

Preparing landscapes and communities to receive and recover from wildfire through collaborative readiness

A CONCEPT PAPER

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September 2023



New Mexico Forest and Watershed Restoration Institute



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Document Development: This paper presents the Stages of Collaborative Readiness framework, which emerged from practice-based knowledge through participation in the Northern Colorado Fireshed Collaborative (NCFC). An early version of the framework was incorporated into the NCFC's charter by the lead author (former NCFC coordinator). Following a literature review, the concept paper was developed by vetting the framework through collaborative networks (specifically the Southwest Collaboratives Support Network and the Colorado Forest Collaboratives Network), and then gathering input and feedback from co-authors across the Southwest Ecological Restoration Institutes (CFRI, NMFWR, and ERI) and the Center for Collaborative Conservation at Colorado State University.

Acknowledgements: The authors would like to thank the participants of the Northern Colorado Fireshed Collaborative who provided input and review on early versions of the Collaborative Readiness Framework for the charter, especially Daniel Bowker, Kerry Major, Corrina Marshall, Emily Olsen, Paul Orbuch, Maria Pezza, Gretchen Reuning, and Monte Williams. We thank Brett Wolk for conceptual feedback throughout the development of the framework, as well as Lauren Brown and Reid Armstrong for designing and providing feedback on the Stages of Readiness graphic, respectively. Editing and layout by Hannah Brown and Angela Hollingsworth.

The Colorado Forest Restoration Institute at Colorado State University receives financial support under the Southwest Forest Health and Wildfire Prevention Act provided through the United States Forest Service. In accordance with Federal law and United States Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. To file a complaint of discrimination, write: USDA, Director, Office of Civil Rights Room 326-A, Whitten Building 1400 Independence Avenue, SW Washington, DC, 20250-9410 or call (202) 720-5964 (voice & TDD).

Publication date: September 2023

Cover: Concept illustration developed by Lauren Brown (LV Brown Studios, LLC) during the development process for this report.

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Suggested Citation: C. Huayhuaca, A.S. Cheng, T.A. Beeton, J.S. Sanderson, A.W. Barton, A.D. Kimple, M.M. Colavito, J. Zebrowski, J. Dunn, N. vonHedemann, A.W. Slack., 2023. Preparing landscapes and communities to receive and recover from wildfire through collaborative readiness: A concept paper. Southwest Ecological Restoration Institutes.



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EXECUTIVE SUMMARY

This concept paper presents a Stages of Collaborative Readiness framework. Collaborative, multi-party entities provide fundamental roles and contributions to prepare landscapes and communities to receive and recover from wildfire (identifying, connecting, and aligning stakeholders; co-developing strategies at scale; synchronizing operations; and facilitating science-informed, continuous learning). The framework applies insights from the collaborative development literature to the context of forest and wildland fire risk management. It embeds the fundamental roles and contributions within a four-stage framework, identifying stage-appropriate benchmarks and outcomes to increase the ability of a collaborative over time to serve those important functions.

The framework includes the following overlapping stages: 1) establish a community of partners around a shared vision; 2) translate that vision into strategy; 3) translate strategy into action; and 4) scale out impact and sustain momentum. During Stage 1, partners coalesce and establish a community of partnership around a shared vision. Depending on the history of collaboration, this may require a lengthy period of preparation to identify and connect the ‘right’ set of stakeholders for the context, requiring investment in human resources to conduct outreach and engagement, facilitate extensive trust- and relationship-building, and lead the development of Stage 1 benchmarks like written agreements documenting mutual commitment. In Stage 2, partners translate vision into appropriately scaled strategies by coupling stakeholder engagement processes with analytical platforms and tools to co-produce maps that provide an important foundation for a landscape spatial strategy, and which stimulate the dialogue necessary for developing other components of a strategy at scale. Stage 3 marks the transition from strategy to action and from planning to implementation, and the emphasis of collaboration shifts to synchronizing operations and supporting joint activities that increase the pace and scale of implementation. By Stage 4, the collaborative has been sufficiently institutionalized to scale and sustain its internal and external functions, and is able to navigate disruption and change long term with a robust collaborative adaptive management process. Few, if any, collaboratives will follow a linear course through these stages, and collaborative formalization into a new incorporated entity may not be the desired endpoint; different models will work for different firesheds. Sensitivity to context is essential for designing effective and durable cross-boundary and cross-scale collaboration.

The purpose of the framework is to enhance the ability of collaboratives to progress within and between stages, and to enhance their ability to receive and deploy funding to increase the pace and scale of implementation by supporting the collective work of partners. It is intended to help collaborative entities articulate and justify funding and capacity needs at different stages, and to encourage more equitable investments in collaboratives situated in landscapes with high wildfire risk that are early in their development, with limited capacity to obtain and mobilize funds for project implementation. The framework could be used to: inform self-assessment and adaptation by collaboratives; gauge or measure progress and development over time; track performance and increase accountability; or guide allocation of financial and other resources to collaboratives relative to need.

INTRODUCTION

Managers and scientists have long advanced the notion that preventing or stopping all wildland fires is neither a feasible nor a desirable goal (Arno, 2000; [Thompson et al., 2018](#)). Forests and plants regenerate through periodic fire, resulting in a rich diversity of wildlife habitat, functioning watersheds, and an abundance of goods and services beneficial to society. However, increasingly large and severe fires are putting these resources and assets at risk of long-term damage or loss. The issue isn’t a simple binary choice of “yes” or “no” to fire, but how to ready wildland landscapes and adjacent communities to receive and recover from fires in ways that are less likely to result in irreparable loss or harm to people, and reduce the time it takes for a community to recover ([USDA Forest Service, 2023](#)).

Collaborative, multi-party entities and organizations working on shared goals to complement the work of public land management agencies like the U.S. Forest Service have proliferated since the 1990s ([Charnley & Poe, 2007](#); [Cheng, Danks & Allred, 2011](#), [Huayhuaca, 2019](#)). While many forest collaboratives retain a focus on rural livelihoods and social-economic wellbeing, forest collaboratives increasingly focus on addressing wildfire risk, particularly in areas experiencing growth into the wildland urban interface—or WUI ([Paveglio et al., 2015](#))—or for source water protection. Collaboratives can play a fundamental role in preparing landscapes and communities to receive and recover from wildfire by laying the foundation of four essential building blocks: identifying, connecting, and aligning stakeholders; co-developing strategies at scale; synchronizing operations; and facilitating science-informed, continuous learning. Getting to a point of stability and capacity to play this role long term requires time, resources, and learning-by-doing.

There are many resources in the literature that elaborate the benefits of collaboration (e.g., [Brick, Snow, & van de Wetering, 2001](#)) or provide general guidance for designing successful multi-stakeholder or inter-organizational collaboratives (e.g., [Bryson, Crosby & Middleton Stone, 2006](#); [Wondolleck & Yaffee, 2000](#)). This document focuses specifically on the complex challenge of how to prepare for a future with wildfire and advance collaborative cross-boundary forest and wildland fire management systems, or *firesheds*, in fire-prone regions of the western U.S.¹. Collaboratives create value in different ways as they develop ([Imperial et al., 2016](#)), and the types and amounts of resources needed change over time. In this concept paper, we present a four-stage Collaborative Readiness framework as a way to gauge collaboratives' 'readiness' to lay those essential building blocks and support long-term, fireshed-level engagement.

PURPOSE AND NEED FOR THE COLLABORATIVE READINESS FRAMEWORK

The need for this framework arises from the confluence of several trends. Over the last 20 years, increasingly large and severe fires and longer fire seasons put infrastructure within the expanding WUI at risk of damage or loss, driving a need to scale up wildfire risk mitigation ([Dennison et al., 2014](#); [Yung et al., 2022](#)). Numerous policies, programs, organizations, and large amounts of funding have been directed at addressing this challenge over the past 20 years, such as the National Fire Plan of 2000 or the 10-Year Wildfire Crisis Strategy of 2022 ([USDA Forest Service, 2022a](#)). Collaboration features prominently in programs and policies like the Joint Chiefs Landscape Restoration Partnership, Collaborative Forest Landscape Restoration Program, and Shared Stewardship. With the proliferation of forest collaboratives and widespread recognition of the need for cross-boundary collaboration, federal and state agencies are increasingly expected to work with collaboratives to meet national- and state-level policy goals related to wildfire mitigation ([Beeton et al., 2022](#); [Yung et al., 2022](#)). Concurrent with these trends is the emergence of decision support tools grounded in risk management science that can be used to support cross-boundary strategic planning and prioritize geographic areas where investments of limited resources will be most likely to have the greatest impact on desired outcomes.

It would seem the stage is set for strategic, outcomes-based, cross-boundary collaboration to ready landscapes to receive and recover from wildland fire. And yet, forest restoration activities remain disconnected across landownerships and jurisdictions; without spatially

explicit strategies at scale, large wildfires will continue to overwhelm uncoordinated and opportunistic mitigation actions under increasingly extreme environmental conditions (Government Accountability Office [GAO], 2015). Thus, there is still work to be done to strengthen collaboration in areas that currently lack stakeholder engagement to develop and support cross-boundary strategic planning, prioritization, implementation, monitoring, and adaptive management. In areas that have collaboratives already, there is a need to bolster those entities to effectively navigate and use decision support tools and incorporate relevant science to co-develop, implement, and adapt long-term landscape-level strategies.

This concept paper presents a Stages of Collaborative Readiness framework, which provides stage-appropriate benchmarks and outcomes of fireshed-focused collaboratives as they evolve in their role in preparing and advancing systems to live with wildfire. The purpose of the framework is to inform reasonable expectations of the kinds of outputs and outcomes that can be achieved at different stages, and enhance the ability of collaboratives to progress within and between stages, such that they are increasingly able to: a) fulfill important functions in their fireshed into the future, and b) receive and deploy funding to increase the pace and scale of implementation by supporting the collective work of partners. This framework is intended to increase understanding of the time and resources needed to establish a high functioning, mature collaborative, and help collaborative entities articulate and justify funding and capacity needs at different stages. The framework aims to encourage more equitable investments in collaboratives situated in landscapes with high wildfire risk that are early in their development, with limited capacity to obtain and mobilize funds for project implementation. The framework could be used to: inform self-assessment and adaptation by collaboratives; gauge or measure progress and development over time; track performance and increase accountability; or guide allocation of financial and other resources to collaboratives relative to need. It applies concepts from existing collaborative development literature to collaboratives situated within a wildland fire management context, and elaborates on several substantive roles and contributions that collaboratives can provide in a fireshed.

The paper begins by defining firesheds and collaboratives before presenting an overview of four roles and contributions that fireshed-focused collaboratives can provide. This is followed by a description of the

¹ While insights may be applicable more broadly, this paper focuses on fire-prone regions of the western United States, as they share commonalities in patterns of public lands ownership and wildfire, and other natural resource policy contexts, in addition to similar fire regimes.

background and components of a framework delineating the stages of readiness that collaboratives commonly step through and must maintain to prepare firesheds and communities to receive and recover from wildfire. The framework was developed in coordination with a large landscape collaborative in northern Colorado and is based on decades of collaborative governance theory development and on-the-ground practice. The audience for this paper includes collaborative conveners, leaders, and members; boundary organizations² that support collaborative capacity and decision-making; agencies and organizations that sponsor or fund collaboratives and collaborative work; and evaluators, researchers, or other observers of collaboration.

DEFINING TERMS AND ROLES

FIRESHED-FOCUSED COLLABORATIVES

Wildfire risk³ occurs at the intersection of biophysical factors (like fuels and topography) and social factors (like human behavior and policy processes) operating at different spatial and temporal scales (Kline, Ager & Fischer, 2015). This presents a scale mismatch challenge⁴ resulting from a failure to link information defined at one scale with the scale at which decisions are made or implementation occurs (such as planning boundaries and processes that leave key stakeholders out to the detriment of plan implementation or outcomes). Recent efforts to address the scale mismatch challenge through risk assessment modeling offered the concept of “Firesheds,” defined in the Fireshed Registry and the 10-year U.S. Forest Service strategy “Confronting the Wildfire Crisis” as ~250,000 acre containers characterizing the likelihood of an ignition spreading to communities and exposing buildings (Ager et al., 2021; USDA Forest Service, 2022a).

For the purposes of this paper, we adapt an earlier definition of “fireshed” by Bahro et al. (2007), using the term to describe a landscape-scale⁵ geographic area where wildland fire has the potential to overlap and interact with socially important resources and assets, and where coordinated mitigation, response, and recovery strategies could influence wildfire outcomes relative to those values. By rooting itself in the strategic goals of the National

Cohesive Wildland Fire Management Strategy (USDA Forest Service, 2014)—i.e., restore and maintain landscapes, wildfire response, and fire adapted communities—this definition of a fireshed extends to a broader wildland fire management system (Zimmerman & Stutler, 2020). It also identifies a flexible spatial scale to potentially ‘fit’ the extent of the problem and address scale mismatch. The high degree of heterogeneity and spatial variability that a fireshed is likely to have in terms of socially important values and priorities among actors at multiple levels on multiple scales (jurisdictional, managerial, etc.) presents a tradeoff. On the one hand, benefits of a higher-level governance arrangement include the ability to consider landscape-level ecological processes and align with the scale at which long-term forest, fuels, and resource management planning occurs on national forests; on the other hand, this scalar advantage can come at the cost of sensitivity to the local-level needs and priorities of stakeholders (Young, 2002). Overcoming this tradeoff to coordinate actions in a fireshed over an extended period of time requires collaboration to occur across scales.

Collaboration brings autonomous stakeholders together across boundaries (e.g., jurisdictions, levels of government, or public/private/civil sector divides) to explore, deliberate on, and possibly implement co-developed solutions through structured processes (Emerson, Nabatchi, & Balogh, 2012; Gray, 1989; Wood & Gray, 1991). Multi-organizational entities that primarily function to sustain cross-boundary collaboration over time to achieve collective goals, or carry out an otherwise unachievable public purpose, are commonly referred to in the literature as collaborative governance regimes, or CGRs (Emerson, Nabatchi & Balogh 2012). As CGRs develop, they may begin to act as a single entity, taking on characteristics of a new collaborative organization, in which relationships are governed by rules and norms (Imperial, 2005). CGRs may formalize into collaborative organizations to acquire funding and human resources, to stabilize and encourage longevity for the partnership, or add value through services such as convening dialogues, resolving conflict, building capacity, catalyzing action, etc. (Imperial & Koontz, 2007). CGRs and collaborative

² Boundary organizations are formal organizations that play an intermediary role between different arenas (e.g., science and policy) or different levels of management. They translate knowledge through boundary objects (such as maps or reports) and facilitate knowledge co-production across boundaries where needs or interests converge, with accountability to either side of the boundary (Sternlieb et al., 2013).

³ Wildfire risk is characterized by the combination of likelihood and intensity (together called hazard), and exposure and susceptibility (together called “vulnerability”) (Scott, Thompson & Calkin, 2013).

⁴ A scale mismatch challenge is a type of social-ecological systems problem in which scale dependencies of an ecological system’s critical functions or processes fail to align with scale dependencies of a social system’s management actions, regulatory institutions, or other social processes and behaviors affecting ecosystems (Bodin, 2017; Cash et al., 2006; Kline et al., 2015; Young, 2006).

⁵ In their hierarchy of planning scales, Addington et al. (2018) define a ‘broad landscape’ as equivalent to a National Forest or 4th level watershed (100,000-1,000,000+ acres), and a ‘local landscape’ as 1,000-10,000+ acres, or a 6th level watershed. Smaller subsequent scales are project areas, treatment units, and stands. For the purposes of this paper, ‘landscape scale’ or ‘landscape level’ generally refers to the broad landscape, though we acknowledge that flexibility is needed in defining the appropriate spatial scale or watershed level for a fireshed.

organizations can evolve over time along a spectrum of formality that includes unincorporated networks, loose coalitions, fiscally sponsored partnerships, public bodies, and nonprofits. For the purposes of this paper, we use the term “collaborative” to broadly refer to CGRs and collaborative organizations that function at least in part to convene dialogues and processes of collaboration. This definition includes place-based collaboratives with ties to local communities or geographies, as well as large landscape or “all-lands” collaboratives that align programmatic resources and actions across multiple communities and geographies. All-lands collaboratives generally support cross-scale, landscape-level collaboration by coordinating, communicating, and implementing a shared vision across large landscapes and multiple landownerships, convening partners from multiple agencies and organizations, and potentially smaller-scale collaboratives (Cowan & Davis, 2022). Whatever their configuration, fireshed focused collaboratives address scale challenges by operating at a spatial scale appropriate to fit the extent of wildfire risk planning and management problems, while also bringing together the many actors across that landscape needed to inform decision making at the right levels to make an impact.

SUBSTANTIVE ROLES & CONTRIBUTIONS OF FIRESHED-FOCUSED COLLABORATIVES

Among other general functions, Emerson and Nabatchi (2015) describe substantive functions of collaboratives, which relate to collaboratives’ externally directed goals and their intended outcomes for the social-ecological system of which they are a part. For fireshed-focused collaboratives, intended outcomes generally pertain to readying landscapes and communities to receive and recover from wildfire through some combination of efforts to increase landscape resilience to wildfire, improve the safety and effectiveness of wildfire response, enhance community adaptedness and preparedness for wildfire, and improve the ability of communities to recover after wildfires. In this section we characterize substantive functions as the iterative and ongoing roles and contributions that fireshed-focused collaboratives can perform in pursuit of intended outcomes: identifying, connecting, and aligning stakeholders; co-developing strategies at scale; synchronizing operations; and facilitating science-informed, continuous learning

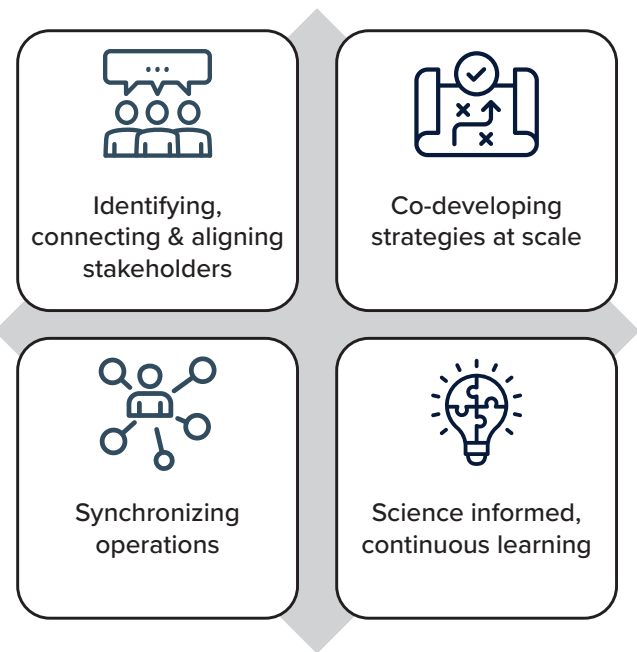


Figure 1. Substantive roles and contributions of fireshed-focused collaboratives

(Figure 1). We present these roles and contributions as ideal scenarios, but we recognize that social, political, economic, and other contextual factors may prevent or constrain collaboratives from serving these functions; we discuss some of these constraints in Section II: Stages of Collaborative Readiness.

Identifying, connecting & aligning stakeholders

Coordinating action to overcome scale mismatch challenges in a fireshed requires long-term engagement among stakeholders across boundaries and scales. Fireshed stakeholders are individuals and entities that have jurisdictional authority over, are interested in, or are affected by, wildland fire mitigation, response, and recovery among firesheds of concern⁶. Collaboratives can provide the structures and venues for inclusive, transparent, and open participation of all participants. Over time and through iterative processes, these stakeholders a) build a composite vision and mission to address wildfire risk to their shared values; b) agree to share risks, responsibilities, and resources in pursuit of that vision and mission; and c) establish a framework to ensure the continuity of the collaborative environment as needed to achieve desired outcomes in their fireshed.

⁶ We use the term “stakeholder” as shorthand to refer to those with interests in or potential to affect or be affected by wildland fire management decisions. When considering who are stakeholders, it is important to consider communities whose rights, opinions, and influence have historically been marginalized (Bendtsen, Clausen & Hansen, 2021). It is also important to recognize that many Indigenous communities have a legal status that is different from other stakeholders or partners. For example, Tribal Nations in the US have a government-to-government relationship with the federal government, a consideration that makes it incorrect to lump them in with other stakeholders or ‘the general public’. Instead, Sarkki, Heikinen, and Löf (2021) recommend the term rights holders be used when engaging Indigenous peoples and Tribes in collaboration around land and resource management.

Place-based collaboratives are well-positioned to build and sustain trust among partners and serve as neutral arbiters of conflict among organizations. Place-based collaboratives with goals that include forest health, wildfire, watershed health, rural livelihoods, and/or community sustainability (e.g., watershed groups, forest health partnerships, wildfire councils, and some resource conservation districts) are particularly situated to do this because they already have broad-based ties to the communities impacted by wildfires. Such groups can provide a point of access for local community members to engage in fireshed-level issues, and as a result have greater sensitivity to local values and priorities.

In landscapes where place-based collaboratives do not yet exist, these processes can be catalyzed (or potentially convened, if resources allow) by other kinds of community-connected organizations that are hubs of local communication and trusted local knowledge, but have primary functions other than multi-stakeholder collaboration (e.g., land conservancies, conservation districts, fire protection districts, and local governments). Alternatively, an existing process convening diverse stakeholders for a fixed time around a targeted outcome (like Community Wildfire Protection Plan [CWPP] work groups) could be leveraged to address a larger set of issues over a longer period of time. Sponsors of collaboration (i.e., those funding the endeavor) may also contract with a professional facilitator to convene the process, though these facilitators may not have broad-based ties to impacted communities or subject matter expertise.

All-lands collaboratives operate at a scale more commensurate with firesheds, but there are potential tradeoffs in terms of access for diverse participation by community-level stakeholders. Increasing the spatial scale at which collaboration takes place simultaneously increases the heterogeneity of values, economies, and politics represented by participants, which require the accommodation of appropriately scaled decision-making structures ([Heikkila & Gerlak, 2005](#); Kark et al., 2015). This tension between problem ‘fit’ and participation has been called the paradox of scale in collaboration ([Cheng & Daniels, 2005](#)), where barriers to inclusive collaboration are lower at smaller scale, but the problem requires collaboration at larger scales. In firesheds fortunate enough to have multiple place-based collaboratives, all-lands collaboratives can function as a “meta-collaborative” by leveraging their access to local communities while helping to coordinate and scale up the impacts of smaller-scale groups (Cowan & Davis, 2022, p. 5). In the absence of place-based collaboratives, all-lands collaboratives must rely on other kinds of community-connected partners to access community-level stakeholders and avoid becoming too top-heavy.

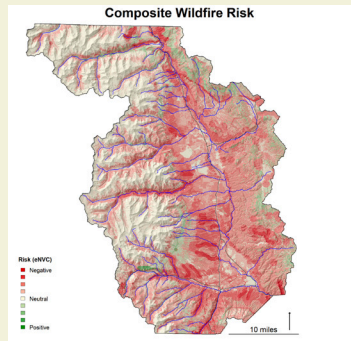
The specific partners and stakeholders engaged will vary by context and over time. Community-connected partners and nongovernmental organizations that serve as hubs of local communication and trusted local knowledge should be recruited early on, as these entities will play an important role in outreach to more diffuse populations of community residents and landowners across the fireshed. Likewise, nonprofits working at larger scales that serve as hubs of broader communities of practice can bring valuable knowledge and resources to the table. Leadership and decision authorities, implementers, and managers of relevant jurisdictions play a crucial role in setting the stage for discussions about common goals and values; they must be recruited and engaged early and often to begin building trust through interaction and communication. Jurisdictions may include Tribal Nations, which are sovereign entities that may require a specific approach to government-to-government relations. They may also include land grants, acequias, and other existing local and regional governance structures. Collaboratives should ensure that crucial, powerful, or influential local entities, and entities that would benefit from participation, are invited to the table. Also critical to the process are science partners and researchers with expertise and local knowledge about wildland fire behavior, mitigation, management, and social science. Boundary organizations with the mission to unite and integrate science into land and wildland fire management decision-making, such as the Fire Science Exchanges supported by the Joint Fire Science Program, the Southwest Ecological Restoration Institutes, or Cooperative Extension, can serve as bridges to the research community.

Co-developing strategies at scale

Collaboratives can bring stakeholders together to do fireshed-scale strategic planning across jurisdictions and ownerships to address wildland fire behavior, wildfire risk, and impacts of wildfire to values and resources people care about. This involves multiple scales of management action from the project and watershed levels to the entire landscape of the fireshed to accomplish a strategy for meaningful risk reduction. Locally developed CWPPs and watershed assessments can be effectively supplemented by science-based analytical platforms and spatial decision support frameworks that characterize risk and risk management to support planning at larger scales. Grounded in risk management science, these tools mathematically parameterize consequences to resources and assets from fire (both beneficial and harmful), and generate outputs like maps, tables, and other data visualizations to identify priority locations and actions on the landscape ([Colavito, 2021](#)). The goal of such actions may not be to prevent or stop fire completely, but to: increase the likelihood that landscapes and their

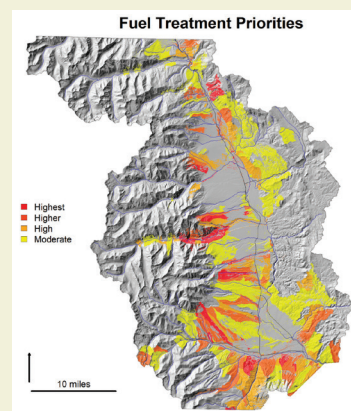
BOX 1: Spatial Decision Support Frameworks and Tools Examples

Quantitative risk assessments, or QRAs (Scott et al., 2013), assess the potential for wildfire to interact with values and resources people care about and the positive and negative impacts to those values and resources should a wildfire occur. QRAs are computer modeling simulations that utilize empirical data to: (a) calculate the likelihood of a wildland fire igniting and spreading under different weather and topographic scenarios; (b) estimate the expected fire intensity as expressed by flame length for each scenario; (c) incorporate local stakeholder knowledge about the extent to which highly-valued resources and assets (HVRAs) would be affected (both positively and negatively) by different types of fire intensities; and (d) integrate wildfire risk based on local stakeholders' weighting of the relative importance of the HVRAs. HVRAs can include built infrastructure (homes, water supply infrastructure, utility transmission infrastructure, communications facilities, recreation facilities) as well as ecological resources (old-growth forests, critical habitat for sensitive terrestrial and aquatic species, riparian areas and wetlands). QRA outputs often include “hot spots” or color-coded gradients for locating which HVRAs would be most impacted by wildland fire, both positively and negatively.



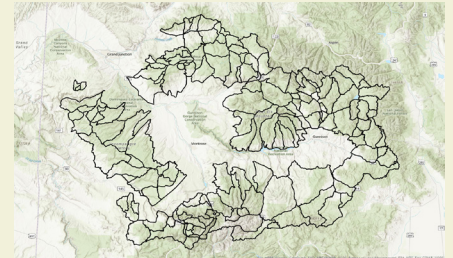
Quantitative risk assessment output from Chaffee County, Colorado (Dunn & Wolk 2023)

Scenario investment prioritization and planning modeling couples the outputs of QRA with costs of different management options and budget constraints (Ager, 2022; Ager et al., 2021). Given limited resources, these models can help stakeholders identify what types of work can be done to have the highest likelihood of changing the outcomes of fire to HVRAs given the cost –i.e., a “bang for the buck” tradeoff analysis for different budget scenarios (Dunn & Wolk, 2023).



Example of risk-informed investment prioritization from Chaffee County, Colorado (Dunn & Wolk 2023)

Potential Operational Delineations (PODs) are a spatial planning framework in which fire responders, resource managers, and other cross-jurisdictional partners bring their local knowledge to a process to identify areas of risk and opportunity for wildfire containment and suppression, facilitated by spatial analysis tools developed and maintained by the U.S. Forest Service Rocky Mountain Research Station (RMRS) (Thompson et al., 2016). Through a series of workshops, participants use reference layer maps (e.g., roads, burned area perimeters, topography, and jurisdictional boundaries) to identify potential control lines, or PCLs, that will have a high likelihood successfully containing wildfire. PODs were initially developed for incident response and management, but have increasingly been used for pre-fire fuels mitigation and fire planning (Stages of Collaborative Readiness). The result is a network of spatial containers that can be used as summary units for spatial data, such as locations of HVRAs, to inform treatments within a POD or along POD boundaries.



POD Network delineated on the Grand Mesa Uncompahgre and Gunnison National Forests (Ritter & Caggiano 2022)

Integrating Spatial Tools with Collaborative Strategy

PODs can be combined with QRA and other spatial analytics to identify and prioritize areas for fuels and forest health treatments, support safe and effective wildfire response, and identify suppression and non-suppression opportunities in advance of ignition (Dunn et al., 2020). If an objective of the collaborative strategy is to promote more prescribed and managed fire on the landscape, this must be tied to actions designed to increase HVRA resilience. Localized planning processes such as watershed wildfire plans or CWPPs often focus on reducing risk and improving HVRA resilience by lowering their susceptibility to wildfire loss or damage up to a threshold of fire intensity, and increasing the benefits they receive from fire. By expanding the scope to a larger fireshed, partners can identify areas on the landscape where investment in mitigation is likely to yield desired outcomes, prioritize those areas for outreach and preparation, and take advantage of windows of opportunity as they open up across the landscape. Collectively recognizing that fire is inevitable and acknowledging what can realistically be achieved through mitigation could also feed into collaborative planning for post-fire recovery. Spatial planning tools can be used to prioritize preparing infrastructure for the aftermath of wildfire within (and possibly beyond) the boundaries of the fireshed.

embedded communities can receive fire with reduced loss or damage to valued resources and assets, promote safe and effective fire response, and restore ecosystem services and functioning. Three spatial decision support frameworks with relevance to fire systems include quantitative risk assessments (Scott, Thompson & Calkin, 2013), scenario investment prioritization and planning (Ager, 2022), and Potential Operational Delineations (Thompson et al., 2016) (See Box 1: Spatial Decision Support Frameworks and Tools Examples).

A spatial strategy: 1. delineates geographic areas where different wildfire outcomes are to be achieved; 2. outlines a suite of coherent, connected actions tiered to those outcomes that will be carried out by specific entities over a specified time period; and 3. describes the conditions under which those actions are expected to be effective in producing the outcomes. A hand-in-hand combination of analytical platforms and local knowledge can be used to identify priorities and co-develop a spatially explicit strategy linking desired outcomes, potential fire mitigation and response actions, and effectiveness parameters across scales.

While spatial decision support frameworks and tools like QRA and PODs can be run with minimal stakeholder input (e.g., by fire response teams alone), they are well positioned to invite collaborative engagement with a broader set of stakeholders. The models and outputs (e.g., maps) generated by spatial decision support frameworks do not provide “The Answer” for a collaborative, but they can facilitate communication among a diversity of individuals to develop shared language and understanding, and to advance learning, dialogue, and deliberation around strategy at spatial scales commensurate with wildfire potential (Davis et al., 2021). Spatial decision support products are further strengthened and made actionable when they are the outcome of collaborative processes that expand participation beyond fire response teams to include land managers, biological resource specialists, local interested and affected parties, landowners, community-connected partners, project contractors, and other implementers. These individuals can help identify HVRAs to incorporate into the frameworks, locate them on the landscape, define potential scenarios, and ultimately increase the likelihood that the resulting products will be used (Beeton & Caggiano, 2022). Incorporating local knowledge and values also advances local ownership of a product that could otherwise be perceived as out of touch with local concerns.

Collaboratively produced maps provide an important foundation for a spatially explicit strategy and

support the dialogue necessary for developing other components of a strategy at scale; these discussions might include monitoring indicators and timeframes for assessing the effect of smaller-scale actions on predicted and actual wildfire outcomes, or identifying where to target community outreach and engagement activities in advance of project implementation. Another potential component of a fire strategy at scale are standard operating procedures (SOPs) for coordinated implementation across jurisdictions, ownerships, and conditions, especially when implementing prescribed fire or managing wildfires.

Synchronizing operations

Coordinating cross-jurisdictional actions among project implementers (e.g., fire managers or foresters) requires a firm foundation of trust. Collaborative processes of interaction (e.g., planning) and structures (e.g., committees) provide venues to connect and build trust among the many jurisdictions with authority and capacity for wildland fire management within a fire strategy. Opportunities to share resources, communicate across organizational boundaries, and ‘think outside the box’ can increase awareness of and ability to utilize a fuller range of response options to safely achieve desired outcomes (Zimmerman & Stutler, 2020). Collaborative activities can also build trust among field-level personnel from different organizations and agencies, which is essential for effective coordination in complex and fluid situations (Saab et al., 2013) like prescribed fire implementation or wildland fire response and management. When developing and applying collaborative strategies and SOPs, operations specialists must establish and sustain trust through frequent communication, cooperative training, and working on fires together. Sharing risks (including the political risks faced by organizations and agencies utilizing prescribed or managed fire) requires the knowledge that others “have your back” and will stand beside you when unexpected events happen.

Facilitating science-informed, continuous learning

Collaboratives can facilitate continuous learning among stakeholders about the science and practice of forest health restoration, wildland fire risk mitigation, response, and recovery. Co-developed strategies must incorporate locally relevant forest, fire, risk management, and social science knowledge; collaboratives can help ensure that strategies are tailored to local contexts and applied through participatory processes of engagement. Before employing science-based analytical platforms to supplement local knowledge and expertise, science partners and boundary organizations should work with (or be embedded within) collaboratives to build literacy

about those decision support tools. Stakeholders need time to internalize the inputs and outputs of models so they are better equipped to engage in the fireshed-level strategic planning process. Decision makers need to be able to understand and explain the science and products to their constituents and colleagues. Managers and implementers need to understand the capabilities of the analytical tools to better utilize the information in decision making (Zimmerman & Stutler, 2020).

The management options laid out in a co-developed landscape level strategy can be constrained or enabled by social and political influences, like acceptability of fuels management treatments (Zimmerman & Stutler, 2020). Collaboratives can lead or coordinate outreach and communication efforts with communities about the science and practice of wildland fire and risk mitigation. Community-connected partners and place-based coalitions are well positioned to understand local contexts, community characteristics, and social networks, and can tailor and target communication and outreach strategies locally based on the larger landscape strategy—e.g., working to build trust to increase acceptance of treatments, or increase local capacity to plan for and respond to wildfire (McCaffrey et al., 2012, [Paveglio et al., 2015](#)). In a collaborative setting, community-connected partners can coordinate and draw on each other's lessons learned and the expertise of partners (e.g., communications specialists, public information officers, and social scientists) to ensure consistent messaging, accurate science translation, and a transparent and accessible science process.

Collaboratives can facilitate the co-development and application of ecological and socio-economic monitoring to inform collaborative adaptive management (CAM) by providing a stable, predictable, and long-term process for knowledge co-production and social learning among partners (Cheng et al., 2019; [Scarlett, 2013](#)). CAM approaches to landscape-scale wildfire risk mitigation in the western US have proliferated in the wake of the establishment of the Collaborative Forest Landscape Restoration Program (CFLRP) in 2009 ([Barrett et al., 2021](#)), but are often applied outside of the CFLRP policy context (Butler & Schultz, 2019). Research on CFLRP CAM performance suggests that it is important to institutionalize the process; documents that detail timing and sequence of actions and responsible parties are formally incorporated into the bureaucratic decision-making processes of the agency(ies) where decision authority lies (Cheng et al., 2019).

STAGES OF COLLABORATIVE READINESS FRAMEWORK

BACKGROUND

The substantive roles and contributions of collaboratives described in the previous section characterize what fireshed-focused collaboratives can potentially achieve in support of their intended outcomes. However, getting to a place where partners are capable of fulfilling those roles and performing together takes time and resources, and requires stepping through stages of collaborative readiness. Prior to introducing the framework and its four stages, this section briefly presents its origins.

The concept of collaborative readiness is rooted in the theory and practice of collaborative development and change. Multi-stage frameworks describing the theoretical development and evolution of collaboratives have emerged from the collaboration and institutional/organizational literature ([Imperial et al. 2016](#); [Taylor and Cheng 2012](#); [Imperial 2022](#); Ulibarri et al. 2020; [Siddiki and Ambrose 2022](#); [Bell and Olivier 2022](#); [Heikkila and Gerlak 2016](#)), as well as from applied insights from experience with programmatic investments in collaborative capacity (e.g., the National Forest Foundation; see Wyckoff & DiBari, 2008). According to this literature, collaboratives evolve over time, going through stages of activation, collectivity, and institutionalization, followed by either stability, decline, re-orientation, or re-creation ([Imperial et al., 2016](#)).

In the first stages of collaborative development—typically characterized by creativity and low resistance to change—collaborative entrepreneurs and champions investigate the potential public value of creating a new collaborative. If there is a niche to fill, collaborative leaders will begin acquiring inputs to create and sustain the collaborative (Imperial & Koontz, 2006). As long as the public value generated is still evident, the collaborative may continue acquiring resources and may formalize or even incorporate (e.g., as a nonprofit). If the collaborative has built in strong feedback loops for monitoring and evaluation and commitment remains high, the group may adapt as the need for change becomes evident. As context and interests change, the group may shift or expand the scope of collaboration and take on new issues or policy problems. Alternatively, they may spin off new collaborative partnerships to address different issues outside the scope or scale of the original collaborative. The collaborative may decide it has attained its collective goals and decide to disband. Or it may fail to adapt as it experiences mission drift, declining membership and commitment, performance problems, and external disturbances, leading to rapid or gradual collapse

(Imperial et al., 2016; Ulibarri et al., 2020). Collaboratives may go dormant for a period and regenerate when the need arises on the landscape. Even as new collaborative partnerships emerge, they may build on the infrastructure and capacity developed by previous collaboratives in the area (Taylor & Cheng, 2012; Monroe & Butler 2016).

The collaborative development stages focus solely on the collaborative entity regardless of its social-ecological context, and there is not one-to-parity with the stages proposed here in the Collaborative Readiness Framework. However, the premise is the same: collaboratives provide value in different ways as they evolve, and produce different outputs and outcomes along the way. In turn, they require different resources and support as they develop, depending on internal dynamics and local context (Imperial et al., 2016; Taylor & Cheng, 2012; Ulibarri et al., 2020).

The Stages of Collaborative Readiness framework emerged from practice-based knowledge through participation in the Northern Colorado Fireshed Collaborative (NCFC), an all-lands collaborative of governmental and

non-governmental organizations covering approximately 4 million acres in the northern Colorado Front Range (Figure 2). The network connects over 50 organizations, including several watershed coalitions and forest and wildfire partnerships at different stages of development. The NCFC connects place-based collaboratives already working across the landscape, and operates as a platform for coordinated forest management activities to enhance landscape resilience to wildfire by collaboratively identifying, building support for, and implementing projects in strategic priority areas.

This framework was initially developed with input from NCFC partners as a way for funding organizations (specifically the USDA Forest Service) to allocate resources to collaboratives and other community-connected partners in a way that is equitable and transparent, and also accounts for differences in the ‘readiness’ of each collaborative to receive and deploy funds to implement on-the-ground projects. Since its initial development in coordination with the NCFC, the framework has been refined by insights from other regional collaborative learning networks (i.e., the Southwest Collaboratives

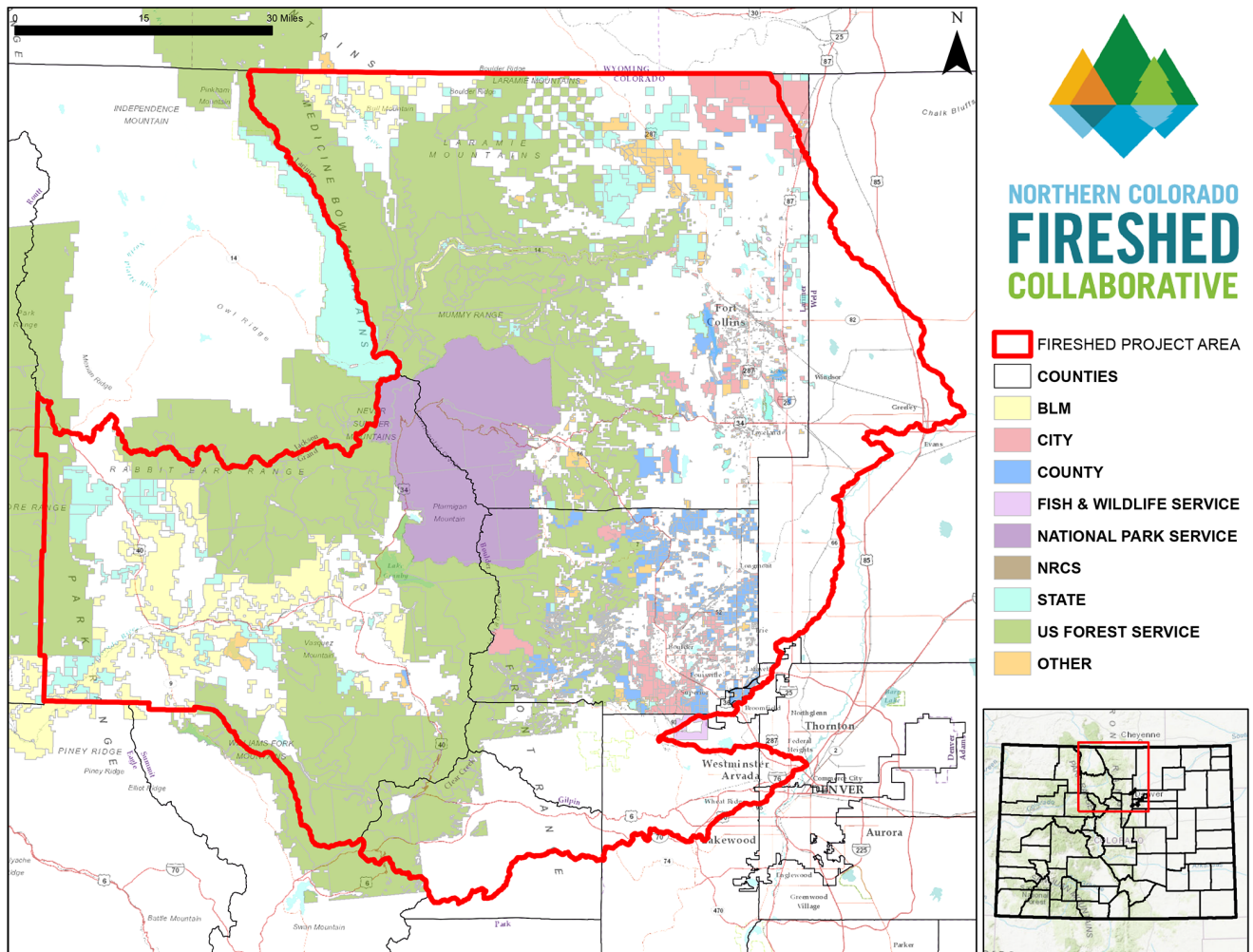


Figure 2. Northern Colorado Fireshed Collaborative boundary

Support Network and the Colorado Forest Collaboratives Network).

Beyond the NCFC, we have observed a tendency for state and federal grant programs (as well as researchers) to overlook younger or smaller collaboratives in favor of investing in more mature, well-resourced collaboratives with a track record of success—so-called “shovel ready.” Many projects that typically receive funding have capacity that surpasses under-represented local networks and collaboratives. Often, historically under-represented groups and rural, under-resourced communities have little capacity to hire staff, develop proposals, secure matching funds, and effectively compete for funding opportunities that could support rural economies and promote ecosystem sustainability in locally plausible and desirable ways.

Further, under-resourced groups may not have the technical expertise or experience to co-design restoration strategies and monitoring plans and use spatial decision-support tools and processes to inform strategies. These are critical antecedents for moving from direction-setting to implementation and developing a multi-year implementation strategy. As a result, lower-capacity projects are often left out of large funding opportunities, creating a feedback loop where existing capacity begets more capacity (Cheng & Dale, 2020; [Smith, 2023](#)). With this framework, we hope to encourage more equitable investment in early-stage collaboratives or in landscapes with high risk but low collaborative capacity.

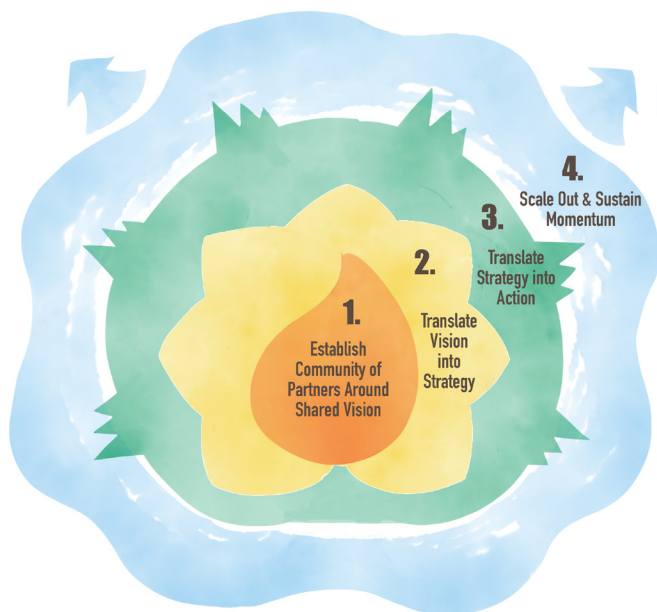


Figure 3. Stages Of Collaborative Readiness. Illustration credit: Lauren Brown

STAGES OF COLLABORATIVE READINESS

The Stages of Collaborative Readiness framework

(Figure 3) aims to develop an outcomes-focused model to a) enhance the ability of collaboratives to fulfill important functions, and b) receive and deploy funding to increase the pace and scale of implementation by supporting the collective work of partners. It applies insights from collaborative development literature to the context of forest and wildland fire risk management. It embeds the substantive roles and contributions of fireshed-focused collaboratives (which are iterative and ongoing) to varying degrees within a four-stage framework, with each stage representing increased ability over time of a collaborative to serve those important functions. The framework includes the following overlapping stages: 1) establish a community of partners around a shared vision; 2) translate that vision into strategy; 3) translate strategy into action; and 4) scale out impact and sustain momentum.

For each stage, the substantive roles and contributions of fireshed-focused collaboratives are translated into critical components of work, associated skills, and benchmarks of readiness. Each stage includes a table summarizing the critical components of work and benchmarks of readiness. Key factors that can affect and constrain progress towards benchmarks or between stages are also highlighted. The framework may be useful to collaboratives for self-assessment and adaptation, and to help them articulate and justify their capacity and financial needs at different stages. It can also be applied by outside interests to gauge or measure progress and development over time, track performance, increase accountability, and inform expectations of the kinds of outputs and outcomes that can be achieved by collaboratives at different stages. In the NCFC, the framework has been used to guide the allocation of funding to collaboratives and other community-connected partners relative to need.

Importantly, we agree with a caveat noted across the literature: as inter-organizational or multi-stakeholder arrangements, collaboratives are dynamic systems and we do not assume any inherent linearity or sequential patterns of progression through stages. Collaboratives may be working on benchmarks at multiple stages simultaneously and/or may need to return to a previous stage due to internal or external disruptions ([Beeton et al., 2022](#)). A single collaborative may contain committees operating at different stages simultaneously. Likewise, in firesheds with multiple place-based collaboratives, each may be participating in an all-lands collaborative at a different stage of readiness (such is the case for the NCFC).

A key advantage of collaborative arrangements is their ability to fit problem context. Increasingly large

investments in collaboratives necessitates mechanisms for accountability, but it is also important to consider tradeoffs to flexibility and avoid over-prescription of form or function. For this reason, we have avoided trying to capture specific timelines or costs associated with each stage and its benchmarks. However, there may be circumstances where incorporation of such information could be valuable and appropriate. Because this framework was developed in the context of a single all-lands collaborative and its constituent place-based collaboratives (as well as community-connected partners, agencies, and other kinds of partners), its components and benchmarks need to be further cross-walked with other collaboratives in different contexts and at different scales to determine its generalizability and proposed utility in other settings.



Stage 1: Establish a community of partners around a shared vision

Stage 1 encompasses an initial period during which there may be an identified need for cross-boundary collaboration, but no collaborative (or even a history

of collaboration) in place. In such cases, there may be a lengthy period of basic preparation and situation assessment to analyze context, define broad conceptual goals (i.e., “reduce wildfire risk”), and identify conveners (e.g., the entity responsible for planning and leading the effort, which may be a collaborative entrepreneur or champion, an existing collaborative organization or community-based nonprofit, boundary organization at a university, local government staff, or contracted facilitator).

While not limited to Stage 1, a critical component of work at this stage is fulfilling the substantive role of identifying, connecting, and aligning stakeholders. Early on, the convener of collaboration identifies key stakeholders and interests, potential members, missing partners, and begins bringing people together to initiate relationship and trust building processes (Emerson & Nabatchi, 2015; Wyckoff & DiBari, 2008). Membership may be unstable initially, as participants weigh whether and how collaboration will advance their individual or organizational goals (Imperial et al., 2016). Through iterative processes of engagement, stakeholders explore problem definition, define the appropriate geographic boundaries, find zones of agreement, and develop their composite vision, mission, and shared theory of change for addressing risk, safe response, and recovery from inevitable wildfires (Table 1). As they do so, collaborative membership, processes, and structures begin to stabilize (Imperial et al., 2016).

Table 1. Critical components and benchmarks of collaboratives at Stage 1 readiness

Critical components at this stage	Benchmarks of readiness
<ul style="list-style-type: none"> • Assess situational context and identify key stakeholders (e.g., jurisdictional leadership, science partners, community-connected partners, underrepresented and/or historically marginalized individuals and communities, etc.) • Conduct outreach and engage with key stakeholders, recruit partners • Establish processes and structures that promote inclusivity, transparency, accountability, trust, and conflict management • Define the problem, the appropriate fireshed boundary (and sub-boundaries, if needed) • Articulate zones of agreement, shared theory of change, and composite vision and mission for addressing risk, safe response, and recovery from inevitable wildfires • Forge shared intent and document commitment to work together through iterative processes of engagement 	<ul style="list-style-type: none"> • Situation assessments/stakeholder assessments, member lists, or other documentation of interested parties that should be and/or are represented as process participants • Indications that key science partners and other critical Stage 2 partners have been identified for consultation or are in place among participants • Critical paid positions filled or contracted out (e.g., coordinator/facilitator, executive director) • Written statements communicating a shared understanding of a clearly defined problem and composite vision • Codes of conduct, process protocols • Written agreements (e.g., a collaborative framework, charter, by-laws, or memorandum of understanding [MOU]), with evidence of support and commitment from entities with decision authority over the resource

Collaboratives early in this stage are generally working to build the basic internal capacity needed to convene and participate in collaborative processes, including sufficient human resources with the necessary skills to fill critical roles, such as coordination and direction. Critical roles are often filled initially by volunteer champions and conveners, but this can lead to overdependence on volunteer capacity, bottlenecks, burnout, disruption (if the volunteer leaves before new capacity is recruited), and associated loss of relationships, institutional knowledge, etc. Collaboratives should endeavor to raise funds for a paid position or contractor to convene and carry out the basic internal functions of collaboration. Important skills for conveners during Stage 1 include facilitation, collaborative process design, systems thinking, conflict management, and grant writing (Cheng & Sturtevant, 2012). Knowledge of local social networks (held by the convener and/or collaborative partners) and subject matter (of forest and fire management, science, and policy) is needed throughout this stage to effectively recruit, understand decision space, define the problem, etc.

An outcome of investing time and resources in early-stage collaboration should include increased capacity to engage the ‘right’ set of partners to ready landscapes and communities to receive and recover from future fires. This shared intent should be described in written statements communicating a clearly defined problem and composite vision. A stakeholder assessment and description of the jurisdictions within the defined boundary of the fireshed can help identify critical partners including: leadership and decision authorities, community-connected partners, managers and project implementers, science partners, local community members, and voices that have historically been left out of forest management decisions such as Tribes. Some partners critical to future stages—e.g., science partners—may need to be recruited from beyond the fireshed’s boundaries. Partners may be documented through contact lists, stakeholder assessment, recruitment strategy, or as part of a governance document.

While important at any stage, a key factor that can enable or constrain the ability of a collaborative to progress through this stage is the capacity of its partner organizations to engage in collaboration. Early-stage collaboratives often face unstable budgets and financial insecurity, and rely heavily on working boards, champions, and volunteers. Stage 1 can be long and protracted if key partners aren’t available to share their knowledge and expertise. Organizations that aren’t established and do not have sufficient organizational capacity nor additional volunteer capacity may be inadvertently excluded from

funding opportunities at this stage. Adequate capacity and funding can support underserved communities and build a foundation for collaboration.

While informal “handshake” collaboration may be appropriate at small scales or among relatively homogeneous actors, more formal articulations of codes of conduct and commitment are often necessary to overcome steep transaction costs of connecting the numerous and diverse partners across the large spatial and temporal scales that characterize forest and wildfire dynamics (Cheng & Daniels, 2005; Huayhuaca, 2019; Poteete, Janssen, & Ostrom, 2010). Early investments in human resources who have skills in process design and facilitation improve capacity to convene the open and transparent processes that foster the relationships and trust needed to synchronize operations, share risks, learn together, and otherwise ensure the continuity of the collaborative environment. In contrast to the stages of collaborative development described in Section I, greater stability of membership, structure, and process may be needed to move to the second stage and begin translating vision into strategy (i.e., Stage 1 for collaborative readiness may encompass stages 1 and 2 of collaborative development). Key benchmarks of stability include written agreements, statements of leadership support for collaboration, and codified commitment to the shared vision—e.g., a collaborative framework, charter, by-laws, or memorandum of understanding (MOU) (Table 1).



Stage 2: Translate vision into strategy

With stakeholders in place and growing capacity for joint action, collaboratives can co-develop a program of work with partners using strategic planning tools and processes to develop deliverables that communicate the shared strategy. For all-lands collaboratives with nested place-based collaboratives, this may be a tiered program of work linking landscape-to-local conditions and priorities. The focus of work in Stage 2 centers on delivering co-developed strategies at scale, including plans for community engagement and outreach, collaborative adaptive management, and coordinated operations, all of which connect to a landscape spatial strategy (Table 2).

Using science-based tools like QRA and PODs in a collaborative setting empowers partners to formulate a landscape strategy informed by values, local ecological knowledge, and realistic expectations about outcomes. In advance of developing the strategies at scale, science partners and subject matter specialists help conveners to lay the groundwork for meaningful collaborative engagement that integrates spatial decision support frameworks. This includes building stakeholder literacy about the concepts and tools being used, what products those tools will generate, and how to interpret and apply those products. This may entail: partners giving presentations at collaborative meetings; developing shared glossaries, briefs, or handbooks; and documenting examples of use and application locally. These processes and products collectively comprise “boundary objects” that serve to memorialize shared understandings and knowledge among a diverse set of partners. Whether collaboratives develop new assessments and custom spatial decision support tools or use existing assessments and tools to support collaborative decision-making, the maps generated can help partners leverage resources, plan larger projects, and avoid completing scattershot treatments with little likelihood of affecting wildfire outcomes.

Spatially explicit plans must be directly and coherently tied to implementation to be useful to and used by implementing and coordinating partners like foresters and fire and resource managers (Colavito, 2019). Project implementers, who bring operational knowledge of what

is feasible and realistic, must be included in the strategic planning process alongside policy makers, planners, scientists, and other relevant stakeholders (Cheng et al., 2015; Cheng et al., 2019). Local implementing partners who depend on opportunities with willing landowners to accomplish work may be skeptical or concerned that spatial prioritization processes will reduce their ability to get work done by directing resources outside of their jurisdiction or away from opportunities (a reasonable concern—if everything is a priority, then nothing is a priority). Bringing these partners along regarding the value and need for a landscape spatial strategy that includes prioritization takes time, and relies on the trust and good relationships established during Stage 1. Frameworks that link landscape-level desired conditions to project-level desired conditions can help get partners on board as they work together to identify and design treatments to compound benefits where they do have opportunities to work. To support linkages across scales, implementing partners should be involved in co-developing and documenting best practices and operating procedures for cross-jurisdictional treatment design and implementation to guide synchronized operations in Stage 3 and beyond.

A few key constraints should be noted regarding engagement around decision support tools and co-developed spatial strategies. Incorporating these technologies into a collaborative process can be a big lift, particularly for place-based collaboratives; science partners or boundary organizations with the right

Table 2. Critical components and benchmarks of collaboratives at Stage 2 readiness

Critical components at this stage	Benchmarks of readiness
<ul style="list-style-type: none"> • Collaboratively utilize science-based risk assessment and scenario analysis platforms to formulate a landscape strategy informed by values, local ecological knowledge (e.g., past fire history and behavior) and realistic expectations about outcomes • Collaboratively develop and deploy public outreach and engagement about the shared vision and goals • Co-develop best practices and operating procedures for cross-jurisdictional treatment design and implementation • Co-develop a monitoring plan and adaptive management strategy that includes shared definitions of success and outcomes 	<ul style="list-style-type: none"> • Documented processes of collaborative assessment and strategic planning (at multiple scales, if applicable) • Collaboratively developed risk assessments and decision support tools, and/or utilization of those tools • Collaboratively developed maps representing priority areas for action based on risk assessments • Written plans for communications and community outreach and engagement to build understanding and social consent in advance of implementation • Collaboratively developed principles, best practices, or standard operating procedures • A collaboratively developed monitoring and adaptive management plan • For federal lands within the boundary of the fireshed, evidence of consideration and linkage between the collective strategy and requirements for broader public involvement and strategic considerations inherent in policies such as the APA, FACA, and/or NEPA

technical expertise are critical, but unevenly distributed. Thus, while tools like QRA may allow for collaborative input, their use depends on whether the right partners are at the table to facilitate the process of co-development, interpretation, and utilization. All-lands collaboratives with access to science partners can help address this challenge by more efficiently developing and sharing knowledge resources useable by multiple place-based collaboratives. Alternatively, collaboratives may focus solely on co-developing desired conditions, which may be less technologically intensive than an explicit spatial strategy (desired conditions are a common output of collaboration as part of the NEPA process). Such processes can be valuable for stakeholder alignment and for accountability, but less helpful for guiding investments of scarce resources on the landscape.

Another challenge pertains to socializing the tools. If not adequately integrated with local or traditional knowledge, some communities may find these tools to be divisive, off-putting, or disruptive of collaborative dialogue. Similarly, the extent to which a collaborative is successful in its role of facilitating science-informed learning at this and other stages will be influenced by the backgrounds and views of its members and the communities it serves. Collaboratives can advocate for incorporating scientific knowledge into policy debates, but there is no certainty that their approach will be viewed as more valid than other kinds of knowledge.

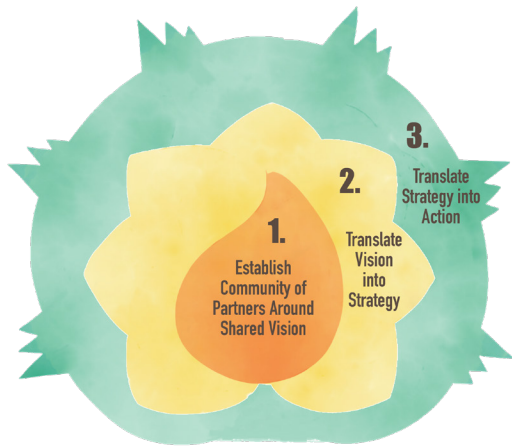
Frameworks to guide social learning processes at multiple scales are also developed during Stage 2. Through facilitated learning, partners develop a monitoring framework for defining and measuring ecological and socio-economic outcomes of their landscape strategy that indicates whether and to what extent their shared vision is being realized. In addition to a written plan, this learning may entail shared monitoring protocols, surveys, and a strategy outlining steps, roles, and responsibilities to guide the CAM process.

To build understanding and social consent in advance of project implementation, communications specialists along with community-connected partners from across the fireshed bring their knowledge of local context, community characteristics, and social networks to the table to develop a written plan to guide community engagement and public outreach. Products may include: guides for messaging and talking points pertinent to the shared vision and mission; protocols for regular internal and external communications; communications tactics and tools (e.g., social media, newsletter, events, or engaging neighborhood captains); and co-developed outreach products designed to effectively educate and engage with key audiences (e.g., event tabling materials,

story maps, or infographics explaining different kinds of treatments). If connected to spatial prioritization, the plan may also identify priority preparatory activities and timelines for community outreach in advance of projects. For federal lands within the boundary of a fireshed (or if federal funds will support project implementation on non-federal lands), plans for community engagement and outreach around the collective strategy should consider and/or be linked to requirements for broader public involvement and strategic considerations inherent in policies such as the Administrative Procedure Act (APA), Federal Advisory Committee Act (FACA), and/or National Environmental Policy Act (NEPA) (See Box 2: Collaborative NEPA).

The overall focus of work during Stage 2 is the identification of critical factors for achieving landscape-level resilience to wildfire; ideal outcomes of this stage are the plans describing skillfully designed and coordinated actions to address those factors moving forward (Rumelt, 2011). Given the different entities typically involved in planning and implementation across scales (which have different jurisdictions, organizational missions, values, and goals), collaboration across a fireshed is challenging, but crucial for connecting large-landscape-scale strategies to site-specific mitigation, restoration, or recovery activities. Collaboratives at Stage 2 need a firm knowledge of their decision space, strategic planning expertise, and participation from representatives with authority to make decisions and implement the plans they develop. They need ready access to data, information, and technology useful for planning (e.g., spatial decision support platforms). They need subject matter experts with scientific and technical expertise (e.g., skills in wildfire modeling, ecological and socio-economic monitoring, data compilation and synthesis, and GIS), soft skills, knowledge of community dynamics, and an understanding of operational feasibility. These individuals should preferably be embedded as collaborative partners.

To generate the written plans and outputs that serve as benchmarks at this stage, conveners need strong skills in writing, organization, communication, negotiation, and facilitation of social learning processes. The breadth of expertise and relationships needed to co-develop these different kinds of strategies means that work at this stage is often carried out through sub-committees or working groups of partners who may have limited capacity to engage. The ability of a collaborative partnership to hire contractors or dedicated staff to assist with planning can support the critical work of committees at this stage, making the most of partners' limited time and availability by maintaining lines of communication and continuity between meetings.



Stage 3: Translate strategy into action

With partnership commitments and a strategic foundation in place, collaboratives and their implementing partners are well-positioned to begin working together on pilot projects and building a project portfolio. A major focus of work at Stage 3 pertains to synchronizing operations (Table 3). Thus, an enabling factor that needs to be in place at this stage (particularly for federally managed lands) is the willingness of landowners and stewards to open up their decision space to allow collaborative input and coordination on out-year planning and implementation. The nature of collaboration may change in Stage 3 as the

roles for implementers and partners with agreements in place with land management agencies increase in importance. Place-based collaborative organizations with staff and programs, such as nonprofit watershed organizations, may or may not be implementing projects themselves; collaboratives that are purely convening entities are less likely to be directly involved with on-the-ground project implementation.

Whatever their configuration, collaboratives in Stage 3 generally continue to fulfill roles of connecting and aligning stakeholders: weaving together community perspectives with common interests among partners, providing venues to coordinate and build trust, gathering and sharing information, and supporting joint activities that increase the pace and scale of implementation. Building the trust and relationships necessary to develop social consent with community members and landowners takes time, so deployment of some form of co-developed outreach and engagement strategy by community-connected partners should be underway early in Stage 3 if not before. Partners should work to build awareness and preparation with communities and private landowners adjacent to priority project areas identified by the landscape spatial strategy.

Collaboratives provide the setting for implementing partners to begin rolling out the landscape spatial

Box 2: Collaborative NEPA

Alignment with NEPA is vital for accomplishing objectives in firesheds where federal land is a parcel in a larger landscape. To build trust between the collaborative(s) and the federal agency completing the NEPA analysis, co-developed strategies and plans should inform or be reflected in NEPA stages from project development to decision, and should help guide adaptive implementation. Documenting and institutionalizing collaboratively developed priorities within NEPA increases accountability of the agency to collaborative partners and stakeholders ([Beeton et al., 2022](#); [Cheng et al., 2015](#)).

One potential NEPA approach for large landscape-level decision making pertinent to fireshed-focused collaboratives is condition-based management (CBM). CBM is a decision framework that can be used to engage collaboratives to design flexible suite of treatment options in response to large forest disturbances (e.g., pathogens and wildfires). CBM relies less on the *where* of a project, and more on the *how* and *why*, with exact locations determined during pre-implementation verification of on-the-ground conditions. Actions are chosen from the range of available options based on the actual landscape condition at the time of implementation. This approach allows managers to respond to on-the-ground conditions with greater flexibility in choosing the right actions in the most impactful locations at the right time ([USDA Forest Service, 2022b](#)). This flexibility is checked by accountability through consistent engagement with place-based collaboratives and their constituent communities during out-year planning, implementation, monitoring, and adaptive management. CBM processes may benefit from engaging with collaboratives in Stage 3 or 4. Such established collaboratives have the relationships, governance structures, and resources in place to engage in the CBM project long term, and they have developed effective strategies for building trust, understanding, and social consent within affected communities.

strategy on the ground, and coordinate implementation schedules and locations to take advantage of geographic proximity and economic efficiencies. Partners may work together to apply for funding for equipment, workforce training, and organizational capacity (discussed in Stage 1) to support implementation or monitoring. Once funds are secured, transparent agreements articulating how partners will pool and share resources can lessen the likelihood of conflict arising over how those funds are directed. Increased cross-jurisdictional coordination will result in jointly developed and submitted applications and resource sharing agreements. Later in this stage, investments begin yielding preliminary results on the ground, as indicated by completed projects that are clearly tied to the landscape spatial strategy. Trust is built through incremental successes as the partners move through Stage 3 and eventually complete projects that support shared values. With pilot projects underway, partners can begin testing out and refining the monitoring and adaptive management plan, which may entail collecting data using shared protocols, or convening initial learning and adaptation dialogues. If capacity allows, the collaborative may be able to start generating monitoring reports that summarize the effects of initial projects.

Early benchmarks in Stage 3 might include short-term metrics tracking progress towards increasing social consent for conducting forestry and prescribed fire work, or other objectives of the co-developed community engagement and outreach strategy. For example, the collaborative might track metrics like community-connected partners' unidirectional engagement and

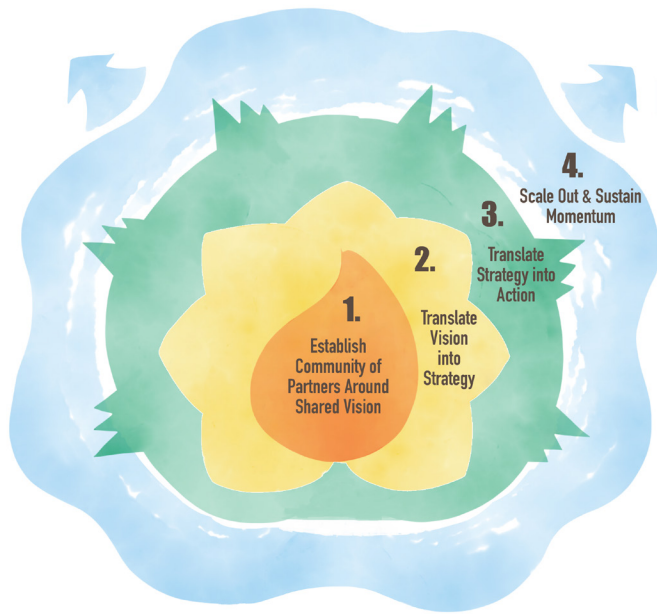
outreach (e.g., number of landowners in priority areas contacted), or metrics associated with the frequency of and participation in interactive events or exchanges (e.g., number and nature of field trips, webinars, public meetings etc.).

While the focus of investment begins to shift towards implementation in Stage 3, maintaining and expanding collaborative capacity to fulfill stakeholder convening and coordination roles remains important. Investments should also be made in developing the tools and mechanisms for coordinating implementing partners long-term, such as websites, data sharing platforms, or geospatial databases to provide a common operating picture for project planning and tracking. If not present in previous stages, a fiscal sponsor or legal designation may be necessary to secure and accept funds (like 501 (c)(3) status) and funnel resources to implementation and capacity maintenance over several years. If the collaborative is directly involved in implementation, staff will need skills in project development, contracting, oversight, and reporting.

With a growing body of work, collaboratives readying to move to Stage 4 may need to hire, co-employ, or contract from beyond the collaborative's working boundaries with mitigation specialists, GIS specialists, communication/social media specialists, grant writers/administrators, accountants, and potentially even legal support (e.g., to review MOUs and agreements that facilitate resource sharing). Capacity is also needed to carry out a program of monitoring and adaptive management.

Table 3. Critical components and benchmarks of collaboratives at Stage 3 readiness

Critical components at this stage	Benchmarks of readiness
<ul style="list-style-type: none"> • Coordinate implementation schedules and locations to take advantage of geographic proximity and economic efficiencies to reach scale • Build trust among collaborative partners through successful implementation and supporting shared values • Pool and share implementation resources and costs through agreements • Secure and direct financial resources for equipment, workforce training and organizational capacity to support implementation and monitoring • Testing out and refining the monitoring and adaptive management plan on pilot projects (collecting information, convening learning and adaptation dialogues, iterating and refining as needed) 	<ul style="list-style-type: none"> • Completed project(s) that are clearly connected to values and strategies (locally and at scale) • A fiscal agent or other mechanism for accepting funds • Jointly developed and submitted funding applications • Agreements to share resources • Agreements for how funding will be allocated and managed across partners • Monitoring report(s) summarizing the effects of initial actions or results of early socio-economic assessments; progress reports on collaborative performance (e.g., tracking efforts to build social consent), self-evaluation forms, etc.



Stage 4: Scaling out and sustaining momentum

When a collaborative has demonstrated capacity to successfully administer funds, implement or coordinate

implementation of projects, complete grant activities within allowable award periods, aggregate and present stories of success, and leverage financial resources for joint projects with other partners, partners can ideally begin scaling out with a multi-year program of work across the landscape. Collaboratives at this stage can be considered ‘mature,’ in that they have taken on sufficient organizational characteristics to endure change over time, while maintaining their functions: act as non-partisan convenors of stakeholders, coordinate and synchronize operations tied to collaboratively developed strategies at scale, and facilitate continuous science-informed learning (Table 4).

The long-term program of work might include a pipeline and growing portfolio of shovel-ready projects across jurisdictions, with landowner agreements and NEPA decisions in place, and sufficient workforce, operators, and infrastructure available to carry out the work. There should be alignment—often indicated by cross-reference—between co-developed strategies and plans such as forest plan amendments, response strategies, and NEPA documents developed by collaborative members.

Table 4. Critical components and benchmarks of collaboratives at Stage 4 readiness

Critical components at this stage	Benchmarks of readiness
<ul style="list-style-type: none"> • Co-develop a 5+ year program of work with partners • Institutionalize expectations of collaborative practices, performance, monitoring, and adaptive management to endure changes in personnel within the partnership • Diversify and leverage funding sources • Foster broader systemic readiness by working to address factors like workforce, biomass utilization, policy issues, and the capacity of partner organizations and agencies • Build support for the collective work of partners • Maintain accountability and inclusive, transparent processes to fulfill substantive roles long-term • Assess progress, learn and adapt 	<ul style="list-style-type: none"> • Portfolio of shovel-ready projects within the context of a landscape-scale strategy, plus clear plans for administering and executing these projects • Collaboratively-developed NEPA • An agreed upon organizational model, at whatever level of formality is appropriate, with long-term mechanisms in place to receive funds • Co-developed strategy and plans that are cross-referenced with those of partners, including those working at different scales • Established budgeting process, identified funds, and strategy for managing funds across the partnership • Updated or revised recruitment strategies, stakeholder assessments, and participant lists • Results or recommendations generated by collaborative performance evaluations • Collaboratively developed principles and strategies to navigate disturbances like personnel turnover, additional funding, elimination of funding, or changes in political administrations • Updated or revised governance or strategy documents, or other plans, signifying periodic review and adjustment • Documentation of ongoing co-learning processes, such as adaptive management workshops, field trips, annual reports, or joint publications • Sufficient staff or paid positions with skills needed to provide substantive roles and contributions within the fireshed long term

At Stage 4, the expectation is that collaborative practices have been institutionalized. At this point, the administrative costs combined with transaction costs of large-landscape collaboration might be better addressed by formalizing to some degree into a collaborative organization that serves to sustain and lead collaboration long term. Managing the complexity of people, finances, accounting, reporting, and information management adds layers of administration and bureaucracy to a collaborative that may be better handled by a separate existing or new 501 (c)(3) entity. However, collaborative formalization into a new, incorporated organization may not work for all firesheds. Formalization can change the dynamics of decision-making, participation, and shared governance, which may actually destabilize collaboration. Alternatively, the collaborative may be sustained by a pre-existing collaborative organization, perhaps by expanding the scope of a place-based collaborative to coordinate partners at a larger scale and serve as fiscal sponsor. Another arrangement might entail an all-lands “meta” collaborative (coordinates across multiple place-based collaboratives and community connected partners) using multi-year agreements to fund staff positions at one or more partner organizations. These staff can then coordinate different aspects of decentralized collaboration and committee work, with one entity serving as the primary fiduciary. This latter model is utilized by the NCFC. Finding the right fit for a given fireshed will require a sensitivity to: contextual factors like political dynamics and network characteristics among partners; socio-economic and cultural characteristics of nested communities; and a history of conflict or collaboration in the region (Emerson & Nabatchi, 2015).

Whatever the agreed-upon organizational model, the collaborative should have mechanisms in place to be able to absorb large amounts of funding. If not adequately planned for, large influxes of funding can challenge group cohesion by upsetting shared objectives, causing mission drift, creating winners and losers, or undermining trust. An established budgeting process and strategy for identifying, managing, and allocating funds may help address the challenge. A collaborative should also diversify and leverage funding sources to: sustain the operations and coordinating capacity of itself or its primary convening organization(s); support the synchronized operations of its partners; and gradually foster broader systemic readiness of the fireshed to receive and recover from wildfire by working (e.g., through committees or joint programs) to address factors like workforce, biomass utilization, or policy constraints.

By this stage, the collaborative should be working to legitimize and build external support for itself and the

collective work of its partners through both horizontal networks (e.g., with community members and other collaboratives) and vertical networks (with higher-level decision authorities and policy makers) (Cheng & Sturtevant, 2012). External support is important for the collaborative’s ability to harness financial resources, sustain its internal functions, maintain transparent processes, and continue to perform its substantive roles long-term. While commitment and participation from land management agencies is critical, the collaborative should be vigilant to avoid the perception that they are subservient to these agencies. At the same time, the collaborative should be working to maintain accountability, particularly when it comes to public lands and the public interest. In Stage 4 collaboratives may revisit stakeholder assessments and recruitment strategies periodically to ensure that membership is inclusive of new stakeholders, and that potential opponents and litigants have opportunities to join the fold and be heard; this may avoid a single party undoing the hard work of collaboration up to that point.

The role of the collaborative in facilitating science-informed, continuous learning across the fireshed through CAM is particularly important in Stage 4 as the results of evaluation, monitoring, and assessments build and reveal needs for course-correction. As conditions change, collective vision and strategies may need to change as well. Formative, summative, or longitudinal performance evaluation (of process and outcomes) can inform updates or changes to guiding documents and policies, and generate recommendations to improve the collaborative process. Performance evaluation can help partners navigate internal and external disturbance, signal the need to modify internal collaboration dynamics to adapt and sustain momentum, or indicate the need to spin off or recreate collaboration to meet current needs and conditions (Beeton et al., 2022; Imperial et al., 2016; Ulibarri et al., 2020).

Likewise, Stage 4 collaboratives have principles or strategies in place for dealing with contingencies like turnover in personnel among key partners or leaders within the collaborative (a common example of internal disturbance). Such strategies might include succession plans, record-keeping/memos, and long-term plans for growth or maintenance of personnel to continue providing services. Collaboratives may also face external disturbance (i.e., occurring outside the collaborative), both directly (such as the COVID-19 pandemic and subsequent sea change in meeting technology and modes of engagement), as well as indirectly through changes in political administrations or in the institutional landscape. A robust and holistic CAM process can keep

the collaborative agile to sustain momentum or re-create itself while conserving critical elements of the network and protecting the substantial time, social, and other capitals invested in developing a mature collaborative.

As monitoring results build and indicate any needed changes to implementation, collaboratives can convene periodic tours and workshops to share findings from ecological and/or socio-economic monitoring and discuss necessary adjustments. All-lands collaboratives with nested place-based collaboratives may be able to coordinate and leverage CAM cycles happening at smaller scales to increase efficiencies and meet the information needs of partners working at multiple, tiered scales. Through CAM workshops, field trips, reports, etc., implementing partners can share lessons learned about challenges to completing their work and develop strategies to address those challenges.

Having moved through these stages (often non-linearly), collaboratives in Stage 4 are ready and able to fulfill their substantive roles and contributions within their fireshed long-term. They are sufficiently stable to receive and effectively deploy funds to implement projects, or support implementation through the collective work of partners. In addition to the other noted benchmarks like a collaboratively developed NEPA decision, the collaborative convener(s) should have sufficient staff (or paid positions distributed across partners) with the knowledge, skills, and abilities needed to carry out their portion of the program of work. Further, all key stakeholders of the collaborative must have the capacity to play their roles (including federal agency partners). Identifying under-resourced partners and stakeholders and working to advocate for or build their capacity could contribute to the long-term success of the collaborative and the fireshed as a whole.

CONCLUSION

In this concept paper, we have presented a Stages of Collaborative Readiness framework that describes critical components of the focus of work and proposes appropriate benchmarks at each stage. The framework was developed through practical experience participating in an all-lands collaborative consisting of several nested place-based collaboratives and community-connected partners within the Northern Colorado Fireshed. The purpose of the framework is to enhance the ability of collaboratives to move between stages, such that they are increasingly able to a) fulfill important functions in their fireshed effectively into the future, and b) receive and deploy funding to increase the pace and scale of implementation by supporting the collective work of partners.

While multi-stage collaborative development frameworks are not new, we advance the discussion by situating collaborative development within the unique context of firesheds as forest and wildland fire management systems. We also embed the substantive roles and contributions of fireshed-focused collaboratives (identifying, connecting, and aligning stakeholders; co-developing strategies at scale; synchronizing operations; and providing venues for science-informed, continuous learning) to varying degrees within a four-stage framework; at each stage, a collaborative increases its ability to serve those important functions. The framework attempts to focus on achievable outcomes by translating the substantive roles and contributions into critical components of work, and identifies stage-appropriate outcomes and benchmarks. The critical components and benchmarks presented in Tables 1-4 could be used to: inform self-assessment and adaptation by collaboratives; gauge or measure progress and development over time; track performance and increase accountability; or guide allocation of financial and other resources to collaboratives and other community-connected partners relative to need. Collaboratives may find the framework useful for articulating and justifying their capacity and financial needs at different stages. We hope the framework can inform reasonable expectations of the kinds of outputs and outcomes that can be achieved at different stages, and increase understanding (particularly among outside observers or funders) of the time and resources needed to establish a high functioning, mature collaborative.

As collaboratives develop, they create value in different (and not always quantifiable) ways; thus, the type and amount of resources needed to sustain value will change ([Imperial et al., 2016](#)). During the Stage 1, partners coalesce and establish a community of partners around a shared vision. Depending on the history of collaboration, this may require a lengthy period of preparation to identify and connect the 'right' stakeholders. Stage 1 requires investment in human resources to conduct outreach and engagement, facilitate extensive trust- and relationship-building, and lead the development of Stage 1 benchmarks like written agreements documenting mutual commitment. In Stage 2, partners translate vision into appropriately-scaled strategies by coupling stakeholder engagement processes with analytical platforms and tools to co-produce maps that provide an important foundation for a landscape spatial strategy. These processes and products stimulate the dialogue necessary for developing other components of a strategy at scale. Stage 3 marks the transition from strategy to action and from planning to implementation. The emphasis of collaboration shifts to synchronizing operations and supporting joint activities that increase the pace and scale of implementation.

By Stage 4, the collaborative has been sufficiently institutionalized to scale, and sustain its internal and external functions, and is able to navigate disruption and change long term with a robust CAM process.

The roles and contributions of fireshed-focused collaboratives, as well as the Stages of Collaborative Readiness have been presented as ideal scenarios, but we have acknowledged important constraints and caveats throughout. Few, if any, collaboratives will follow a linear course through these stages, and collaborative formalization into a new incorporated entity may not be the desired endpoint; different models will work for different firesheds. Sensitivity to context is essential for designing effective and durable cross-boundary and cross-scale collaboration.

Regardless of form, collaboration takes time and resources. While some volunteer-driven collaboratives can achieve a great deal with low collaborative capacity for a while, the impact of the work will likely be limited in scope as key leaders burn out or move on. Achieving landscape-level objectives through engagement of the many and varied stakeholders involved in firesheds requires investment in human resources to overcome the high transaction costs of collaboration at this scale. The initiation of Stage 3 and shifting emphasis from collaborative planning to coordinated implementation does not end the need for continued investment in collaborative capacity and human resources. Not all collaboratives are designed or even intended to endure long term. However, if the aim is to institutionalize and enable collaboration in a complex and evolving fireshed to achieve long-term social-ecological outcomes, then investments in collaborative capacity are particularly important at the early stages of visioning and strategizing, and a plan to sustain and grow capacity in later stages and into the future is needed.

Low risk tolerance among funders is a persistent challenge to increasing equitable investment in early-stage collaboratives or in landscapes with low collaborative capacity ([Sanderson et al., 2022](#)). Funders want their investments to be successful, so they favor investing in groups with a proven record of success, rather than investing in innovation or need. Many of the stage-specific components and benchmarks proposed in this concept paper—such as securing commitments and developing strategies to navigate disturbance—are intended to address this challenge by increasing collaborative resilience in the face of uncertainty. More programs that provide stand-alone funding sources for collaborative capacity and community-based stewardship (such as the National Forest Foundation's Community Capacity and Lands Stewardship) are needed, and should

be specifically designed to support early stage or low-capacity collaboratives in high risk firesheds. Eliminating funding match requirements can also increase equity and readiness in lower-capacity and lower-income communities and collaboratives ([Smith, 2023](#)).

The Stages of Collaborative Readiness framework presented in this paper provides general benchmarks and guideposts, but it could be refined or customized for different applications by developing more specific indicators, metrics, criteria, costs, or timelines at each stage. For example, the framework could be used to pair appropriate funding sources, types, and amounts with appropriate stages of collaborative readiness. Benchmarks could be more narrowly specified so that outcomes from one stage lead into the funding eligibility criteria at the next stage. However, take care when applying this framework to avoid an overly rigid interpretation of the stages, critical components, and benchmarks—particularly when applied for investment or resource allocation purposes. The framework has been used to guide allocation of resources among partners of the NCFC, but the members of that collaborative had input in developing the framework and applied it to themselves (as constituent place-based collaboratives and community-connected partners) to articulate and justify capacity funding needs. Collaboratives themselves will often be best able to gauge and interpret their progress towards achieving benchmarks and outcomes. Alternatively, observers who are close enough to the process that they are familiar with local context and constraints can verify the quality of collaboration and associated benchmarks. The framework is not intended to be prescriptive, and context and constraints may call for adjustments to critical components of work and benchmarks across stages.

While beyond the scope of this paper, further elaboration of needs for and barriers to moving from one stage to the next (such as recruitment and retention issues) could improve the applicability of this framework for conveners and leaders working to build capacity in their own collaboratives. Future refinements of this framework will also delve deeper into specific metrics to assess targets and outcomes for different purposes and at different stages. Beyond its application to collaboratives, further investigation is also needed to evaluate the applicability of this framework to the organizations and agencies that partner with these collaboratives, and which also face collaborative capacity constraints.

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