

Co-Management of Fire Risk Transmission (CoMFRT)

Project Strategic Planning Report

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¹ This report was written by the above authors on behalf of the CoMFRT Partnership. The content is based on interactions with wildfire management practitioners, leadership from the USDA Forest Service Rocky Mountain Research Station (RMRS), Fire and Aviation Management (FAM), and the Washington Office, and CoMFRT researchers.

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“Successfully living in fire-prone landscapes is only possible when the various locally situated organizations and agencies that deal with wildfire risk can work collaboratively across boundaries”

-National Cohesive Wildland Fire Management Strategy

Executive Summary

The importance of the USDA Forest Service (USFS) working across boundaries with other federal, tribal, state, and local agencies, individual residents, as well as private businesses and non-governmental organizations to address wildfire risk and build community resilience to wildfire has been emphasized in long-standing documents like the interagency National Cohesive Wildland Fire Management Strategy and more recently USFS priorities like Shared Stewardship, the Wildfire Crisis Strategy (WCS), and the fire-related provisions of the Infrastructure Investment and Jobs Act (IIJA). In 2017, USFS Fire and Aviation Management (FAM) piloted The Co-management of Fire Risk Transmission (CoMFRT) partnership - a unique effort - created to explore the establishment of a long-term social science research program on community capacity and resilience to address cross-boundary wildfire risk in fire-prone areas that could inform fire-related agency programs and investments. Building on these initial research and application efforts the purpose of this report is to summarize the outcomes of a strategic planning to inform future design of CoMFRT Partnership, including an iterative five-year strategic plan and vision. This report provides a brief overview of CoMFRT, summarizes the insights from strategic planning dialog sessions conducted in the late Fall of 2021, and offers recommendations for the guiding the next generation of the CoMFRT Partnership (CoMFRT 2.0) informed by both the best available social science and the strategic insights gleaned from the dialog sessions. A consistent thread of the strategic planning conversations centered on the need to recognize and support diverse approaches to addressing cross-boundary wildfire risk to build wildfire adapted communities by including different perspectives and sources of knowledge (e.g., technical knowledge, Indigenous Tribal Ecological Knowledge) and sharing power and authority in devising wildfire adaptation strategies. Different parts of the Forest Service have and serve different needs. The key underlying questions across these different perspectives and needs ranged from the strategic (how to design programs and services to best advance the National Cohesive Strategy?), to tactical (how to increase the pace and scale of fuel treatments and measure progress?) to more organizational or operational questions (how should CoMFRT position and promote itself to be in service to the organization?). To realize the potential of CoMFRT, it will be important to more formally develop the structure of the effort (e.g., where positions are located – across USFS R&D, universities, etc.) in parallel with the intended function or goals of CoMFRT. In addition, building in a strong advisory function comprised of a diverse set of wildfire related experts from the public, tribal, and private sectors will help steer CoMFRT activities to best meet the goals of both research and wildfire practice. Finally, as priorities change and learning occurs it will be prudent to engage in a review and subsequent strategic planning process every five years to be sure CoMFRT remains relevant to the current needs of cross-boundary wildfire risk and building resilience to wildfire.

Introduction and Purpose of this report

In 2017 the USDA Forest Service (USFS) Fire and Aviation Management (FAM) led the way in establishing a long-term social science research program focusing on building community capacity to address and adapt to cross-boundary wildfire risk in fire-prone areas. The goal was that this effort would inform USFS wildfire risk related programs and investments. Thus, the Co-management of Fire Risk Transmission

(CoMFRT) partnership was created, and to address this goal, CoMFRT adopted a unique co-production approach to doing science, something that is more than many traditional science efforts (see e.g., Lubchenco 1998, Kates et al. 2001, Wyborn et al. 2019). Specifically, CoMFRT includes multiple social science disciplines and associated approaches within one fire-prone landscape in a “transdisciplinary deep dive” to co-produce a more holistic picture of the wildfire social system in that landscape than could otherwise be produced by any one-off study. Broadly speaking, CoMFRT is intended to yield actionable recommendations to support adaptation to cross-boundary wildfire risk and can inform USFS investments using the best available social science specifically related to building wildfire adaptation. As this was intended to be a long-term effort, CoMFRT builds on its own actionable recommendations in ways other efforts cannot. This report summarizes a multi-step strategic planning process completed in 2021 that reflected back on the initial years of CoMFRT. Thus, the purpose of this report is to share outcomes and recommendations of this strategic planning process with key USFS leadership staff regarding future directions of the CoMFRT Partnership to support the strategic direction of USFS (including the Wildfire Crisis Strategy [WCS] and implementation of fire-related provisions of the Infrastructure Investment and Jobs Act [IIJA]).

The specific goal of this strategic planning effort is to inform the advancement of social science research and practice related to addressing wildfire risk, building resilient landscapes/systems and informing governing wildfire as a complex/wicked natural resource issue that are in service to the Agency. In addition, we set out to address the following objectives:

1. Reflect on CoMFRT Partnership to-date (phase one of CoMFRT).
2. Identify internal strengths, opportunities, and gaps (another way to think about it may be to identify what’s worked, what hasn’t worked, and what’s missing) and how to amplify strengths, maximize opportunities, and address gaps.
3. Use this dialogue and its outcomes to inform future design of CoMFRT Partnership, including an iterative five-year strategic plan and vision.

This report is organized in four parts: 1) a brief overview of CoMFRT including a description of the problem of cross-boundary wildfire risk informed by the best available social science and why this description matters; 2) Insights from strategic planning dialog sessions; 3) recommendations for the next generation of the CoMFRT Partnership (CoMFRT 2.0) informed by both the best available social science and a series of strategic dialogs conducted in the late Fall of 2021; and 4) a summary and conclusion.

Part 1. CoMFRT: What is it and why does it matter?

The USDA Forest Service (USFS) is the largest wildfire management agency in the United States. Despite this, it does not have sole responsibility and authority to fully address wildfire risk in the US. Instead, the USFS is part of a complex network of public, private, and tribal agencies and organizations, each having varied roles in addressing wildfire risk across diverse fire-prone landscapes. Thus, to successfully address wildfire risk these co-dependent actors and organizations must learn how to work respectfully and effectively together to improve outcomes.

Public, tribal, and private agencies and organizations operate within a variety of nested social and institutional scales (not unlike ecological scales; see Figure 1.1) each possessing varying abilities and responsibilities to affect factors crucial in addressing wildfire risk, such as often calculated likelihood,

intensity, and fire effects. For example, the suite of agencies and organizations working on wildfire risk in a specific fire-prone landscape, such as Eastern Washington, is comprised of various people and organizations including homeowners, local fire protection authorities, county and state agencies, water management authorities, tribal organizations, and federal land management agencies. These organizations and individuals associated with them have varying capacities to decide and act on where and how to reduce exposure, treat the landscape, and make landscapes and communities more resilient to fire. In other words, desired outcomes are not dependent on the USFS in isolation, but instead depend on a suite of interactions across jurisdictions, land ownerships, and temporal scales. Furthermore, the suite of agencies and organizations working on wildfire risk will differ in different places, where different organizations, including the USFS, play varying roles. For instance, the USFS may most effectively act as a convener of organizations in one place, but in other places, it may be more effective for the USFS to support other organizations to do this work. Investing in a program of social science like CoMFRT can provide scientific insights as to how to best calibrate the role of the USFS as it relates to the existing suite of networked organizations and individuals in a given fire-prone area.

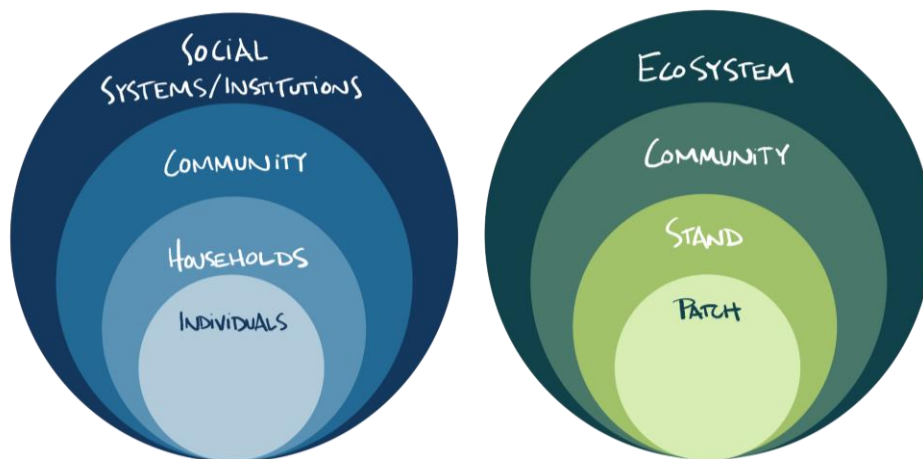


Figure 1.1 A comparison of Ecological and Social/Institutional scales.

CoMFRT offers a unique opportunity to examine the complex interactions required to address wildfire as a cross-boundary risk. For much of the Forest Service’s history, investments related to wildfire risk have focused on calculating risk based on biophysical characteristics of fire-prone areas, calculating locations that present an opportunity to engage an active fire incident more successfully, and then delivering this information to end users and other decision makers. While these investments have yielded important outputs and insights, they are not, alone, adept at taking local context or local configurations of social systems into account nor the varying role the USFS should play in different fire-prone places. As a long-term effort, CoMFRT is designed to gain insights about varying social geographies of wildfire mitigation and the varying roles of the USFS in those landscapes by generating, place-specific knowledge based on the assumption that no two places are alike in terms of what may support building local capacity to address wildfire challenges. CoMFRT represents the best available social science – accounting for the complex network of public, private, and tribal organizations and individuals making decisions that bear on wildfire risk – in a way that supports the National Cohesive Strategy (NCS), Shared Stewardship, Wildfire Crisis Strategy, Infrastructure Investments and Jobs Act, and the agency’s goal to live with wildland fire more successfully.

With this framing in mind the specific goals of CoMFRT are to: (1) identify efforts across all institutional levels that enable successful collective adaptation to complex wildfire hazards across different land ownerships and jurisdictions in fire-prone landscapes; and (2) provide a) recommendations to local communities and wildfire managers to build fire adapted communities and b) guidance to national level policy (e.g., NCS and WCS) implementation.

To achieve these goals, CoMFRT has been largely organized into teams focusing on different questions, stakeholders, governing agencies and institutions at multiple geographic and organizational scales. These teams are:

1. *Wildfire Research (WiRē)* – The Wirē team works with local wildfire education programs to develop proactive, evidence-based programs based on understandings of local needs. Such programs work to reduce wildfire risk on private land parcels and increase resident preparedness for a wildfire event.
2. *Community Pathways* – The community pathways team examines how diverse sets of human populations across landscapes form (or do not form) the bonds, shared values, institutions, and processes of interaction that allow them to promote or modify collective action to build adaptation to wildfire.
3. *Social Networks* – The networks team examines how professional stakeholders in wildfire risk management organize to manage cross-boundary wildfire risk.
4. *Multi-Scale and Cross-Boundary Governance* – The Governance Team examines the processes and institutions that support (or constrain) cross-scale and cross-boundary wildfire work, with a focus on identifying policies, programs, and organizational changes that can scale up wildfire risk mitigation.

In sum, this effort is a partnership informed by the best available social science for understanding the formation and operation of complex place-based formal and informal networks of actors and organizations (i.e., the networks necessary to effectively govern wildfire risk; Essen et al. 2021) and the USFS's role in these networks and social systems. This knowledge enhances the Agency's ability to address wildfire risk to meet the moment in a way that respects and leverages the (social and ecological) diversity of fire-prone landscapes.

Part 2. Insights from Dialog Sessions.

Recognizing the collaborative nature of CoMFRT, the content for this strategic plan was created with input from longtime partners and informed by the best available social science. Between September and December 2021, one workshop and two listening sessions were convened with the goals to:

- Reflect on best practices and lessons learned from CoMFRT thus far
- Co-produce a vision for the future of CoMFRT with perspectives from all parties

Accordingly, the CoMFRT research team, along with local practitioner partners from the Northern Utah and North Central Washington study sites, and several members of RMRS and FAM leadership convened for an initial two-day virtual workshop on September 28-29, 2021 to reflect and co-create a vision for the next generation of CoMFRT. In addition, recognizing the cross-boundary focus of CoMFRT, fire

related staff from the Department of Interior were also engaged. Figure 2.1 is a screenshot of the process the group worked through during the initial workshop. Details can be further explored [here](#).



Figure 2.1: Screenshot of the workshop outline and content from the interactive on-line platform.

The strategic conversations about creating a five-year vision for CoMFR were rich and complex. Given the broad participation in the workshop it was not easy to find clarity or consensus on an aspirational vision for CoMFR. Figure 2.2 is a synthesis of themes surfaced by participants in characterizing an aspirational vision for CoMFR. For designing a research vision, one of the central dilemmas is, in fact, the presence of diverse definitions of the problem, often dependent on, for example one's training, organizational affiliation, or role in addressing wildfire risk, that yield different interpretations of the problem of cross-boundary wildfire risk (and therefore the vision of success). Thus, there is universal definition of the wildfire conundrum nor is there a "one-size-fits-all" solutions. To account for these diverse definitions and associated preferred solutions, a consistent thread of these strategic planning conversations centered on the need to recognize and support diverse approaches to addressing cross-boundary wildfire risk to build wildfire adapted communities by including different perspectives and knowledges (e.g., technical knowledge, Indigenous Tribal Ecological Knowledge) and sharing power and authority in devising wildfire adaptation strategies.

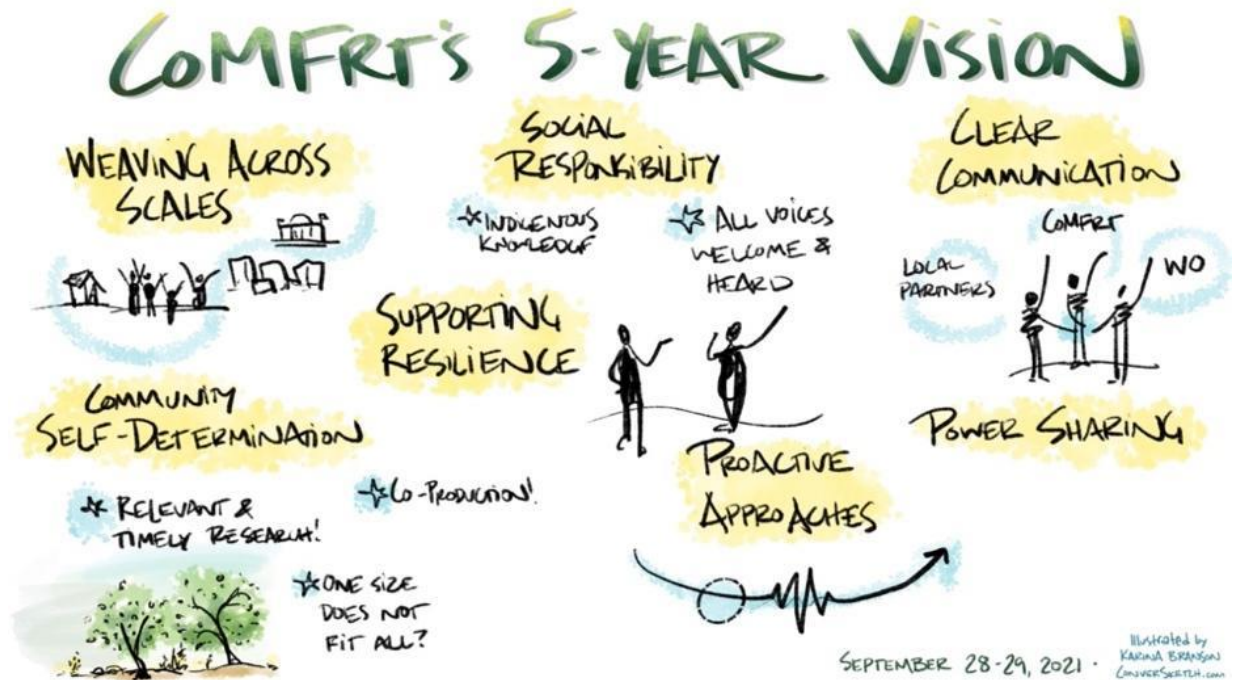


Figure 2.2: Illustration of CoMFRT's aspirational 5-year Vision

Following this initial workshop session, a virtual Leadership Dialog Session was hosted on October 13, 2021 to summarize and build on previous workshop outcomes with leadership from CoMFRT funders in Fire and Aviation Management (FAM) who were not able to participate in the full workshop. What was striking about this rich conversation was how varied the reflections of leadership were, highlighting once again the diverse definitions of the wildfire problem. The core challenge underlying this diversity was how to balance or integrate local and national needs. Different parts of the Forest Service have and serve different needs. To summarize the key underlying questions, they ranged from the strategic (how to design programs and services to best advance the National Cohesive Strategy?), to tactical (how to increase the pace and scale of fuel treatments and measure progress?) to more organizational or operational questions (how should CoMFRT position and promote itself to be in service to the organization?).

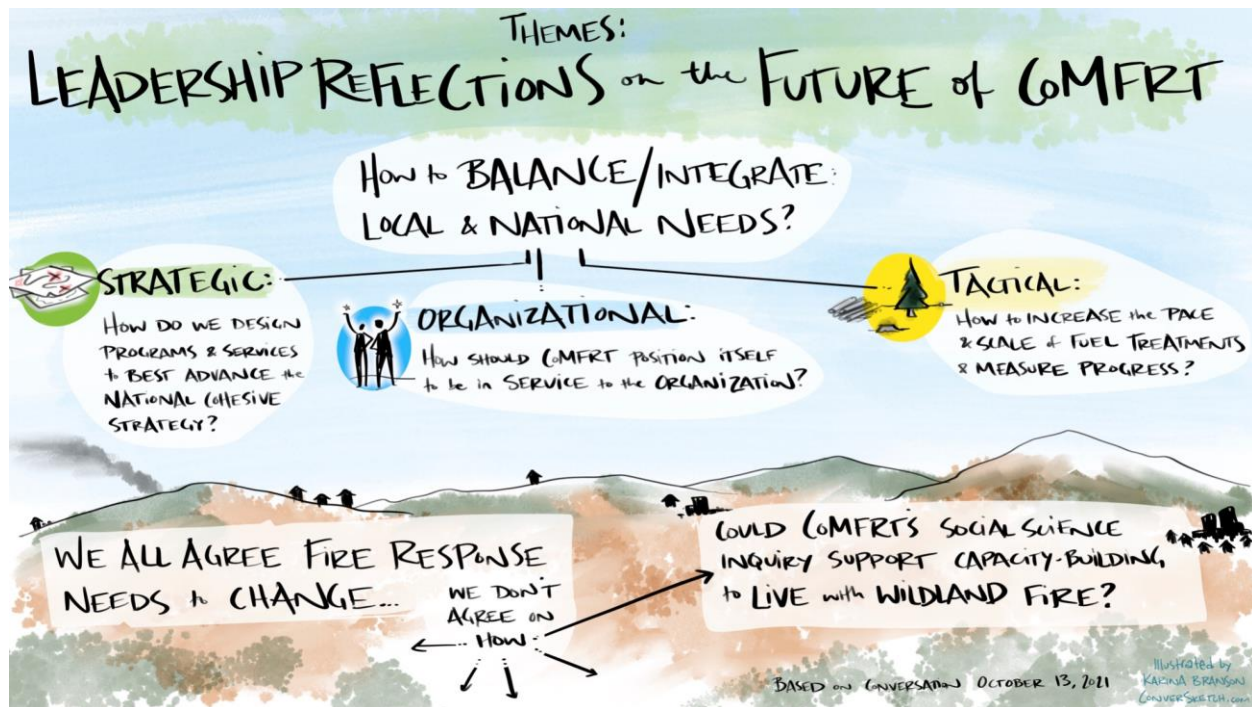


Figure 2.3: Leadership reflections about the future of CoMFRT based on a presentation of previous workshop content: 1) Technical - to focus on building social license; 2) Interagency - to be in service of obtaining the goals of the National Wildfire Cohesive Strategy by providing communities with what they need to build wildfire resilience; 3) RD&A - to use the USFS RMRS Fire Modeling Institute (FMI) as a model for building CoMFRT with research and application capacities.

A final virtual Dialog Session was hosted on December 6, 2021 to build on the previous Listening Session and to include practitioner perspectives. The purpose of this final session was to weave local practitioner knowledge and experience with national perspectives and research, to describe how CoMFRT might best serve the agency moving forward.

This series of engagements not only helped the CoMFRT team understand how it might evolve towards what might be called CoMFRT 2.0, but also provided valuable opportunities for people who otherwise may not have an opportunity to speak directly to connect, learn, and listen with each other to innovate new ideas to inform the future of CoMFRT. The sum of these dialogues surfaced three important tensions or trade-offs in charting the future course of CoMFRT. They help map the choices or paths that CoMFRT 2.0 might take and some of the consequences of those alternative paths (Figure 2.3).

Among these paths were several noteworthy tensions:

- 1) A tension between a top-down ecological fuel treatment-focused approach versus a more grassroots co-produced approach that centers on place-specific local and regional capacity for adaptation and how to live with wildland fire (x-axis in Figure 2.3). This represented the conversation that defined the core of the cross-boundary wildfire risk problem.
- 2) A second tension was between flexibility in addressing local priorities and capacities in implementation versus the needs for more stable or stronger national programs and recommendations for how to implement change at the policy USFS agency level (y-axis). This represented how the problem of cross-boundary wildfire risk should be addressed.

- 3) Finally, a tension surfaced between management experience for solving the underlying wildfire problem (the need for applications) and trying to articulate the research needs informed by social science (research; z-axis). This represented the intersection between the best available social science and important management experiential and tribal knowledge.

In charting the course of CoMFRT 2.0, we can ask where do we focus future CoMFRT efforts within this framework? How can we use and build on the best available science, combining both biophysical and social sciences, in a way that yields actionable recommendations? How can CoMFRT best serve the agency and the Cohesive Strategy? We believe the answer to those questions lies somewhere nearer to the grass-roots governance perspective on the x-axis. At the same time, we think that a key role for CoMFRT 2.0 going forward is to find the balance between flexibility in addressing local priorities and capacities and stability and accountability of national programs (See Craig et al. 2017 for more on the importance of flexibility and stability in public policy).

With all these considerations in mind, the key takeaways from the dialog sessions include:

- While there have been many advances that inform approaches to address wildfire risk, there are still gaps in applying and understanding the social related components of building wildfire adapted communities to better live with fire.
- More specifically, there is a need to identify, share and strategically invest in community wildfire adaptation approaches that account for the social and ecological diversity of fire-prone landscapes in the US to support desired outcomes.
- It is imperative to work across scales and boundaries to co-produce successful recommendations to inform investments related to furthering adaptation strategies, opportunities to yield better outcomes as wildfire becomes more complex.
- By supporting CoMFRT, the agency is leading the way in innovative, long-term applied social science that will directly inform future management recommendations that are supported by communities in fire-prone areas in a way a one-off study cannot do. CoMFRT provides a much-needed, long-term, multi-scale perspective the agency currently does not leverage to address social *and* biological challenges of wildfire.
- The initial phase of CoMFRT served an important purpose - identifying the key dimensions of the problem - but lacked capacity to build and deliver broadly applicable tools and strategies to devise wildfire adaptation strategies. Thus, CoMFRT 2.0 should be strategically shifted to ensure adequate capacity and accountability to deliver locally applicable outputs *and* facilitate national program design and evaluation.
- Challenges of the existing CoMFRT project organization and management to meet the expectations that surround the problem of cross-boundary wildfire risk mitigation as experienced from the local to the national scale.

The sessions also surfaced various challenges that come with trying to organize a large transdisciplinary team in which most of the work is accomplished through university-based partners in cooperation with Forest Service R&D.

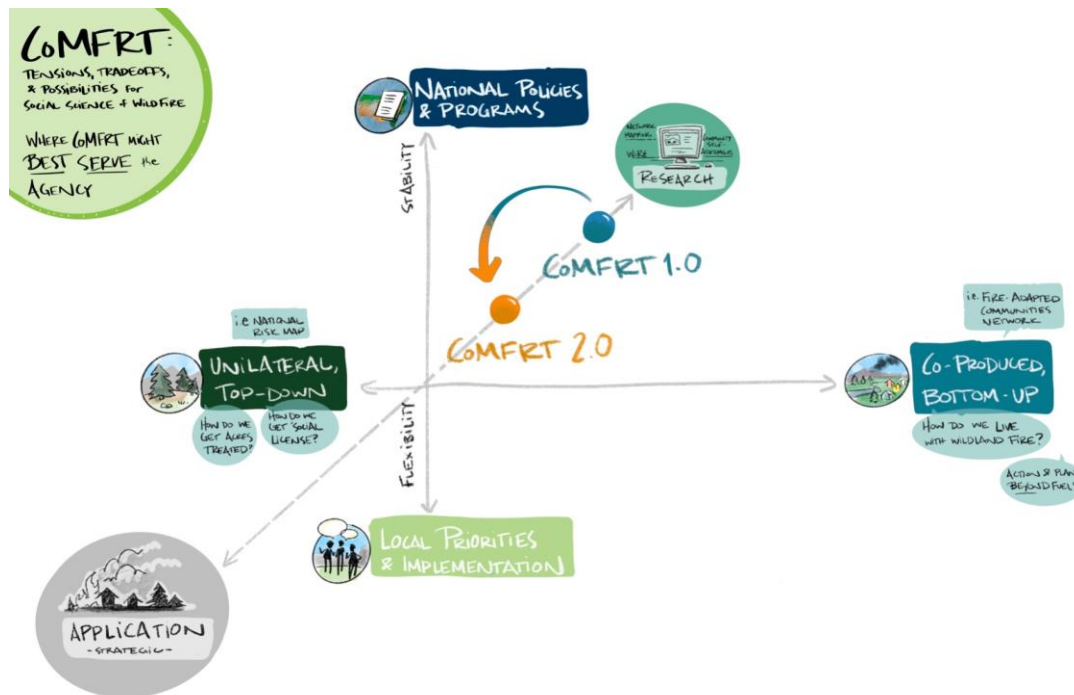


Figure 2.4: Mapping opportunities for future CoMFRT work to best serve the Agency – three tensions: 1) a top-down ecological fuel treatment- focused approach versus a more grassroots co-produced approach that centers on community place-specific local and regional capacity to adaptation and how to live with wildland fire (x-axis); 2) flexibility in addressing local priorities and capacities in implementation versus the needs for more or better stable national programs or how to implement change at the policy USFS agency level (y-axis); and 3) informed by management experience for solving the underlying wildfire problem (applied/problemscape) and, on the other hand, trying to articulate the research needs informed by social science (research; z-axis).

Part 3. Agile Options for CoMFRT 2.0

During these strategic planning sessions, USFS announced a new “Wildfire Crisis Strategy” (WCS) also known as the 10-Year Plan. This section will outline a program of research over the next 5 years that can provide the best available social science to support achieving the goals of the new WCS as well as advancing interagency efforts to support the National Wildfire Cohesive Strategy. Aspects of this program of research are informed by CoMFRT work to-date, key social science literature and principles throughout this document (see Appendix 1), and the dialog sessions described in Part 2. For CoMFRT to remain aligned with the evolution of USFS and social science, we suggest another strategic planning process in 4-5 years. Also, as we know that structure is tied to function, this section will outline the function, or the research objectives, of CoMFRT 2.0 and identify key project organizational needs and structure to most efficiently meet these objectives. Broadly speaking, CoMFRT is intended to yield actionable recommendations related to cross-boundary wildfire risk at multiple scales.

3.1– CoMFRT 2.0 - Vision and Objectives

Building on the strategic process described in Section 2, CoMFRT 2.0 proposes the following vision statement:

To co-produce an understanding of the structure and functions of the many social systems related to wildfire management in specific fire prone areas in a way that accounts for the social (and ecological) diversity of these landscapes and to use this understanding to inform investments in the wildfire fire social system to support Agency and interagency goals, including supporting underserved communities, to further fire adaptive communities and resilience to fire.

Similarly, the following key research objectives emerged from existing research and the strategic dialog sessions:

1. To better understand the variety of social systems related to wildfire management in specific fire prone areas in a way that accounts for the social (and ecological) diversity of these landscapes.
2. Continue to build place-specific (socially legitimate and relevant) co-produced social science knowledge to support collaborative cross-boundary, multi-scale co-management of wildfire risk and exposure.
3. Work closely with public, private, and tribal organizations active in the wildfire social system in site-specific fire-prone landscapes to co-produce a shared understanding of the structure and functions of these systems, identify existing fire adaptation strategies that may be relevant elsewhere and can inform future agency investments, and innovate new, socially relevant and legitimate opportunities to further fire adaptation across boundaries that account for both the similarities and differences across these wildfire fire social systems.
4. Design CoMFRT 2.0 to be able to 1) examine the interconnections and integrate findings across various team protocols; 2) conduct analyses across study sites/geographies; and 3) develop strategies for monitoring and evaluating improvements in local fire adaptive capacities over time.

3.2 CoMFRT 2.0 - Function

Our strategic dialog suggests that CoMFRT 1.0 pursued a largely research focused agenda while noting a need to build in more application-oriented insights and outcomes. This shift is illustrated in Figure 2.4 as strategically repositioning the work of CoMFRT 2.0 in a way that balances and integrates research (learning) and practice (applications). Moving forward CoMFRT 2.0 proposes to pursue two overlapping components: Research and Practice.

Research (Learning) Component

Primary objective – To engage in iterative learning grounded in each study site guided by a co-production approach among researchers, practitioners, and decision makers throughout the research cycle. There will be two steps in this phase:

1. Coordinated research design, data collection, analyses, and recommendations associated with each of components of CoMFRT examining key cross-boundary aspects of fire risk mitigation. This work will focus on the wildfire risk social system at multiple scales.
2. Integration across each subteam yielding actionable recommendations.

Outputs – Actionable recommendations from CoMFRT 2.0 research and co-produced with partners will include:

1. Those specific to individual study sites and landscapes; and
2. Generalizable recommendations that would apply to other fire-prone area(s).

Timeline – One new study site will be selected every 1-2 years.

Practice (Applications) Component

Primary objective – To test selected recommendations from Phase I in appropriate areas and monitor results through time. This would follow a two-part design:

1. Select and design the most appropriate actionable recommendation in concert with key stakeholders;
2. Carry out recommendation; and
3. Design approach to measure effects of implemented interventions.

3.3 CoMFRT 2.0 Transdisciplinary Team Structure

To successfully reach these identified objectives, the organizational structure and related capacity that constitutes CoMFRT 2.0 would include, but not be limited to the current efforts (work packages) (bullets 1-4), additional research capacities (bullets 5-6), and administrative and outreach capacities (bullets 9-11).

1. *Wildfire Research (WiRē)* – Wirē will continue to work with local wildfire education programs to develop proactive, evidence-based programs based on understandings of local conditions.
 - a. Identify mitigation factors such as reported mitigation activities, barriers, and openness to potential incentives to mitigate, expectations about the likely outcomes of future wildfires, and wildfire information sources.
 - b. Identify variation among fire-prone communities in a shared landscape.
2. *Community Pathways* – Community pathways will continue to examine how diverse sets of human populations across landscapes form (or do not form) the bonds, shared values, institutions, and processes of interaction that allow them to promote or modify collective action to build adaptation to wildfire.
 - a. Community capacity self-assessments tools to assist selections of appropriate community pathways that are related to specific local capacities. These tools would allow residents to identify and prioritize specific needs to better live with fire.
 - b. Advance the WUI human community archetypes to include underrepresented communities.
3. *Social Networks* – Networks will continue to examine how professional stakeholders in wildfire risk management are organized to manage cross-boundary wildfire risk.
 - a. Social network mapping protocols that identify actors in the social system, including those that are most prominent, underserved groups and others that might be missing from cross-boundary efforts to address wildfire risk.

- b. Identify regional level wildfire risk mitigation efforts and where mitigation activities have occurred on the landscape.
 - c. Using network analysis (and potentially other team expertise), seek to understand how the knowledge and interests of underrepresented groups are represented in Potential Operational Delineations (PODs) and Strategic Response Zones assessments.
- 4. *Multi-Scale and Cross-Boundary Governance* – Governance will continue to examine the processes and institutions that support (or constrain) cross-scale and cross-boundary wildfire work, with a focus on identifying policies, programs, and organizational changes that can scale up wildfire risk mitigation.
 - a. Multi-scale assessments of agency and tribal governance programs, structures, and practices and how they contribute or create barriers to building adaptation to wildfire in study sites.
 - b. Develop and test local stakeholder social learning tools, such as analog table-top games, scenario planning, and other simulated problem solving approaches that will foster inter-stakeholder learning, capacity, and relationship building.
 - c. Develop and evaluate anticipatory, futuring, and visioning tools that engage local stakeholders in developing shared community-wide wildfire risk governance strategies.
- 5. *Social/community Vulnerability* - Social vulnerability will assess and characterize both the kinds and degrees of vulnerability (e.g., vulnerability archetypes) and identify the social and geographic forces that are producing vulnerabilities and their unequal distribution across society. Put another way, fire management programs need to be able to assess both *social equity* in program service delivery and differential *social vulnerabilities* to wildfire hazards.
 - a. Apply and evaluate established methods for spatial social vulnerability analyses (e.g., Cutter et al. 2003).
 - b. Design protocols and conduct research tailored to each study site to “ground truth” commonly used social vulnerability indices and outputs that rely on secondary (e.g., Census) data to inform these assessments.
- 6. *Co-Production and Integration* – This involves conducting cross topic and cross study site integrated analyses (e.g., meta-analysis) to generate co-produced, integrated, and actionable recommendations to yield additional recommendations to build wildfire adapted communities.
 - a. Review Forest Service analysis guiding the Forest Service investments and operations (e.g. Firesheds and PODs) and summarize the extent to which social science has and/or could be more fully integrated into the management actions guided by that analysis.
 - b. Co-produce actionable findings and recommendations with wildfire managers working at a variety of scales.
 - c. Convene co-production workshops of both researchers and managers to identify lessons learned and integrated recommendations for future efforts to support wildfire adaptation.
- 7. *Study Site Advisory Group* - Develop and resource a small local advisory/co-production group that allows for local, tribal, and CoMFRT teams engagement and learning, including connecting

each study site with USFS staff with local and regional responsibility to implement the 10-year plan and other key USFS priorities as they develop.

8. National Advisory Group – Establish a national CoMFRT Advisory Team that meets annually that includes NFS & R&D social science leads, tribal liaison, FAM L&P Lead, Prevention staff, Other R&D social scientists and wildfire social science academics, representation from key NGOs (e.g., FACNet, Intertribal Timber Council, Indigenous Peoples Burning Network (IPBN), The Nature Conservancy (TNC)) and other federal and state agencies that have wildfire mitigation responsibilities (e.g., DOI and DOD Agency representative(s)).
9. CoMFRT Co-leads – Administer the program of work, lead regular reporting efforts to funders, coordinate teams, and advisory groups.
10. Communication and Outreach – A full time position for communications external to CoMFRT, outreach, supporting web presence, story mapping, briefing documents, and serves as a liaison and coordinator of outreach and engagement with stakeholders.
11. Moving forward with the structure and capacity listed above, it will be useful to have regular face-to-face team and stakeholder meetings, beginning in the fall of 2022 to build more specifics to coordinate research and integrate findings around the actions, build team cohesion, coordinate research plans, identify future study sites and related firehedges, and mechanisms for sharing and integrating findings. Previous CoMFRT experience indicated that these meetings should revisit or establish:
 - a. Team leads responsible for work packages to reduce the burden on high level coordination.
 - b. Specific commitments to a series of regular CoMFRT team meetings annually where team leads must attend, including one that would correspond with the advisory team meeting.
 - c. Deliverables and deadlines.
 - d. A process for cross topic (work package) learning.

3.4 CoMFRT 2.0 -- Mechanisms for moving CoMFRT forward

Thus far CoMFRT has operated largely using Cooperative Research Agreements administered by Forest Service R&D (RMRS) employed research grade scientists to pass through funds from Fire and Aviation Management to university and other partners organizations. RMRS has contributed scientist salaries, but essentially all CoMFRT research and fieldwork done has been resourced and completed through cooperative agreements due to USFS hiring constraints.

One of the historical strengths of Forest Service R&D was to be able to invest in durable long-term research capacities around specific problems. This has become more challenging with the increasingly complex and transdisciplinary nature of many applied natural resources research topics in an era of decreasing budgets and other administrative changes for funding partners. Forest Service research is still adapting to the challenges of organizing and executing research projects, which require large teams of scientists with diverse sets of expertise, professional capacities for project management, and capacity to design and share science applications that naturally fall between agreements, stretch through time, and do not contribute to the professional rewards of university faculty (i.e., peer refereed journal articles).

Funding university-based scientists has been and likely will remain a key mechanism for accomplishing research projects; however, the links between focusing research capacity at university institutions and project outputs should be considered and accounted for in moving forward with CoMFRT 2.0. If CoMFRT 2.0 is to focus more on delivering tools and facilitate national program design and evaluation, durable capacity must also be built with those with experience with the Agency and its approach to wildfire risk.

3.5 Co-MFRT 2.0 -- Study site selection

One new study site will be selected every 1-2 years. We recommend that the study site selection strategy for CoMFRT 2.0 would be to co-select fire-prone areas with partners (public, tribal, and private) and advisors that are socially diverse and compact enough to include research by all above listed teams. It is important that these sites consider underrepresented groups in study site selection as well. While fire-shed clusters, Fire Adapted Communities Network locations, Indigenous People's Burning Network locations, locations where Potential Operational Delineations (PODs) and Strategic Response Zones have been or are to be completed, for example, could be selected at the outset to reflect some social-ecological system gradients and/or other sources of variance of interest, it's important to also select sites that have not received these resources to understand why and/or what other strategies are being used outside of these well-known approaches. Such new strategies have the possibility to highlight new and effective strategies to address cross-boundary wildfire risk. As the project continues to develop additional study sites will be co-selected to incorporate lessons learned.

Part 4. Summary and Conclusions

The Co-management of Fire Risk Transmission (CoMFRT) partnership is a unique effort funded by the USDA Forest Service (USFS), Fire and Aviation Management (FAM) in 2017 to explore the establishment of a long-term social science research program on community capacity to address cross-boundary wildfire risk in fire-prone areas that could inform USFS wildfire risk related programs and investments. CoMFRT was established to go beyond "one-off" studies by creating a coordinated multi-scaled, interdisciplinary, longitudinal applied research program. This demonstrated USFS FAM's ability to lead the way on innovative applied social science work to inform internal and interagency priorities. The purpose of this report is to share recommendations with key USFS leadership staff regarding future directions of the CoMFRT Partnership to support the strategic direction of USFS (including the Wildfire Crisis Strategy [WCS] and implementation of fire-related provisions of the Infrastructure Investment and Jobs Act [IIJA]) as well as the enduring interagency goals outlined in the National Wildland Fire Cohesive Strategy.

Key lessons learned through this strategic planning process included highlighting the innovative nature of this effort and the opportunity it presents to the agency and others in the wildfire management system to improve outcomes by building place-specific (socially legitimate and relevant) co-produced social science knowledge to support collaborative cross-boundary, multi-scale co-management of wildfire risk and exposure. To better realize the opportunity presented, it will be important to meaningfully build/shift CoMFRT in a way that purposefully develops the structure of the effort (e.g., where positions are located – across USFS R&D, universities, etc.) in parallel with the intended function or goals of CoMFRT. In addition, building in a strong advisory function comprised of a diverse set of wildfire related experts from the public, tribal, and private sectors will help steer CoMFRT activities to best meet the goals of both research and wildfire practice. This programmatic advisory effort should be complemented with local, study-site-specific advisory groups to support co-production at the site level.

Finally, as priorities change and learning occurs it will be prudent to engage in a review and subsequent strategic planning process every five years to be sure CoMFRT remains relevant to the current needs of cross-boundary wildfire risk and building resilience to wildfire.

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