usable format. Yigitbasioglu and Velcu (2012) explain that dashboards can improve decision support when they reduce information overload, present information clearly, and provide useful visualization and analysis capabilities. Emergency response information systems must also support communication and decision making across operational levels (Turoff et al., 2004). A disaster dashboard should therefore function not only as a reporting tool, but as a shared decision support environment for hazards, needs, resources, lifelines, vulnerabilities, and recovery indicators.

Research Gap

The reviewed doctrine, official disaster reports, and scholarly literature establish that a Common Operating Picture is essential for coordinated emergency management, that information sharing remains difficult in multiagency disaster settings, and that GeoAI and dashboard tools can support spatial analysis and decision support. However, these areas remain insufficiently integrated. Emergency management doctrine emphasizes shared situational awareness and communications, but it does not provide a detailed cycle wide GeoAI enabled dashboard framework for connecting preparedness, response, recovery, and mitigation. Situational awareness theory explains how decision makers perceive, understand, and project changing conditions, but it does not specify how disaster agencies should organize hazard, resource, lifeline, vulnerability, and recovery information into an operational dashboard. GeoAI literature demonstrates analytical potential, but it often focuses on technical capability rather than governance, interagency trust, resource allocation, and accountable emergency management use. Dashboard literature explains visualization and decision support value, but it is rarely connected to Common Operating Picture gaps across the full disaster management cycle.

A second gap concerns the use of official disaster evidence. Hurricane Katrina and the Black Summer bushfires show that communication failures, fragmented information, weak coordination, and limited decision support can affect major disasters. However, if these events are presented without a declared analytical method, the article can appear to be a case-based discussion. This study therefore treats those disaster documents as illustrative official evidence within a qualitative document based conceptual analysis, not as bounded case studies. The purpose is not to compare the disasters as cases, but to use official lessons, doctrine, and scholarly literature to identify recurring COP gap patterns and translate them into a practical GeoAI-enabled dashboard framework. This article addresses the gap by linking COP doctrine, situational awareness theory, disaster review evidence, Geo-AI scholarship, dashboard decision support literature, Community Lifelines, and multiagency information-sharing research into one document based conceptual framework. The specific contribution is to move beyond describing COP gaps and instead show how selected evidence can be analyzed into dashboard components, analytical findings, and decision support functions for preparedness, response, recovery, and mitigation.

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METHODOLOGY

This study uses a qualitative document based conceptual analysis. It does not claim to be a systematic literature review, statistical study, interview based study, simulation, or formal comparative case study. The purpose is to synthesize selected doctrine, official disaster review documents, policy guidance, and peer reviewed literature in order to develop a defensible conceptual framework for reducing COP gaps through a GeoAI-enabled dashboard.

The source base was selected through purposive relevance sampling. The selection was not intended to be exhaustive; rather, it was designed to include high relevance sources that directly informed the conceptual development of the framework. Sources were included when they directly addressed one or more of the article's core concepts: COP development, shared situational awareness, multiagency coordination, disaster risk governance, information sharing, Community Lifelines, GeoAI, dashboard-based decision support, or official lessons from major disasters. The source base included FEMA NIMS and Community Lifelines guidance, Australian disaster risk and emergency planning guidance, official post disaster review documents on Hurricane Katrina and the Black Summer bushfires, and peer reviewed literature on situational awareness, GeoAI, dashboards, information sharing, and emergency information systems.

Hurricane Katrina and the Black Summer bushfires were not treated as bounded case studies. They were used as illustrative official disaster documents because both provide documented evidence of information, coordination, communication, and decision support problems in large scale disasters. Their role in the analysis was to support theme identification, not to produce case comparison or causal inference.

The analytical procedure followed four steps. First, the selected documents and articles were reviewed to identify recurring references to information fragmentation, situational awareness, coordination barriers, resource visibility, lifeline disruption, risk information, recovery tracking, and decision-support needs. Second, these recurring issues were grouped into thematic categories aligned with the research questions. Third, the themes were compared across doctrine, official reports, and scholarly literature to identify common patterns. Fourth, the themes were translated into framework components that could support practical dashboard design, interagency coordination, and future empirical testing.

Trustworthiness was supported through triangulation across different source types: official doctrine, disaster review reports, government guidance, and peer reviewed scholarship. The framework was not developed from a single disaster event or one institutional source. Ethical concerns were limited because the study used publicly available documents and published literature and did not involve human subjects, private records, field interviews, or personally identifiable data.

Table 1. Source Categories and Analytical Roles

Source category	Examples used	Analytical role
Emergency management doctrine	FEMA NIMS; FEMA Community Lifelines	Defined COP, shared situational awareness, information management, lifeline stabilization, and operational coordination needs.
Disaster risk governance and planning guidance	Australian National Disaster Risk Reduction Framework; AIDR Emergency Planning Handbook	Supported the cycle-wide view of risk reduction, planning, shared responsibility, and interagency coordination.
Official disaster review documents	Hurricane Katrina reports; Black Summer Royal Commission report	Provided illustrative evidence of recurring information fragmentation, coordination failure, and decision support gaps.
Peer reviewed conceptual and technical literature	Endsley; Bharosa et al.; Janowicz et al.; VoPham et al.; Li; Turoff et al.; Yigitbasioglu and Velcu	Provided theoretical grounding for situational awareness, GeoAI, dashboards, information sharing, and emergency information systems.

RESULTS / ANALYTICAL FINDINGS

Finding 1: The COP is a coordination capability, not only a display.

Across doctrine and literature, the COP is best understood as a shared decision support capability that helps agencies develop situational awareness, coordinate resources, and interpret operational priorities. The analysis shows that a COP has limited value if it only displays information without supporting shared interpretation, validation, and coordinated action.

Finding 2: COP gaps are cycle-wide disaster management problems.

The document analysis shows that COP gaps affect preparedness, response, recovery, and mitigation. Before disasters, they weaken risk mapping, resource pre-positioning, evacuation planning, and vulnerability identification. During response, they weaken field

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awareness, resource allocation, and interagency coordination. After disasters, they limit visibility over housing, debris, infrastructure restoration, assistance requests, and lifeline recovery.

Finding 3: Lifeline, resource, vulnerability, and recovery information are often disconnected.

A recurring pattern across the source base is that emergency management information is distributed across many organizations and systems. Hazard data, resource inventories, infrastructure status, hospital and shelter data, community vulnerability indicators, and recovery progress are often maintained separately. This fragmentation makes it difficult to prioritize support, identify unmet needs, and understand cascading consequences.

Finding 4: Geo-AI and dashboards can support integration, but they do not solve governance problems alone.

GeoAI can support spatial analysis, pattern recognition, exposure assessment, resource prioritization, and recovery monitoring. Dashboards can reduce information overload and provide visual decision support. However, the analysis also shows that technology must be supported by data quality, interoperability, common reporting standards, trust, privacy safeguards, human review, and institutional readiness.

Finding 5: Responsible COP development requires transparent and human led decision support.

The analysis shows that GeoAI-enabled disaster decision support must remain explainable, auditable, and accountable. A dashboard can inform decisions, but it should not replace emergency managers, incident command structures, local knowledge, or professional judgment. This finding is especially important where algorithmic outputs may influence warnings, evacuation support, resource allocation, or recovery assistance.

Analysis and Framework Development

The findings indicate that COP gaps can be analyzed as a chain of connected problems: information is fragmented, fragmented information weakens situational awareness, weak situational awareness reduces coordination, reduced coordination affects resource allocation and lifeline stabilization, and poor visibility over recovery limits learning and future mitigation. This chain explains why a dashboard framework must include more than incident mapping. It must connect risk intelligence, operational reporting, resource information, lifeline status, community needs, recovery progress, and analytical prioritization.

The first analytical step was to translate the identified COP gaps into functional dashboard requirements. Preparedness and mitigation gaps require geospatial risk intelligence. Incident awareness gaps require real time incident information. Resource duplication and uncertainty require resource and logistics visibility. Infrastructure disruption and cascading failure require infrastructure and community lifeline monitoring. Invisible or underreported needs require social vulnerability and community needs assessment. Recovery blind spots require recovery progress tracking. Information display without prioritization requires decision-support analytics.

The second analytical step was to organize these functions across the disaster management cycle. Before disaster, the dashboard should support risk mapping, evacuation planning, infrastructure vulnerability assessment, resource pre-positioning, targeted community outreach, training, and mitigation investment prioritization. During disaster, it should support real time incident awareness, field reporting, needs identification, resource allocation, lifeline monitoring, public warning, and operational coordination. After disaster, it should support damage assessment, debris monitoring, housing needs tracking, infrastructure restoration, utility recovery, recovery performance tracking, and community recovery monitoring.

The third analytical step was to identify enabling conditions. The framework requires data governance and quality, interoperability and data integration, multiagency collaboration and information sharing, security and privacy controls, standards and governance, training, exercises, and continuous improvement. Without these foundations, a GeoAI-enabled dashboard may reproduce information silos instead of reducing them. The resulting framework is therefore both technical and institutional: it combines dashboard capabilities with governance requirements.

CONCEPTUAL FRAMEWORK

This article proposes a GeoAI-enabled dashboard framework for reducing COP gaps across the disaster management cycle. The framework is based on the argument that disaster coordination problems are not caused only by communication breakdowns. They also emerge when hazard data, field reports, resource information, infrastructure status, community vulnerability indicators, and recovery progress remain separated across agencies, systems, jurisdictions, and phases of disaster management.

The proposed dashboard is not intended to replace incident command, emergency operations centers, emergency managers, or interagency coordination procedures. Instead, it is designed to strengthen those systems by improving how disaster information is collected, integrated, visualized, interpreted, and prioritized. In this framework, the dashboard functions as a shared decision support environment where agencies can view hazard conditions, resource availability, infrastructure disruption, community lifeline status, social vulnerability, and recovery progress through one operational interface.

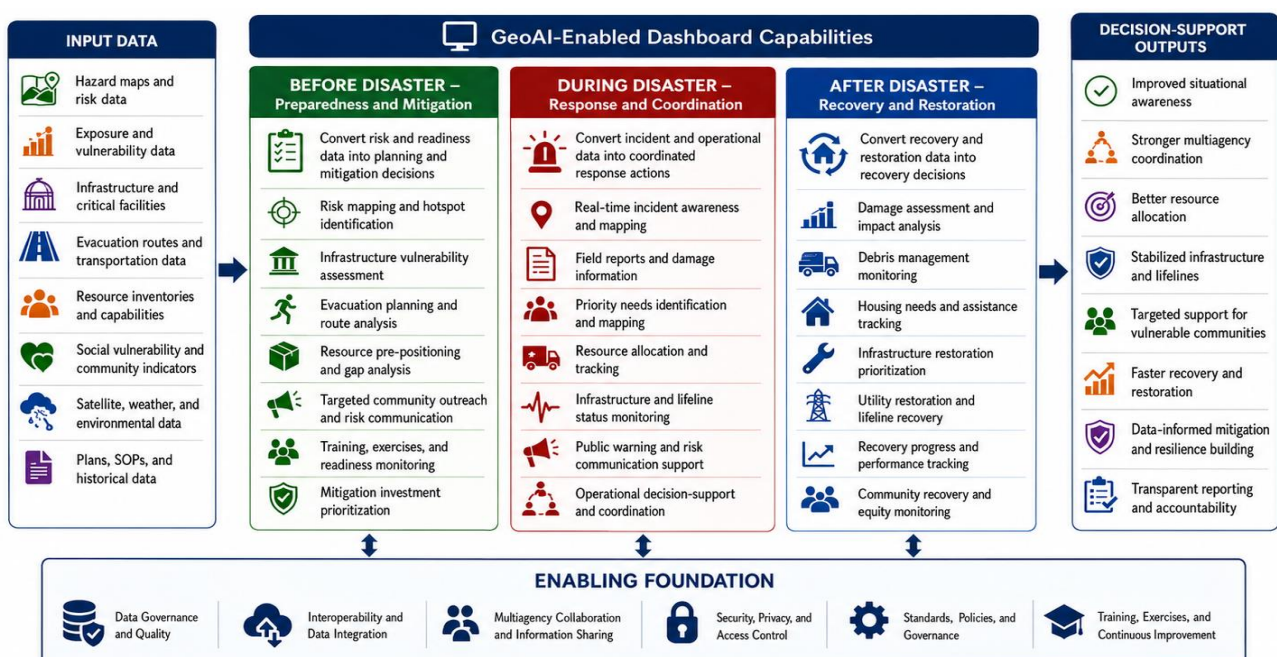
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Table 2. GeoAI-Enabled Dashboard Framework Components

Component	Main integrated information	COP gap addressed	Decision-support value
Geospatial risk intelligence	Hazard maps, exposure, evacuation routes, infrastructure, vulnerable populations	Preparedness and mitigation information fragmentation	Risk analysis, evacuation planning, resource pre-positioning, mitigation priorities
Real time incident information	Field reports, sensor data, emergency calls, road closures, shelter and hospital status	Delayed or incomplete incident awareness	Incident mapping, priority needs identification, public warning support
Resource and logistics visibility	Personnel, equipment, supplies, mutual aid, shelters, medical resources, transportation assets	Unclear resource availability and duplication	Resource allocation, gap identification, logistics coordination
Infrastructure and lifeline monitoring	Energy, water, transport, communications, healthcare, public safety, shelter status	Disconnected infrastructure and service disruption data	Lifeline stabilization, cascading impact awareness, restoration prioritization
Social vulnerability and community needs	Age, disability, income, language access, transport access, medical dependency, unmet needs	Invisible or underreported vulnerable community needs	Targeted outreach, accessible support, needs-based resource allocation
Recovery progress tracking	Debris status, housing assistance, utility restoration, infrastructure repair, recovery requests	Limited visibility after response phase	Recovery bottleneck detection, progress tracking, restoration coordination
Decision support analytics	Risk scoring, route analysis, resource gap analysis, scenario comparison, recovery delay detection	Information display without prioritization	Operational prioritization, transparent decision support, earlier corrective action

The central proposition is that COP gaps weaken disaster management when information remains fragmented across agencies, systems, jurisdictions, and phases of the disaster cycle. A GeoAI-enabled dashboard can reduce these gaps by integrating geospatial risk intelligence, real time incident information, resource visibility, lifeline status, social vulnerability indicators, recovery progress, and prioritization analytics into a shared decision-support environment.

Figure 1. Integrated GeoAI-Enabled Dashboard Framework Across the Disaster Management Cycle



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Note. The framework shows how a GeoAI-enabled dashboard can connect input data, before disaster preparedness and mitigation capabilities, during disaster response and coordination capabilities, after disaster recovery and restoration capabilities, enabling foundations, and decision support outputs across the disaster management cycle.

DISCUSSION

The findings and analysis show that COP gaps are not isolated technology failures. They are coordination, interpretation, governance, and decision support failures that can occur across the disaster management cycle. This matters because emergency management agencies often invest in information systems without fully addressing the institutional conditions needed for shared understanding and coordinated action.

The first research question asked what a COP is and how it supports coordinated emergency operations. The analysis indicates that a COP should be understood as a shared, timely, and actionable representation of disaster conditions that supports situational awareness, coordination, and decision making. The COP is not merely a map or dashboard. It becomes operationally useful when it helps agencies perceive conditions, understand operational meaning, and anticipate future needs, consistent with Endsley's (1995) situational awareness theory.

The second research question asked how COP gaps influence situational awareness, multiagency coordination, resource allocation, and decision making. The findings show that COP gaps weaken each of these functions. Fragmented information can prevent agencies from understanding the same risk environment, identifying priority communities, seeing lifeline disruption, knowing resource availability, and tracking recovery progress. Hurricane Katrina and the Black Summer bushfire review documents demonstrate that such gaps are not hypothetical; they appear in major disasters where communication, coordination, risk information, and decision support become operationally critical.

The third research question asked how a GeoAI-enabled dashboard framework can strengthen disaster coordination. The framework responds by integrating seven dashboard components and six enabling foundations. GeoAI can support spatial pattern recognition, risk scoring, route analysis, resource gap analysis, and recovery delay detection. However, the framework makes clear that GeoAI only adds value when embedded in emergency management doctrine, interagency trust, data governance, and human-led decision making.

The contribution of the article is therefore twofold. Conceptually, it reframes the COP as a cycle-wide decision support capability rather than a response phase display. Practically, it offers a framework that emergency operations centers, local governments, infrastructure operators, healthcare systems, nonprofit organizations, and community partners can use to organize dashboard requirements, governance arrangements, and future exercises.

Policy and Practice Implications

For emergency operations centers, the framework suggests that dashboard development should be treated as part of operational doctrine, not only as an information technology project. EOCs should connect dashboard design to standard operating procedures, reporting requirements, role assignments, resource request processes, and exercises.

For multiagency coordination, the framework highlights the need for interagency data sharing agreements, common reporting templates, access rules, information validation procedures, and shared terminology before disasters occur. A dashboard will not produce coordination if agencies do not trust the data, understand their roles, or agree on how information will be used.

For resource allocation and Community Lifeline stabilization, the framework can help agencies compare resource availability with hazard severity, population exposure, access constraints, lifeline disruption, and social vulnerability. A GeoAI-enabled dashboard can make lifeline conditions visible across agencies and show where disruptions may create cascading consequences.

For recovery and mitigation, the framework encourages agencies to preserve and analyze location based disaster information after the incident response period closes. Data collected during preparedness, response, and recovery should inform future hazard analysis, infrastructure investment, evacuation planning, training, and mitigation priorities.

Limitations and Future Research

This article is conceptual and document based. It does not test the proposed GeoAI-enabled dashboard framework through field implementation, simulation, expert interviews, or statistical analysis. The framework should therefore be understood as a structured model for future research and practice rather than as a validated operational system.

The study uses selected documents and literature rather than an exhaustive systematic review. The source base was selected for conceptual relevance to COP gaps, GeoAI, dashboards, disaster doctrine, and official disaster lessons. Future research should expand the source base, compare additional disaster governance contexts, and test whether the framework improves decision making in practice.

The framework also depends on data quality, interoperability, and institutional willingness to share information. A GeoAI-enabled dashboard can support decision making only if underlying data are accurate, timely, standardized, and accessible. Future studies

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should examine barriers to dashboard implementation, including data governance, interoperability standards, cybersecurity requirements, privacy protection, and interagency data-sharing agreements.

Future empirical testing could use emergency operations center simulations, tabletop exercises, practitioner interviews, pilot applications, and measurable indicators such as improved situational awareness, faster resource request processing, reduced duplication of resource deployment, improved lifeline stabilization tracking, and stronger recovery progress monitoring.

CONCLUSION

This article examined Common Operating Picture gaps as a cycle-wide challenge in disaster management and proposed a GeoAI-enabled dashboard framework for strengthening multiagency coordination, resource allocation, and decision support. By reframing the study as a qualitative document based conceptual analysis, the article clarifies its methodological basis and avoids presenting the Hurricane Katrina and Black Summer documents as formal case studies.

The analysis found that COP gaps are not simply communication failures during emergency response. They are broader problems of information integration, interpretation, visibility, governance, and decision support that can affect preparedness, response, recovery, and mitigation. The proposed framework integrates geospatial risk intelligence, real time incident information, resource and logistics visibility, infrastructure and community lifeline monitoring, social vulnerability and community needs assessment, recovery progress tracking, and decision support analytics.

The main contribution is to reposition the COP as a continuing, human led decision support capability. A GeoAI-enabled dashboard can help agencies prepare for risk, coordinate response, monitor lifeline disruption, allocate resources, support vulnerable communities, track recovery, and inform future mitigation. At the same time, the framework emphasizes that technology alone cannot solve disaster coordination problems. Responsible implementation requires data governance, interagency trust, human judgment, privacy safeguards, common reporting standards, training, and institutional readiness.

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