Wildfire Resilience Initiative Grantee Convening

Report on Progress, Challenges, and Opportunities

APRIL 22-24, 2024

GORDON AND BETTY MOORE FOUNDATION

Above: A new tribal fire practitioner learning how to put fire on the ground for the first time. (Photo: Elizabeth Azzuz).

Cover: A scientific study to evaluate the relative flammability of various mulch products sold in Marin, conducted by a coalition of agencies, industries, and scientific organizations. The various mulch products were aged for roughly four months to simulate condition of mulch in Marin yards, and then burned, at which point flame length, rate of flame spread, and radiant heat were measured. This study will enable residents to make informed decisions about the use of fire-resistant mulch products. (Photo: Michael Gollner, Assistant Professor, University of California, Berkeley, Department of Mechanical Engineering)

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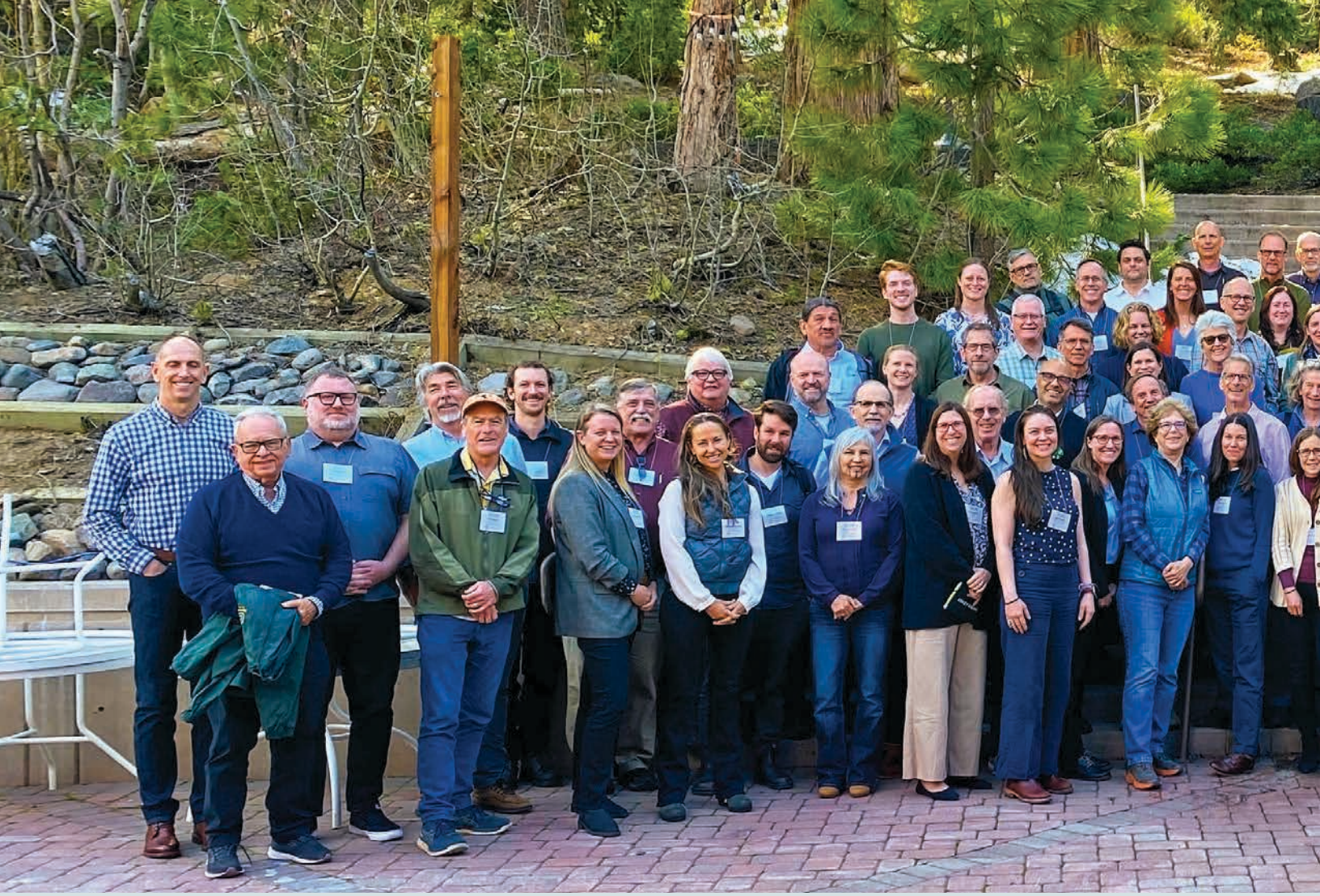
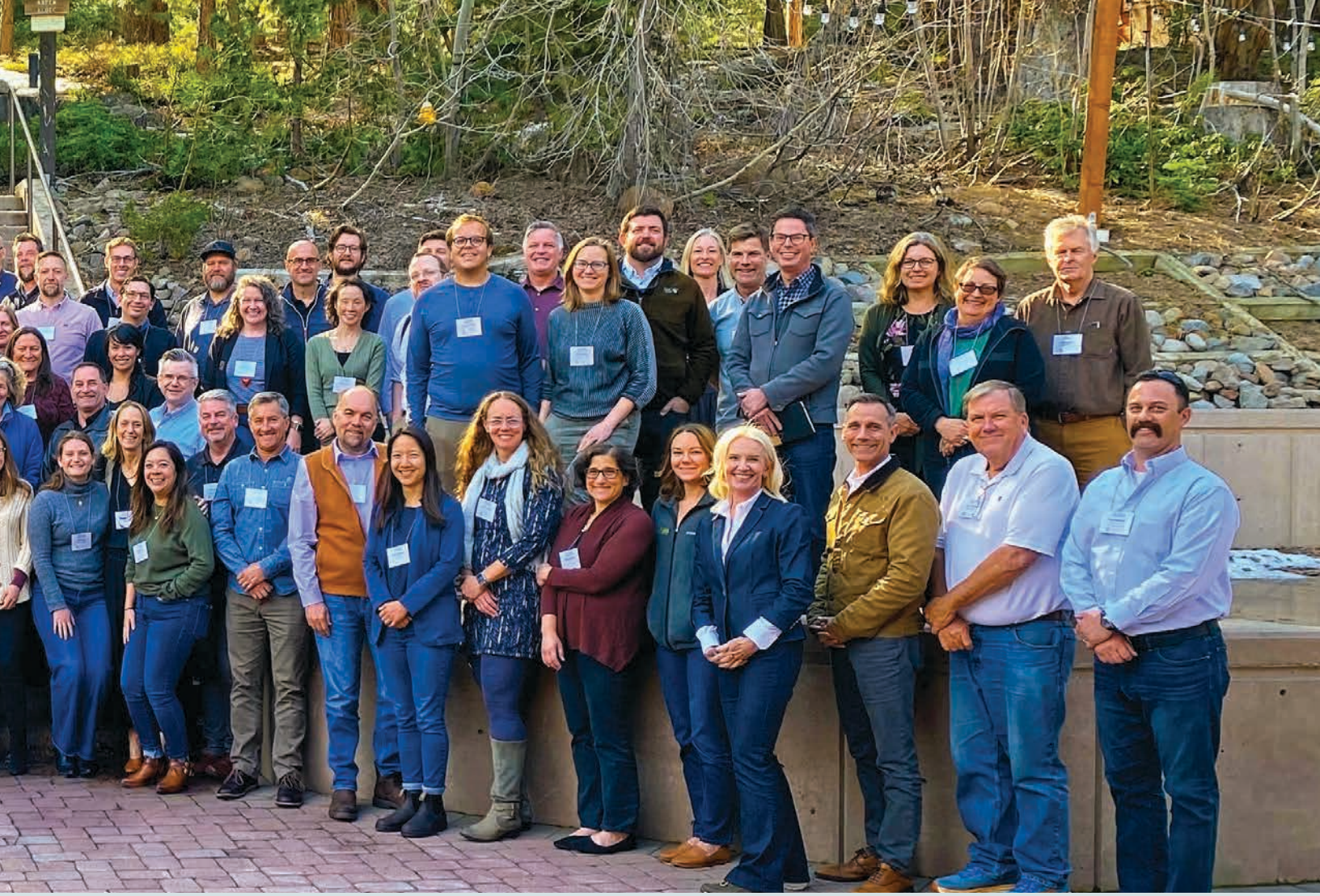


INTRODUCTION AND MEETING OBJECTIVES

A little more than a year after the February 2023 launch of the Gordon and Betty Moore Foundation's Wildfire Resilience Initiative, grantees gathered for an inaugural convening. The April 2024 meeting had four objectives:

1. Strengthening understanding of the initiative's theory of change, and understanding grant-funded projects as a portfolio of efforts to achieve the initiative's outcome (i.e., "By 2035, wildfire resilience has significantly increased for fire-adapted ecosystems and fire-prone communities in Western North America—through integrated early-fire decision support, effective community mitigation, and improved fire and land stewardship that have enabled beneficial fire and substantially decreased severe wildfire risk"), as measured by three overarching goals,[1] and by advancing six strategies: (1) early-fire interventions, (2) pre-fire community interventions, (3) pre-fire ecosystem interventions, (4) deeper understanding, (5) enabling conditions, and (6) measurement & evaluation,



Attendees at the 2024 Wildfire Resilience Initiative Grantee Convening at Granlibakken Tahoe. (Photo: Credit: Gordon and Betty Moore Foundation)

2. Fostering connections among attendees, to build community for greater impact and to be aware of the full range of other projects and activities,
3. Experimenting with new tools and ways of collaborating, and
4. Celebrating early progress and accomplishments, and spotlighting emerging opportunities.

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1 The initiative's goals are three-fold and map to the initiative's three "core" strategies. For early-fire interventions: 100% of wildland fire (both beneficial and severe fire, based on science-informed data) ignitions and detections to be confirmed and transmitted to responders within 15 minutes in Western North America; for pre-fire (community) interventions: property loss will have stabilized through risk mitigations sufficient to disrupt fire pathways and structure-to-structure conflagration in developed wildland-urban interface communities; for pre-fire (ecosystem) interventions: annual acres burned at low-to-moderate severity will have increased in aggregate, and annual acres burned at high severity will have decreased in aggregate.

As attendees collectively reviewed what has been accomplished to date by strategy, and the opportunities and challenges they are encountering, important progress was already evident. Increasing incidence and severity of wildfire is a daunting, accelerating, urgent challenge, but grantees' ingenuity is serving as a powerful springboard for action. New knowledge has been generated from a wide diversity of grantees representing research, NGO, tribal, fire service, state and federal agency and other communities, and is informing and filling critical gaps. Cross-sectoral coalitions also have formed and are poised to seize windows of opportunity for positive change. New models and platforms are illuminating stewardship priorities for healthy watersheds and identifying "mitigations that matter" for resilient communities. Place-based pilot projects with a facilitated community of practice have been launched to test this prioritized stewardship and mitigation across Western North America. Innovative ideas for improving wildfire detection and tracking have been accelerated and are being developed, tested, and refined. Across ecosystems, communities, and early fire detection, frameworks and indicators have been developed to better measure what can therefore be better managed.

While the Wildfire Resilience Initiative is still nascent, some of this rapid progress can be credited to the grantees supported by the foundation's earlier exploratory wildfire portfolio—as early as 2019—that focused more narrowly on supporting science and technology to improve integrated early-fire detection, risk assessment, and effective response. That preliminary exploration (2019-2022) evolved into one of the initiative's six strategies (early-fire interventions), and lessons gleaned from that work informed much of the broader theory of change that underpins the current initiative. To read earlier recommendations and follow that progression, see the April 2019 Fire Immediate Response System Workshop Report, the subsequent March 2021 Keck Institute for Space Studies "Wicked Wildfire Problem" Workshop Recommendations, and the March 2022 Grantee Progress and Priorities Report.

Gordon and Betty Moore intended for their foundation "to tackle large, important issues at a scale where it can achieve significant and measurable impacts." Our grantees' collective commitment to tackling the wildfire issue is

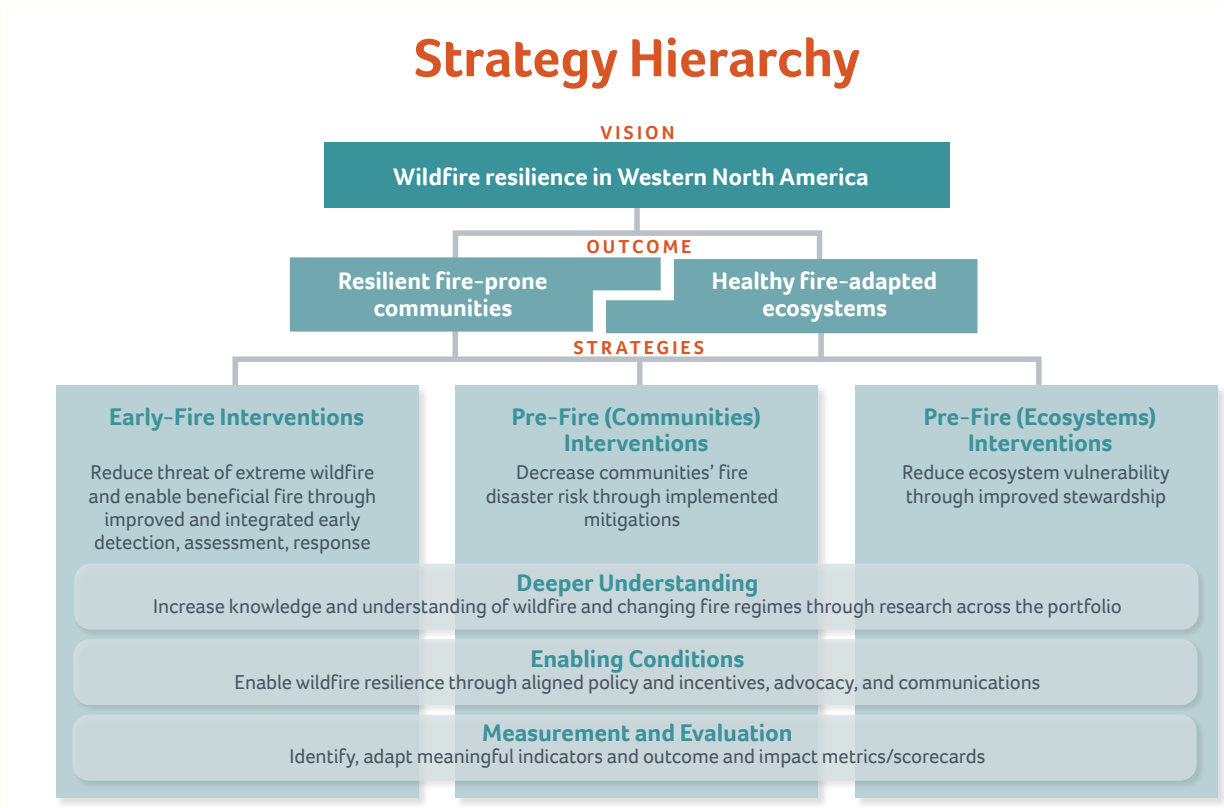


Figure 1. The Gordon & Betty Moore Foundation Wildfire Resilience Initiative vision and outcome is supported by six strategies: (1) Early-fire, (2) Pre-fire (communities) and (3) Pre-fire (ecosystems) interventions, (4) Deeper understanding, (5) Enabling conditions, and (6) Measurement and evaluation.

making a meaningful, measurable difference and helping transform the role it plays across Western North America—from what is perceived as an unwanted, destructive force, to an integral element in nature that delivers ecological and cultural benefits.

In the pages that follow, we report on the early progress our grantees have made within each strategy, one year into the Gordon and Betty Moore Foundation's Wildfire Resilience Initiative. We also highlight the challenges and opportunities that have emerged so far.

Lockheed Martin - Sikorsky autonomous Black Haw equipped with Rain software for dispatch, remote supervision, fire localization, and suppression targeting flies over a fire set behind Sikorsky HQ in Connecticut for testing. (Photo: Rain Industries Inc)

SYNTHESIS BY STRATEGY

Early-fire interventions

Grant investments within the Wildfire Resilience Initiative's "early-fire interventions" strategy include leading edge technology for satellite-based, near-real-time wildfire remote sensing, artificial intelligence and machine learning applications for improved fire information and intelligence, and autonomous detection and suppression of wildfire. Programs to ensure that Indigenous and place-based knowledge can better inform and guide wildfire science and technology innovations, including those that pertain to wildfire detection and tracking, are also key investments under this initiative strategy.

Progress

Early-fire intervention grantees have demonstrated technical viability for transformative wildfire data, along with established science and social integration goals for that data. These include low-earth orbit

(Earth Fire Alliance's FireSat) and geostationary (UC Berkeley's FUEGO) satellite capabilities that will accurately detect, track, and disseminate wildfire data, every 20 minutes for almost any location globally (low-earth orbit) or nearly continuously for Western North America (geostationary). Also validated is the ability to accurately define the heat output of wildfire at a scale small enough (single acre) to use that data to inform and improve novel firefighting strategies based on fire intensity data. Finally, the XPRIZE Wildfire competition is aiming to transform current wildfire management through a two-track, global competition incentivizing the development of new firefighting technologies. In April, they announced the selection of 20 qualified teams competing for Track A, space-based wildfire detection and intelligence, and the announcement for Track B, autonomous wildfire response, is anticipated for later this year.

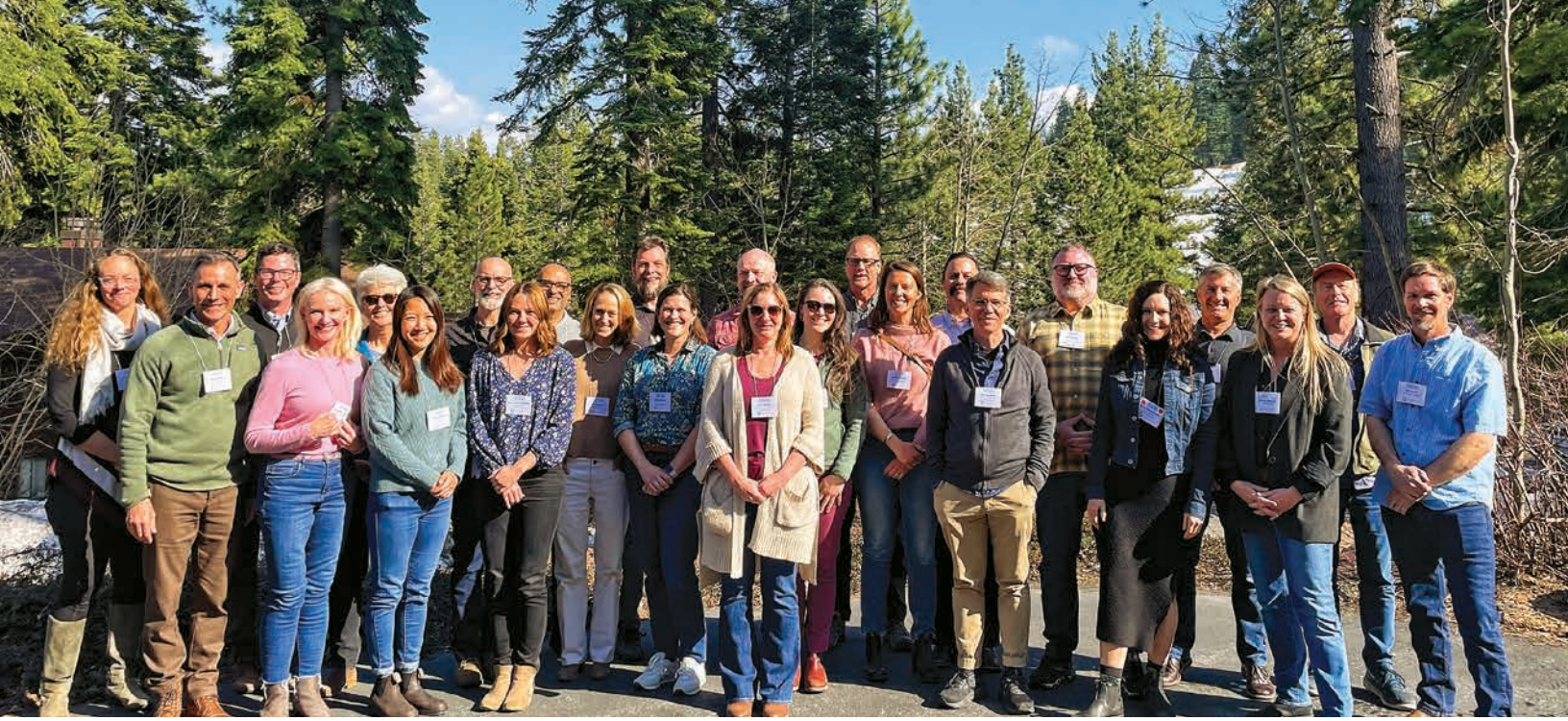
Concurrent with these early-fire intervention designs is the added value of the collected data from the above technologies for climate, smoke, and carbon research needs. Autonomous aircraft (Rain) promises future capability as wildfire demands continue to increase beyond current resource capacity, and faster-response aircraft can be deployed. These autonomous aircraft will be able to engage in wildfire environments too dangerous for human suppression forces to operate and manage heat intensity directly, creating an ability to reduce fire intensity and harness ecologically beneficial fire, transformed from otherwise high-severity-vast-extent "megafire" events.

Challenges

The greatest challenge for early-fire intervention is to weave innovation into a structured fire suppression model without counterproductive disruption. Developing new satellite data streams that provide continuous fire perimeter monitoring, improved fire intensity data, and depict new wildfire starts faster all potentially open avenues to new practices, but also presume that firefighters want that data, have the needed resources for an aggressive initial attack, and are willing to change their current operations rather than use the new information to re-enforce them. Many early-fire grantees point to anticipated second-order challenges that stem from this primary challenge, including wide user adoption, sustainable business models, innovation barriers, and long-term funding commitments.

Opportunities

Early-fire opportunities include the ability to offer compelling displays of new data and digital intelligence capability. The data developed through the satellite systems will bring new views of wildfire to first responders as well as a trove of foundational, rich data for scientific study and management applications. The positive social impact of such data will likely include a more uniform and broad knowledge of where fires are occurring and the impact they are having. For example, XPRIZE Wildfire will serve as a platform for subsequent innovations as well as potential new markets seeded through this competition. These new data streams and associated digital intelligence will open future pathways, both for novel fire suppression capabilities to lessen community loss and also to increase beneficial fire occurrence and extent. The data will also form the skeleton for profound machine learning growth in the wildfire intelligence space.



Wildfire Resilience Initiative Select Pilots to Achieve Resilience by Key Indicators (SPARK) grantees at the 2024 Wildfire Resilience Initiative Grantee Convening at Granlibakken Tahoe. (Photo: Gordon and Betty Moore Foundation)

Pre-Fire Ecosystems and Pre-Fire Communities

The Wildfire Resilience Initiative's "pre-fire ecosystems" and "pre-fire communities" strategies are expressed through place-based demonstration projects, called SPARKs, or Select Pilots to Achieve Resilience by Key indicators, and which are facilitated through a "learning exchange." Distributed across Western North America, the initial cohort includes seven grantee organizations working in six watershed and six county SPARKs, representing a variety of communities and ecosystem types in eight state/provincial locations (lead grantee organization in parentheses): Alaska (Alaska Venture Fund), Arizona (City of Flagstaff), British Columbia (Bulkley Valley Research Centre), Northern California (Climate and Wildfire Institute), Southern California (Santa Barbara County FireSafe Council), Colorado (Colorado River Sustainability Campaign), Washington (Resources Legacy Fund), and Wyoming (Colorado River Sustainability Campaign).

Progress

At the first annual grantee convening, the SPARK projects and learning exchange convened in-person, formally launching the SPARK program and establishing the community of practice intended to support this multi-year wildfire resilience work. Grantees workshopped a "SPARK Roadmap" -- a guiding and planning resource developed by the Learning Exchange and Chris Anthony, former Chief Deputy Director of Cal Fire and Tahoe Sierra SPARK lead (with Climate and Wildfire Institute). Facilitated by the learning exchange, the SPARK leads spent the day exploring the Roadmap, and identifying challenges, gaps, and opportunities associated with their work.

Additionally, "deeper understanding" and "enabling conditions" strategy grantees Chief Dave Winnacker and Professor Hussam Mahmoud presented fire pathway and "mitigations that matter" models, respectively, and NASA collaborator Dr. Michael Falkowski, provided an overview of NASA FireSense a NASA earth observation data program available to SPARKs for use in their work. These presentations,

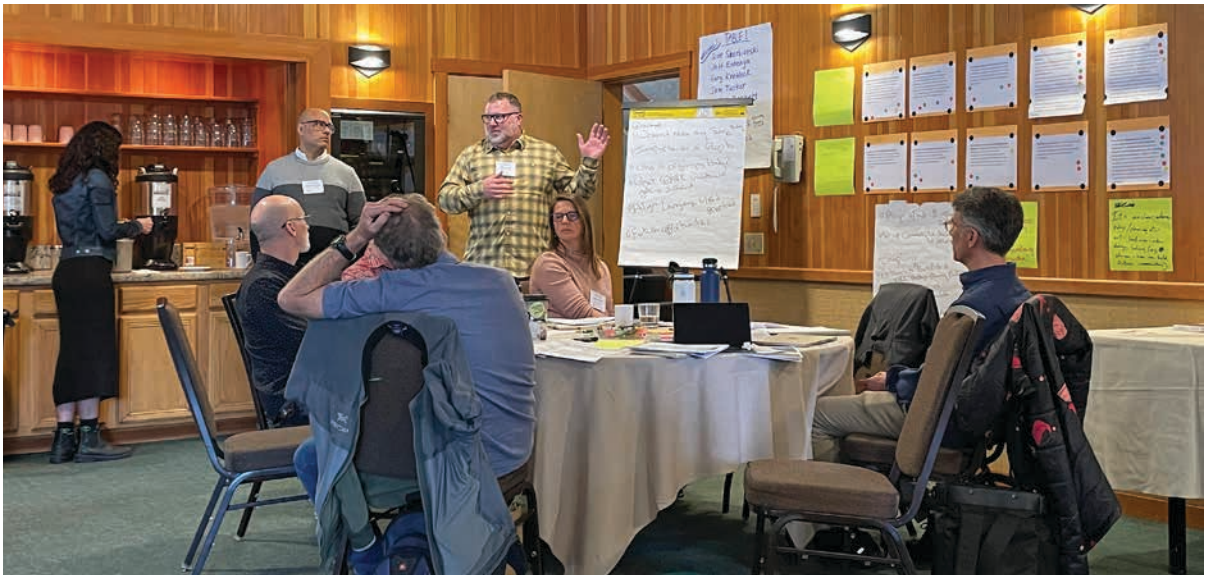
and the subsequent discussions during the convening, fostered connections and opened new opportunities to utilize the modeling and data resources to enable SPARKs toward wildfire resilience implementations and outcomes.

Challenges

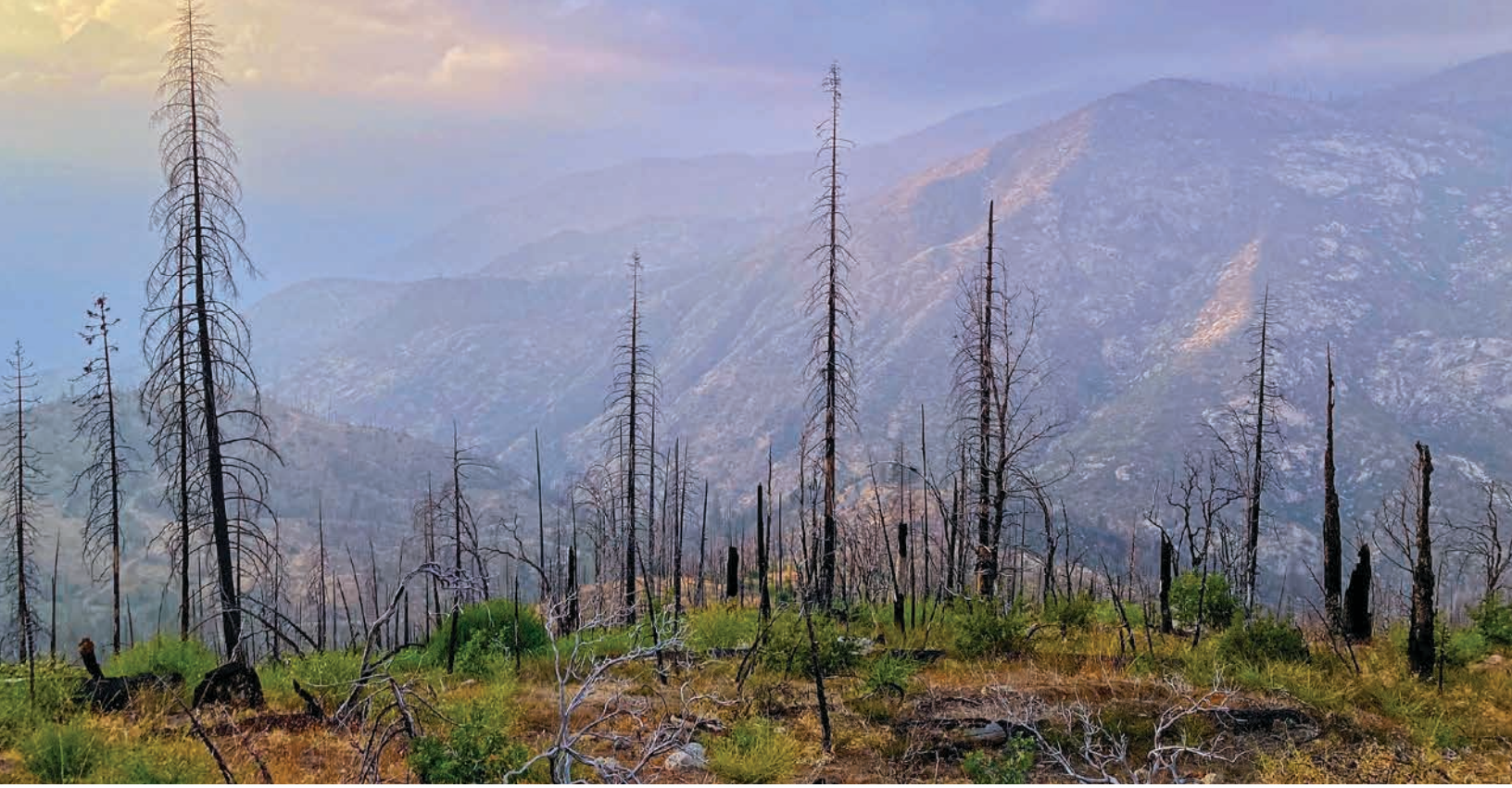
Consistent challenges identified across all the SPARKs included elements that are also representative of challenges observed across other locales in Western North America: (1) ability to work at the necessary pace and scale for wildfire risk reduction at the watershed scale, (2) lack of long-term fiscal sustainability – both in terms of wildfire response as well as wildfire mitigation, management and implementation, (3) critical data and/or knowledge gaps, (4) lack of coordination around existing community, county or state level wildfire plans, including the lack of tribal sovereignty or knowledge representation, and (5) lack of workforce availability. Further, recent regulatory changes for air quality and uncertainties associated with the transport, and impact of smoke, likely will provide challenges in the ability to increase the pace and scale of prescribed and cultural burns in some SPARK locations.

Opportunities

The SPARK grantees have also identified opportunities associated with their place-based work, many of which directly address the challenges outlined above: (1) the chance to build capacity with a wide array of stakeholders, (2) facilitation of science-based input into the creation or revision of local or statewide fire management plans, (3) integration of technology to support early-fire interventions, prioritized mitigations, fire pathway disruptions and land-use planning decisions, (4) a ripe environment for cultural shift and building momentum in the wildfire space, and (5) opportunities to develop and implement sustainable and long term solutions toward wildfire resilience. Finally, and perhaps most importantly, each SPARK pilot provides an opportunity for (6) current and future grantees to connect and leverage their work where research or development can be translated into "real-world" applications that can benefit the SPARK projects, and the communities and ecosystems they are supporting.



SPARK grantees at the 2024 Wildfire Resilience Initiative Grantee Convening at Granlibakken Tahoe. (Photo: Gordon and Betty Moore Foundation)



Ponderosa pine forests near Shaver Lake that our models describe as experiencing "Vegetation Climate Mismatch (VCM)." The 2020 Creek fire burned through these forests, and we expect that because of climate change they are less likely to grow back as conifer forests, but rather chaparral or other vegetation that is better suited for warmer and drier conditions. (Photo: Avery Hill)

Deeper understanding

The "deeper understanding" strategy has already resulted in preliminary, as well as published results (please reference Annex B) that offer data-driven insights towards identifying critical knowledge-to-action gaps, and specifically toward the pre-fire communities and pre-fire ecosystems strategies. Deeper understanding grantees represented a variety of organization types, including institutions of higher education, community-based organizations, tribal communities, and NGOs.

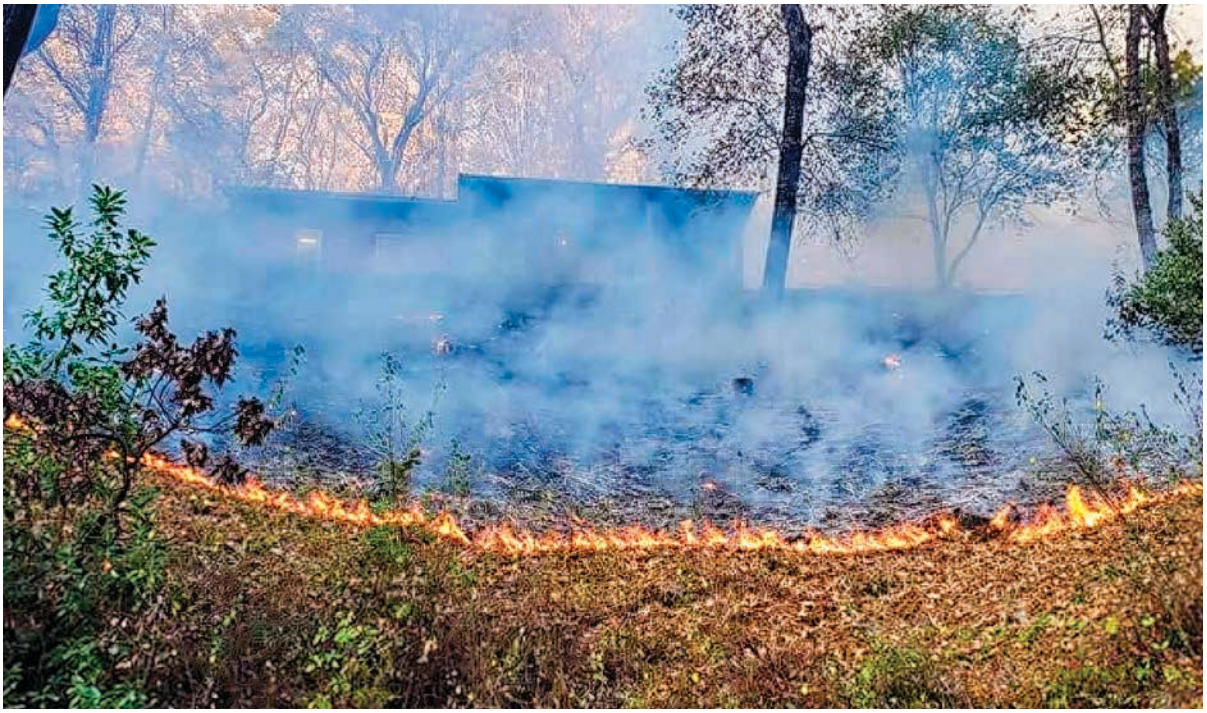
Progress

Fire ecology modeling efforts addressing knowledge gaps in pre-fire ecosystems have focused on relationships between ecosystem/vegetation type, fire behavior (including speed and fire severity, climate), and fire management. The Western Fire and Forest Resilience Collaborative (Hansen) has developed preliminary spatially explicit Western U.S. (not including AK) fire severity assessments, as well as models to evaluate future fire impact to forest landscapes under changing climate conditions. Stanford University (Wara) published key research regarding new approaches to evaluating Cal Fire and USFS performance with a focus in California – highlighting the importance of return intervals and the role that low and moderate severity fire can play in reducing the risk of catastrophic fire in the future. Providing critical information regarding ecosystem change and future resiliency, another Stanford University research group (Field) published articles that examined shifting broad scale vegetation-climate relationships in California. UC Davis (Latimer) modeling results evaluated how the speed of fire traveling across a landscape impacts severity and ecosystem health, and showed that the more diverse a landscape is, the more resilient it can be to high severity fire regimes. Through laboratory research and field work,

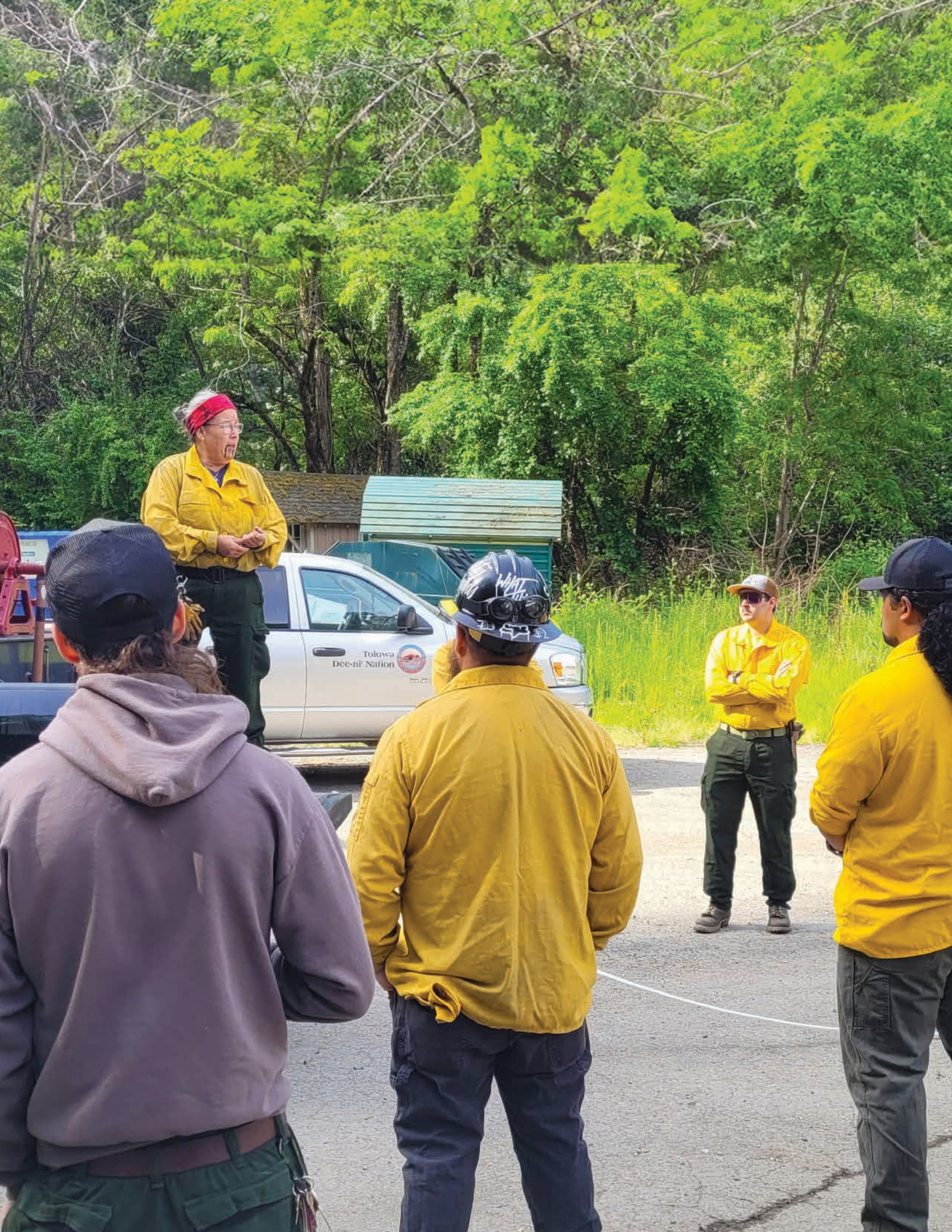
UC Santa Barbara (Anderson), the Cultural Fire Management Council (Robbins), the Karuk Tribe (Tripp) and CalPoly SLO (Wilson) have provided targeted learning on: prescribed and cultural burns in both foothill/coastal ecosystems of Central California, conifer forest landscapes in Northwestern California, and with observations of shifting management and regulatory processes, landscape-scale ecological feedback mechanisms of soil, groundwater, and vegetation relevant to fire events, and observations of impacts associated with application of preventative fire retardants. In addition to Wilson's work at CalPoly SLO, biotechnology workshops focusing on soils from Lab 2 Land (Zimring), as well as Stanford bio-engineering (Appel) research have focused on conceptualizing, developing, and testing "greener," and more sustainable solutions to reduce ignitions and fire severity through investigations into gel retardants, soil characteristics, and land management practices.

Deeper understanding work advancing the pre-fire communities strategy has been significant. The UC Berkeley Firelab (Gollner) and Colorado State University (Mahmoud) have established and compared approaches to their stochastic and deterministic models to predict wildfire damage occurring in the built environment. These novel models – Gollner's "WU-E", or an end-to-end Wildland Urban Interface modeling system that simulates fires in the wildland-urban interface and Mahmoud's fire pathways modeling, which utilizes a Graph Theoretic approach, consider spread through structures and effects of mitigation, link feedback loops between wildland processes and the built environment, and integrate with existing frameworks. Mahmoud's work may be used in SPARK projects for vulnerability, risk, and exposure estimates to establish baseline assessments for SPARK locations as they begin to develop their workplans. Cal Poly SLO (Siembieda) presented a calibrated and community specific "Plan Integration for Resilience Scorecard" (PIRS) which enables a community to spatially evaluate its network of plans by systematically scoring wildfire resilience-affecting policies in the parts of the community they affect.

Finally, to advance understanding of the socio-ecological aspects of wildfire – an often underrepresented area of study that the National Academies of Science and Medicine (Thornton) hosted a bi-national workshop on the socio-ecological consequences of fire, in June 2024. UC Santa Barbara



A home protection burn. (Photo: Elizabeth Azzuz)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National Center for Ecological Analysis and Synthesis (NCEAS) (Halpern) is working on fuel break design that can maintain function for fire risk reduction while increasing the social and ecological benefits for Northern Communities. Other deeper understanding work in this area involves Stanford University (Wara) and CalPoly SLO (Frievalt) and others who have been developing workable policy proposals and associated tools to stabilize homeowners insurance availability and price. Finally, in March 2024, the Association for Fire Ecology published a report titled "The Braiding Indigenous and Western Knowledge for Climate-Adapted Forests: An Ecocultural State of Science" which outlines a new approach to forest stewardship that braids Indigenous knowledge and Western science to conserve and restore more resilient forestlands.

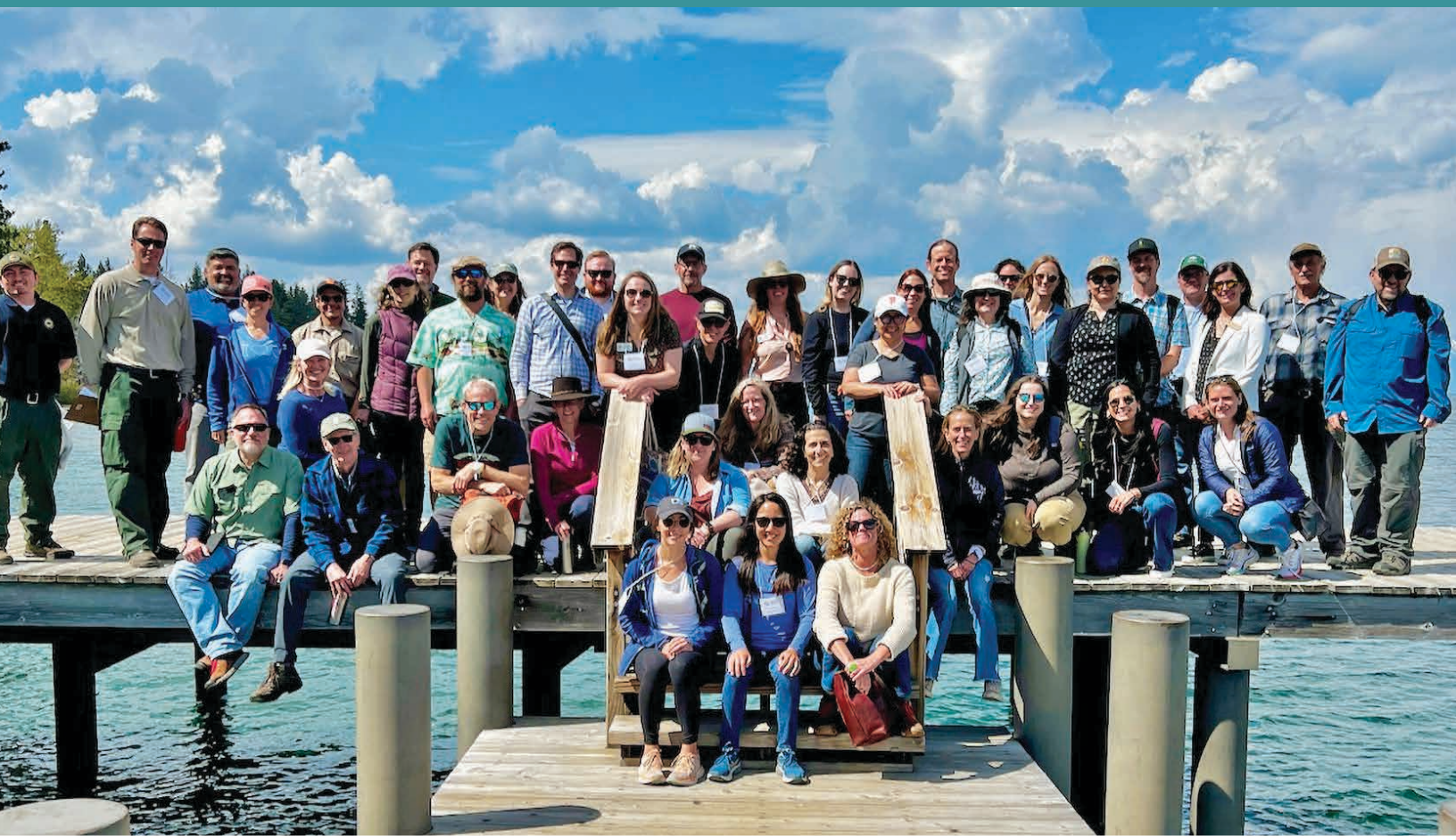
Challenges

Deeper understanding grantees identified many challenges. Some that were consistent across most projects were indicative of a current lack in available data or significant uncertainty existing due to unknown conditions in current and/or future ecological systems. Identified challenges include: (1) data or knowledge gaps in terms of populating models or other mapping efforts – this includes both data availability and consistency, (2) limited evaluation of treatment efficacy (forests/ecosystems) over space and time, (3) specific to insurance, identifying an acceptable policy approach that will meet financial and economic challenges, (4) difficulties synthesizing diverse information into modeling frameworks that can best support decision making, (5) time commitments, including time needed for coordination and integration with other efforts, (6) building trust, and (7) moving from research results to implementation.

Opportunities

Paving the way for next steps, and identifying important areas of future focus, deeper understanding grantees also identified the following opportunities: (1) There is a need to better understand the effective approaches to fire management and decision-making that are not being used to full advantage, such as land-use planning. (2) Currently there are no models able to capture wildfire damage at a community scale – here we can develop methodologies to inform "mitigations that matter" most to achieve long term community wildfire resilience. (3) Developing better ways to characterize vegetation composition and structure using near and remote sensing techniques have potential to improve models and subsequent decision-making, planning, and management. (4) New partnerships and network connections developed through grant work are opening new doors toward increased beneficial outcomes. (5) Building on interest and willingness amongst a wide range of groups including decision makers, rights holders, state and federal agencies, tribes, and communities to broaden partnerships and enhance collaboration, particularly around including or enhancing data-driven insights into management or policy frameworks, or on-the-ground SPARK pilot project outcomes.

Aspiring fire lighters learning how to operate a "slip on engine" from Elizabeth Azzuz, Cultural Fire Management Council. (Photo: Margo Robbins)



Wildfire Resilience Funders Network annual convening at Lake Tahoe, May 2023. (Photo: John Nordgren)

Enabling conditions

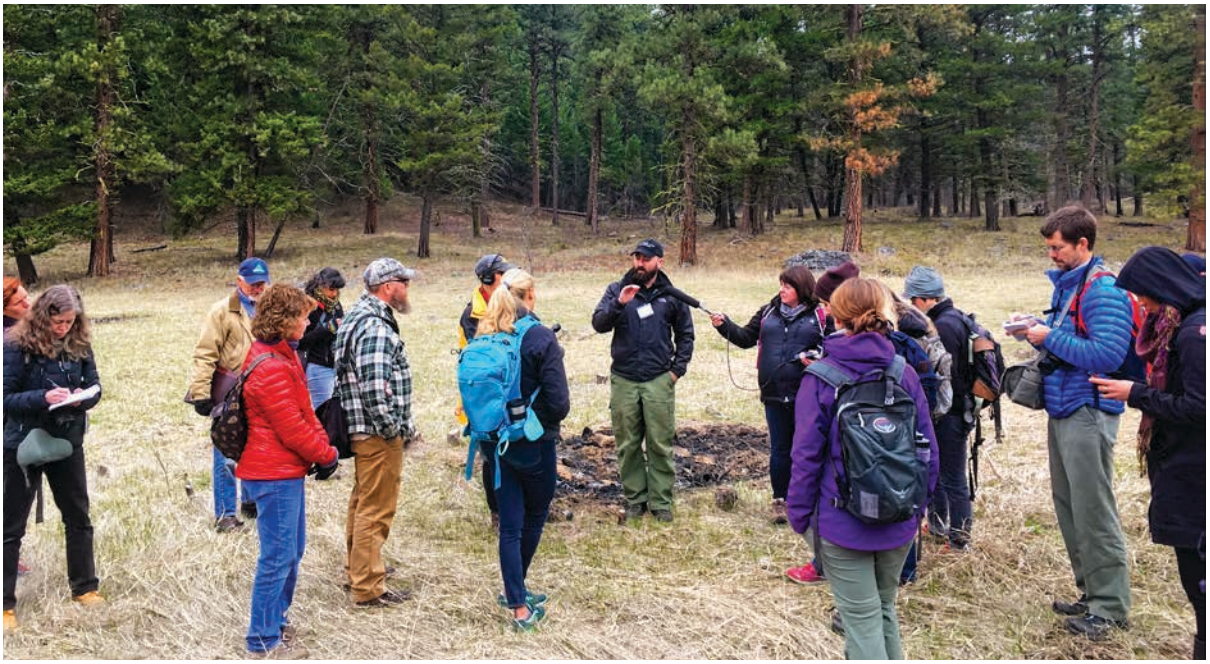
The "enabling conditions" strategy consists of several grants that serve as linkage elements among other strategies and that accelerate or increase likelihood of initiative success, reach, positive impact, or durability.

Alignment is one key enabler, grants supporting work to foster alignment and incentives include building a wildfire community map and member database; state-level, US federal, and Canadian policy analyses; tracking and reporting of wildfire funding; coordination of philanthropic wildfire funders; work to align private sector incentives with wildfire resilience; convening tech entrepreneurs, policymakers, and agency and fire management personnel; and nurturing pathways to global reach for solutions through sub-national and national partnerships. Other grant-funded efforts within this strategy are cultivating more rapid innovation to address pace and scale challenges, and tracking gaps and progress within the FireTech community.

Progress

Enabling conditions grantees—including Resources for the Future, Federation of American Scientists, POLIS Wildfire Resilience Project at the University of Victoria's Centre for Global Studies, and Stanford University — have proposed innovative wildfire policy concepts. The Pacific Forest Trust carried out an extensive analysis and assessment of Siskiyou County (CA) and its associated watersheds, aggregating key information to understand fire history, and importantly, identifying a number of components ripe for opportunity around fuels reduction, ecological health, WUI development, community coordination and planning frameworks to enable the long term resiliency of this key headwaters region in CA. For some of these projects, other Wildfire Resilience Initiative grantees have been enlisted to help shape concepts that would help enable durability for their own grant-supported outcomes. A coalition among the Northern Sierra Partnership, Resources Legacy Fund, Sierra Business Council, and The Nature Conservancy is identifying mechanisms and conceptual policy for long-term state funding for wildfire in California. Virridy has been studying market methodologies and mechanisms that promote watershed health and wildfire resilience while leveraging avoided carbon emissions through averted need for gray water infrastructure.

Other alignment projects include supporting development of a Wildfire Resilience Funders network that now numbers more than 75 funding organizations participating in online and in-person meetings, developing action groups around topics of shared concern, and identifying opportunities to improve alignment and maximize impact. Conversa Corps has built a searchable 8,000-member wildfire community member database called the "Aid Arena" and curated communications via Slack to connect new groups. The Institutes for Journalism for Natural Resources convened journalists to experience the wildfire challenge through a week-long field trip, curating speakers to illustrate the nuance and complexity of wildfire management.



Journalists learn about fuel reduction during a training program with the Institute for Journalism & Natural Resources. Suggested (Photo: Dave Spratt)

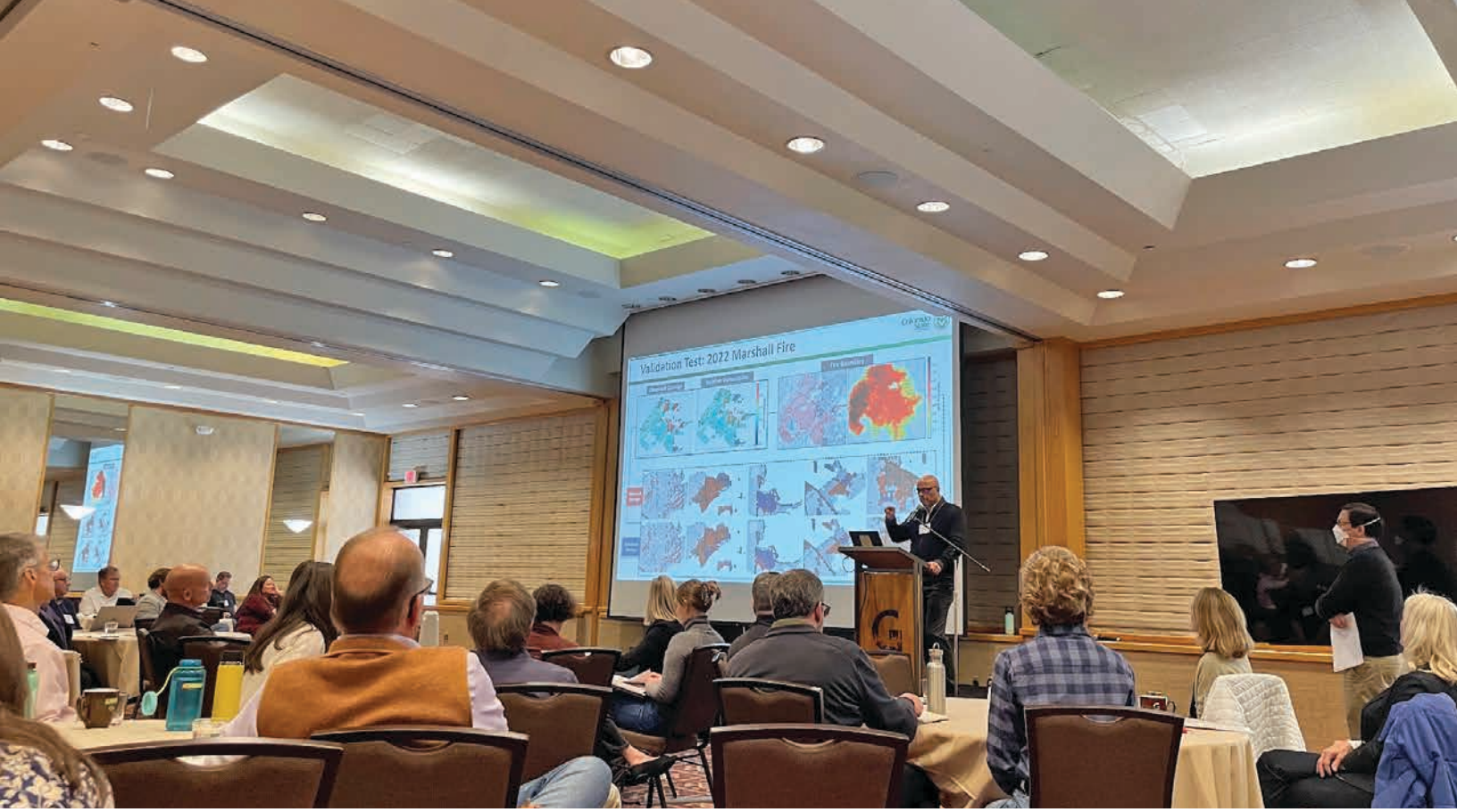
In addition, innovation projects through the Western Fire Chiefs Association and California Fire Chiefs Foundation and partners have been building the enabling environment for "mitigations that matter" to be implemented, to achieve more resilient communities. These projects focus on five enabling tasks to operationalize the ideal state: a WUI "Data Commons" now in development, a WUI Response Rating now piloted, fire spread models now developed for the built environment with structures as a new fuel type, and coalescence in progress around a well-defined set of core parcel and community-level "mitigations that matter."

Challenges

The most significant challenges include adequate and sustained funding and workforce, alignment of diverse stakeholders, and agreement on strategic priorities across government and across sectors. The added uncertainty of the national election may also present a challenge – but wildfire tends to bridge rather than exacerbate divisions, and opportunities to continue fostering conditions for success will persist.

Opportunities

Grantees emphasized opportunities to increase collaboration among wildfire stakeholders including utilities, insurance, reinsurance, and the ag sector. Grantees cited opportunities stemming from a growing public awareness of the benefits of "controlled burns" and ecologically beneficial fire. They also pointed to the new and strengthening relationships between the wildfire community and other sectors, including industry, government, and philanthropy. Increased future alignment and new agreements were seen as important drivers of the changes we will need as conditions for high severity fire increase in coming decades. Finally, and particularly in some of the regional assessments offered, convening participants highlighted that this current time and environment are ripe for major cultural and practical shifts in forest stewardship, mitigation, and coordination.



Dr. Mahmoud (Colorado State University) presents on his fire pathways modeling work at the 2024 grantee convening. (Photo: Ana Tamargo)

Measurement & Evaluation

Our Measurement & Evaluation strategy stems from the Moore Foundation's approach to philanthropy. As our chief adaptive management and evaluation officer, Richard Margoluis, wrote in 2019:

> Our founders instilled in us a dogged focus on outcomes and measurement. But they also insisted that the foundation — and those of us who work within its four walls —practice with humility… As a scientist, Gordon knew he did not have all the answers, and he also knew what he wanted to accomplish. He knew the best way to get the right answers was to get the right people, ask the right questions, set up experiments, test, succeed, and fail, in order to learn, adapt and improve quickly.

From the outset of our Wildfire Resilience Initiative, we have set aspirational and quantitative goals for the initiative outcome, believing that our grantees can, working together, accomplish these—and recognizing that we have been afforded an extraordinary opportunity to support their brilliant work and diligent efforts to learn, adapt, and improve quickly. To support this group exercise in adaptive management, we have channeled some of the initiative's resources to establishing baselines and assessing past fire incidence and severity (e.g., through support to USGS to study changing fire effects over forty years), and also to help inform and assess future decision making through quantitative measurement of wildfire resilience (i.e., through support for the creation of the flexible, open access Western Wildfire Resilience Index in development at the UC Santa Barbara National Center for Ecological Analysis and Synthesis (NCEAS).

Progress

As a whole, grant-funded work within our "measurement and evaluation" strategy is helping to identify and adapt meaningful indicators and outcomes and impact metrics – not just for our own internal adaptive management, but as a contribution to the broader wildfire resilience community.

Within USGS, the fire science team at the Earth Resources Observation and Science Center has used data from the Monitoring Trends in Burn Severity program to study spatial and temporal trends in burned area, burn severity, and vegetation recovery within the contiguous US, Alaska, and Hawaii.

At NCEAS, the core project team for the Western Wildfire Resilience Index has been established, and experts convened in a workshop to begin to formulate the Index framework and finalize and document data needs. Scores will be updated annually to track performance, and reported at different scales, to allow for local and regional management and to help operationalize the concept of resilience.

Challenges

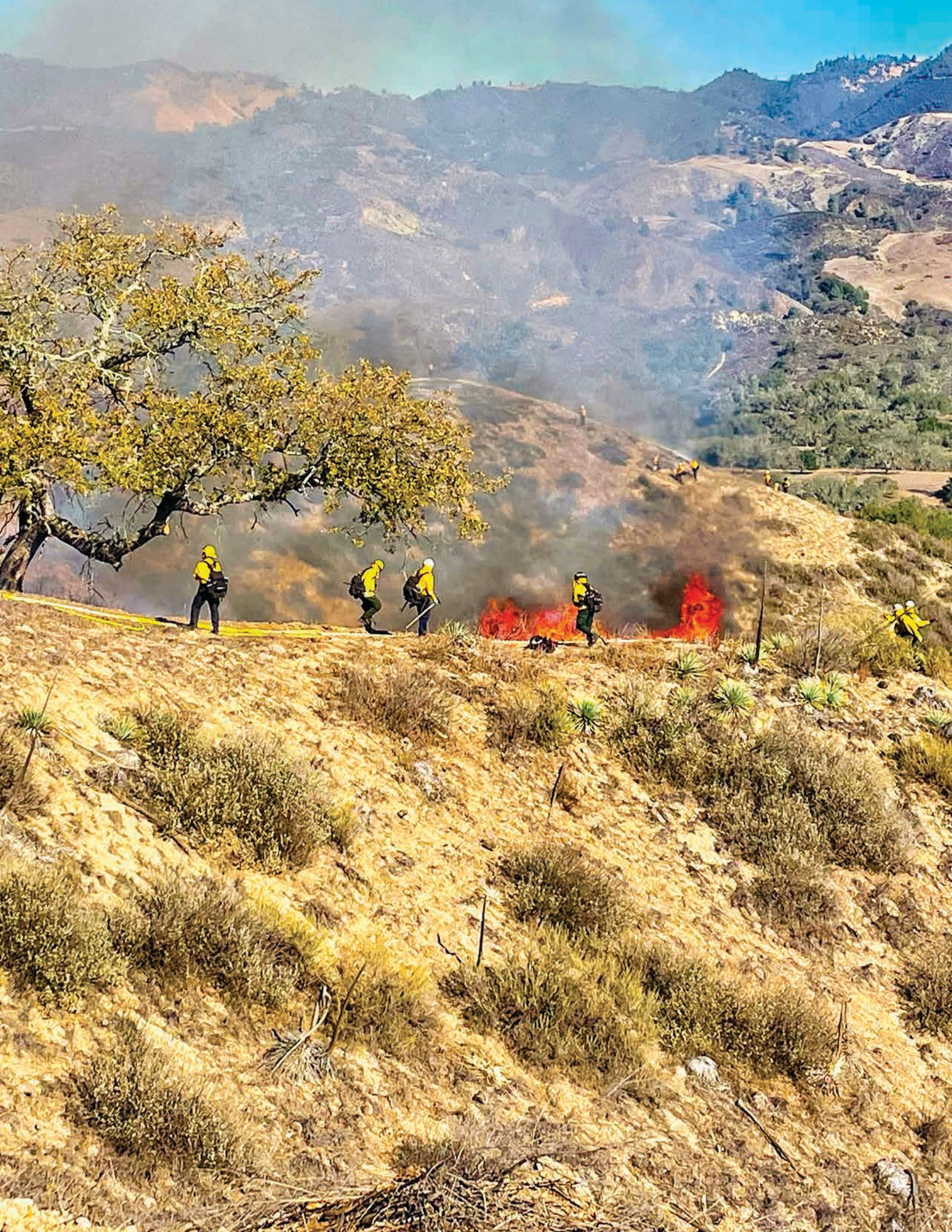
Challenges for measurement and evaluation of past or future wildfire impacts and resilience stem from diversity of geographic range and scales of interest. Retrospective study, this arises in investigating how fuel treatments affect burned area and burn severity at multiple scales, and in relating burned area and burn severity to fire behavior models and fire/postfire risk models. This is further complicated by the multiple environmental and fire response factors that affect burned area and burn severity.

For example, to create the Western Wildfire Resilience Index, a key challenge is aligning common metrics, which are fed by data that can be found and harmonized, and will be relevant across Western North America. The sheer scale and significant differences in ecosystems, in demographic patterns, and other factors across the full geography impact the types, quality, and availability of necessary data.

Opportunities

We have a wealth of data to help shape our approaches to measurement and evaluation of progress toward more resilient fire-prone communities and healthier fire-adapted ecosystems across Western North America – and the project teams working to synthesize and understand these data bring a great deal of creativity and ingenuity to the work. By finding the right balance between including enough of the data and enough of the heterogeneity for accuracy and meaningful observations of difference, but without so much complexity that comparison and relative understanding of progress remain elusive, we have an opportunity to learn faster and better by having a broad view of changing fire regimes and wildfire resilience across time and space. Grantees are actively seeking agency partners for collaboration, new data and new data streams as technological abilities continue to evolve, and sustainment of tools that yield insights and useful measures.

TREX training prescribed burn at UC Santa Barbara Sedgwick Reserve. (Photo: Marion Wittmann)



CONCLUSION

The last time the Moore Foundation's wildfire grantees assembled, the meeting was held virtually and pre-dated approval of the foundation's Wildfire Resilience Initiative. In that March 2022 meeting, grantees from the exploratory wildfire portfolio expressed a desire, "above all," for a "unified vision on how to establish resilient fire-prone communities and healthy fire-adapted ecosystems…With common, measurable goals identified and an overarching consensus strategy established, we believe that well-coordinated federal and state initiatives–in concert with new philanthropic investments, private sector engagement, and public support–could have a significant impact on limiting catastrophic megafires, increasing our ability to live with beneficial fire, and strengthening ecosystem and community resilience."

The foundation's Wildfire Resilience Initiative grantees have now begun implementing this vision, already achieving measurable project-level outcomes. They are also working collectively—with common, measurable goals identified—and capturing synergy among projects and among strategies to achieve even more, better, and faster. When surveyed at the conclusion of the meeting, above all, grantees reported feeling "energized." Multiple votes were also cast for "connected," "committed," and "inspired." Grantees have identified significant challenges that must be overcome or circumvented to achieve healthy fire-adapted ecosystems and resilient fire-prone communities, and they are capturing and exchanging those lessons, pressing forward, and securing important early gains.

TREX training prescribed burn at UC Santa Barbara Sedgwick Reserve. (Photo: Hannah Etchells)

WILDFIRE RESILIENCE INITIATIVE GRANTEE CONVENING

ANNEX A: ATTENDEE ORGANIZATIONS

Alaska Venture Fund

California Academy of Sciences

California Wildfire and Forest Resilient Task Force

California Polytechnic State University San Luis Obispo

Cary Institute of Ecology

City of Flagstaff

Climate and Wildfire Institute

Climate Resilience Fund

Colorado River Sustainability Campaign

Colorado State University

Conservation Innovations Group

Conservation X Labs

Conversa Corps Incorporated

Cultural Fire Management Council

Earth Fire Alliance

Environmental Data Science Innovation and Inclusion Lab (ESIIL)

Environmental Defense Fund

Federation of American Scientists

Fireball Information Technologies, LLC

Flagstaff Fire Department

FUEGO

Institute for Journalism & Natural Resources

International Association of Fire Chiefs

Karuk Tribe

Lab 2 Land Institute

Lasair Fire Consulting Group LLC

Megafire Action

Moraga-Orinda Fire District (MOFD)

NASA

National Academies of Sciences, Engineering, and Medicine

National Center for Atmospheric Research

Northern Sierra Partnership

Pacific Forest Trust

POLIS, Centre for Global Studies, University of Victoria

Rain Industries Inc.

Resilient Cities Catalyst

Resources for the Future

Resources Legacy Fund

Santa Barbara County Fire Safe Council

Sierra Business Council

Stanford University

Susan Bell & Associates

The Nature Conservancy

The Stewardship Network

United States Forest Service

United States Geological Survey, Ecosystems

University of California, Berkeley

University of California, Cooperative Extension

University of California, Davis

University of California, Santa Barbara

University of Colorado, Boulder

University of Montana

University of Wisconsin-Madison

Virridy Inc.

Western Fire Chiefs Association

XPRIZE

WILDFIRE RESILIENCE INITIATIVE GRANTEE CONVENING

ANNEX B: GRANTEE BIBLIOGRAPHY

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