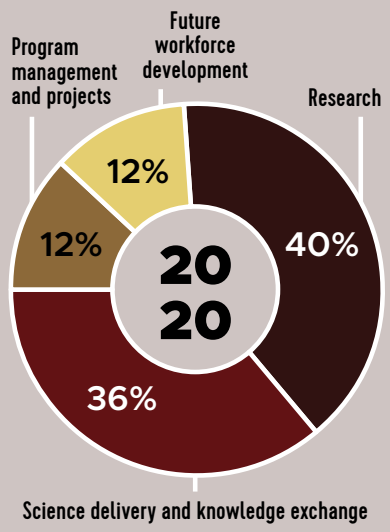
2021 JFSP PROGRESS REPORT

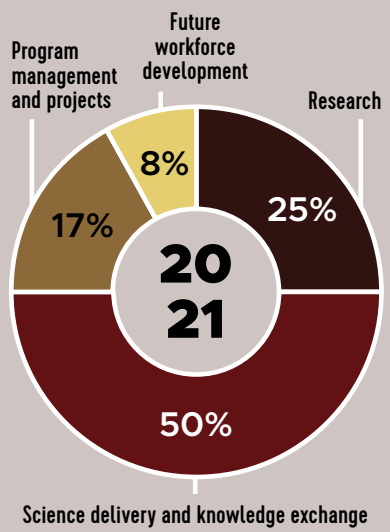
INTRODUCTION

Since 1998, the Joint Fire Science Program (JFSP) has provided funding and science delivery for scientific studies associated with managing wildland fire, fuels, and fire-impacted ecosystems to respond to emerging needs of managers, practitioners, and policymakers from local to national levels. Over the past 23 years, the program has funded high-priority science needs to assist decision makers in the field through annual funding opportunity announcements. The JFSP continues to deliver science of high value through projects carried out by researchers and graduate students and delivered to those in the field through a well-coordinated exchange network (Fire Science Exchange Network). This report summarizes fiscal year (FY) 2020 and FY 2021 program accomplishments related to funded research, science delivery, exchange highlights, and more.

BUDGET

The JFSP Governing Board utilizes a dynamic investment strategy to guide the program's spending. In FY 2020 and FY 2021, the JFSP operated at $7.3 million and $6 million, respectively. Split into four categories, the JFSP budget goes towards supporting science delivery and knowledge exchange, research, future workforce development, and program management and projects. Moving forward, the program will continue to use the investment strategy along with research and science needs to determine spending levels.





SUMMARY OF FY 2020 AND FY 2021 FUNDED RESEARCH

In FY 2020, the JFSP funded 4 core research projects and 11 Graduate Research Innovation (GRIN) projects out of 31 proposals received (Table 1). The four core research projects funded fall under task number 20-2-01: Performance of fuel breaks and fuel break systems.

TASK 20-2-01:
Performance of fuel breaks and fuel break systems

The objectives of this task statement are to: (1) identify or develop metrics (standards) to assess fuel break and fuel break system performance in terms of controlling wildfire behavior, aiding in wildfire suppression operations, and minimizing wildfire risk and impacts to valued resources; (2) evaluate fuel breaks and fuel break systems using these metrics; and (3) identify necessary improvements in the implementation of operational fire behavior models and their data input requirements relative to assessing fuel break and fuel break system performance.

TABLE 1. Number of FY 2020 research proposals received and funded by the JFSP, by research topic.

Task Number	Research Topic	Proposals Received	Proposals Funded
20-1-01	Graduate Research Innovation (GRIN) Award	21	11
20-2-01	Performance of fuel breaks and fuel break systems	10	4

In FY 2021, the JFSP funded 6 core research projects and 12 GRIN projects out of 62 proposals received (Table 2). Three of the core research projects fall under task number 21-2-01: Sources and distribution of human-caused ignitions and their relation to wildfire impacts. The other three core research projects fall under task number 21-2-02: Reducing damages and losses to valued resources from wildfire.

TASK 21-2-01:
Sources and distribution of human-caused ignitions and their relation to wildfire impacts

The objective of this task statement is to inform effective fire prevention strategies by providing information on the spatial and temporal distribution of different human-caused wildfire ignition sources and factors that lead to development of large wildfires.

TASK 21-2-02:
Reducing damages and losses to valued resources from wildfire

The objectives of this task statement are to: (1) understand the role of changing fuel conditions from active management and fire suppression operations on reducing wildfire-induced damages and losses to valued resources and (2) use gains in knowledge to evaluate wildfire risk assessments and inform the development of outcome-based metrics used to assess potential impacts (benefits, as well as damages and losses) of wildfire to valued resources.

TABLE 2. Number of FY 2021 research proposals received and funded by the JFSP, by research topic.

Task Number	Research Topic	Proposals Received	Proposals Funded
21-1-01	Graduate Research Innovation (GRIN) Award	35	12
21-2-01	Sources and distribution of human-caused ignitions and their relation to wildfire impacts	9	3
21-2-02	Reducing damages and losses to valued resources from wildfire	18	3

SUMMARY OF FY 2020 AND FY 2021 COMPLETED PROJECTS

In FY 2020 and FY 2021, the JFSP received 29 and 28 final reports (Tables 3 and 4), respectively, on research it funded.

TABLE 3. Final reports funded by the JFSP that were completed in FY 2020.

Project ID	Principal Investigator	Title
18-1-01-18	Dennis R. Becker	Toward fire-adapted rangeland communities: A policy analysis of outcome-based approaches to managing wildfire risk in Idaho
18-1-01-37	Eva K. Strand	Effects of scale for assessing fuel treatment effectiveness and recovery post-fire in ponderosa pine
18-1-01-48	Trevor T. Caughlin	Impact of unburned remnant sagebrush versus outplants on post-fire landscape rehabilitation
17-1-05-5	Jordan G. Powers	Use of NWP models to identify convective outflows for fire weather forecasting
17-2-01-8	Wayne P. Sousa	Controls of post-fire N retention in California chaparral: Mammalian herbivores and ephemeral herbs
17-2-01-11	Eva K. Strand	Assessing post-wildfire conifer regeneration: Validation of a non-destructive seedling aging method
17-2-01-23	Scott L. Stephens	Predicting forest recovery following high-severity fire
16-1-01-15	Philip E. Higuera	Climate variability and post-fire forest regeneration in the Northern Rockies
16-1-01-18	Courtney A. Schultz	Impacts of climate and management options on wildland fire fighting in Alaska: Implications for operational costs and complexity under future scenarios
16-1-01-20	Penny Morgan	Post-fire tree regeneration and fuels across the Northern Rockies following large wildfires: Science meta-analyses, scenarios and manager workshops
16-1-02-19	Robert K. Grala	Determining public influences on managers' decisions regarding prescribed fire in longleaf pine ecosystems
16-1-03-25	Becky K. Kerns	Long-term effects of restoration treatments in a Wyoming big sagebrush community invaded by annual exotic grasses
16-1-04-8	Sharon M. Hood	Mortality reconsidered: Testing and extending models of fire-induced tree mortality across the US
16-1-05-20	Jonathan W. Long	Post-fire restoration to avert novel conditions in Sierra Nevada forests
16-1-08-1	Mehmet T. Odman	Southern Integrated Prescribed Fire Information System for air quality and health impacts
16-2-01-26	Ellen I. Damschen	The interactive effects of prescribed fire timing and climate change on Midwestern tallgrass prairie communities
16-3-01-37	Jody L. S. Jahn	Defining "resilient landscapes" from multiple stakeholder perspectives in a wildland urban interface (WUI) area
15-1-01-1	Nancy H. F. French	Mapping fuels for regional smoke management and emissions inventories
15-1-03-6	Erica Fleishman	Relations among cheatgrass-driven fire, climate, and sensitive-status birds across the Great Basin
15-1-03-23	Nancy F. Glenn	Modeling long-term effects of fuel treatments on fuel loads and fire regimes in the Great Basin
15-1-03-26	Andrea E. Thode	Landscape impacts of fire and climate change in the Southwest: A science-management partnership
15-1-04-9	David L. Blunck	Multi-scale study of ember production and transport under multiple environmental and fuel conditions
15-1-04-55	Rory H. Hadden	Measurement of firebrands generated during fires in pine-dominated ecosystems in relation to fire behavior and intensity
15-1-05-13	Brian R. Sturtevant	Manipulating soil heating patterns to optimize barrens restoration
15-1-07-6	Malcolm P. North	Changes in forest vegetation and fuel conditions 15 years after prescribed fire
15-1-07-15	Daniel M. Kashian	Assessing 30 years of changes in vegetation and fuels following wildfire in jack pine forests of northern Lower Michigan
15-1-07-30	Christopher R. Keyes	Lick Creek Demonstration-Research Forest: 25-year fire and cutting effects on vegetation and fuels
14-2-01-6	Miranda H. Mockrin	Trial by fire: Community adaptation and rebuilding after catastrophic wildfire
13-1-04-14	Patrick D. Keyser	Effectiveness of joint fuel treatments and vegetation management in restoring eastern upland oak ecosystems

TABLE 4. Final reports funded by the JFSP that were completed in FY 2021.

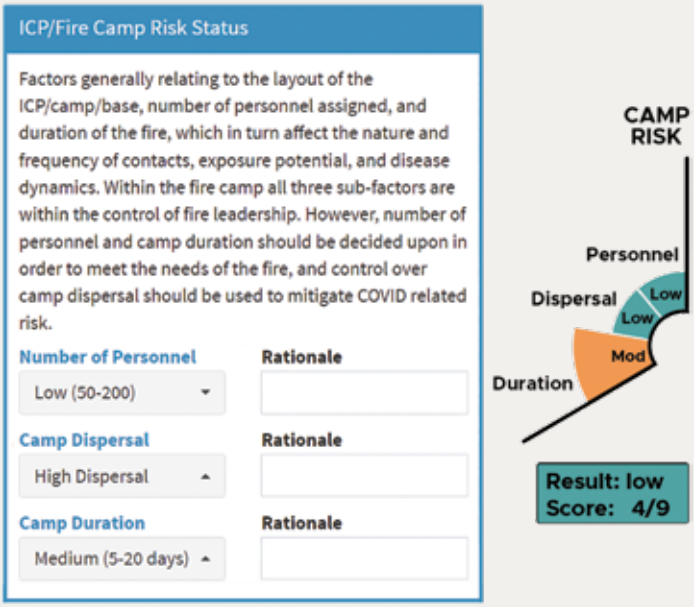
Project ID	Principal Investigator	Title
20-1-01-8	Thomas S. Davis	Effects of prescribed fire restoration treatments on wild bee communities within Colorado
19-1-01-10	James A. Lutz	Interactive effects of fire, drought, and bark beetles on tree mortality
19-1-01-35	Volker C. Radeloff	A multi-proxy approach to understand forested peatland fire regimes at scales relevant to management
19-1-01-49	Andrés Holz	Predicting fire-mediated forest structure over biophysical gradients in moist mixed-conifer forests
19-1-01-55	Alicia M. Kinoshita	Improving post-wildfire peak streamflow predictions for small watersheds and communities
19-1-01-59	Camille S. Stevens-Rumann	The impact of interacting disturbances and climate on tree seedling establishment in high elevation forests
19-S-01-1	J. Morgan Varner III	Coproduction of wildland fire science: Models to transform the way fire science is applied
18-1-01-17	Jody C. Vogeler	Roles of pre-fire vegetation, soil, and climate in Great Basin ecosystem recovery
18-1-01-49	Anita J. Antoninka	Assessing the contribution of soil faunal complexity to ecosystem services after restoration with thinning and fire
18-1-01-55	Matthew A. Bowker	Elucidating and disseminating the role of fire mosses in post-fire ecosystem recovery
17-1-03-16	Andrew M. Latimer	Optimizing performance of tree planting treatments after severe wildfire
17-1-05-1	John D. Horel	Assessment of HRRR model forecasts of convective outflows in the fire environment
16-1-01-1	Arjan J.H. Meddens	Identifying and protecting wildfire refugia in a warmer, drier Pacific Northwest
16-1-01-8	Daniel H. Mann	Alaskan tundra fires during a time of rapid climate change
16-1-01-21	Becky K. Kerns	Ecosystem change in the Blue Mountains ecoregion: Exotic invaders, shifts in fuel structure, and management implications
16-1-02-5	Erica A.H. Smithwick	Firescapes in the mid-Atlantic: Mismatches between social perceptions and prescribed fire use
16-1-02-8	Courtney A. Schultz	Policy barriers to prescribed fire: Identifying opportunities and mechanisms for change
16-1-04-2	James A. Lutz	Using multi-scale spatial data to improve predictions of immediate and delayed fire mortality
16-1-05-8	Matthew D. Hurteau	Quantifying the effects of post-fire decision-making on forest recovery in a severely burned southwestern landscape
16-1-05-11	J. Boone Kauffman	Post-fire landscape management and fire severity influences in Western Oregon forests
16-1-05-13	Michelle L. Coppoletta	Effects of post-fire management on vegetation and fuels following successive wildfires in mixed conifer forests
16-1-05-24	Andrew J. Larson	Landscape evaluations and prescriptions for post-fire landscapes
16-1-06-12	Donald L. Hagan	Community and ecosystem-level effects of growing v. dormant season burning in the southern Appalachians
16-3-01-4	Monica G. Turner	What makes for a resilient landscape? Climate, fire and forests in the Northern Rockies
16-3-01-10	Heidi R. Huber-Stearns	Integrating social and ecological resilience into forest management planning
15-1-03-35	Clare E. Aslan	Assessing the implications of changing fuels and fire regimes on management and resiliency in the Southwest
15-1-07-1	Margaret M. Moore	Restoration experiments in ponderosa pine at Fort Valley Experimental Forest: Twenty years post-fire
14-1-01-18	Chad M. Hoffman	Assessing factors that influence landscape fuels treatment effectiveness

PROGRAM MANAGEMENT

The following are some examples of small dollar projects the program funds outside the competitive process.

COVID-19 Incident Risk Assessment Tool

Jointly funded by the JFSP, Colorado State University, and the U.S. Department of Agriculture Forest Service, the COVID-19 Risk Assessment Tool was developed to support line officer and incident manager assessment of COVID-19 risk in fire camps at the incident level. It was created by Jake Dilliott, Erin Belval, Jude Bayham, and Matthew Thompson of the COVID-19 Fire Modeling Team. A numerical risk score and visual graphic is generated based on user inputs for three risk factors and nine subfactors. This tool has and will continue to play a valuable role in addressing firefighter safety. Access the tool by clicking on the image or scanning the QR code.



Metrics for Resilience

In FY 2016, the JFSP solicited proposals that explore ecological and social dimensions of resilient landscapes, especially considering changing climates. Several projects supported under this funding opportunity announcement completed their analyses in 2020 and 2021. The two examples that follow show some of the completed research related to defining and developing metrics for resilient landscapes. These projects succeeded in meeting the goals of the proposal solicitation, which was to stimulate innovative thinking and generate new ideas and concepts that could help fire, fuels, and resource managers better understand how to develop measurable objectives leading to more resilient landscapes.

PROJECT #: 16-3-01-4

Title: What makes for a resilient landscape? Climate, fire, and forests in the Northern Rockies

Investigators: Monica Turner, Adena Rissman, A. Leroy Westerling, and Rupert Seidl

Objectives:

- Quantify ecological and social dimensions of resilience for Northern Rocky Mountain forests and develop innovative, widely applicable scientific methods for operationalizing forest and landscape resilience concepts.
- Compare outcomes under a range of management options and generate new understanding of how land managers and communities may enhance landscape resilience and balance tradeoffs in a changing climate.

Key Findings:

- Climate-driven change in fire regimes rather than climate change per se is likely to be the proximate cause of substantial 21st-century changes in Northern Rocky Mountain forests.
- Postfire tree regeneration, which is critical for sustaining forest resilience, is projected to decline if more frequent fires reduce local seed availability, larger burn patches exceed effective dispersal distances, and postfire climate condition are not conducive to seedling establishment.
- Forests dominated by fire-sensitive tree species (e.g., Engelmann spruce, subalpine fir, lodgepole pine) are likely to show the greatest declines, whereas forests dominated by fire resisters (e.g., Douglas-fir, larch) and resprouters (e.g., aspen) will be more resilient.

PROJECT #: 16-3-01-24

Title: Identifying ecological and social resilience in fire-prone landscapes

Investigators: Philip E. Higuera, Elizabeth C. Metcalf, Alexander L. Metcalf, Carol L. Miller and David B. McWethy

Objectives:

- Define ecological and social resilience of fire-prone landscapes.
- Understand community perspectives of social-ecological resilience of fire affected communities in the Northern Rockies and interior Pacific Northwest.
- Identify management-relevant dimensions of social-ecological resilience.

Key Findings and Deliverables:

- The value-free and value-explicit framework, developed to highlight varying dimensions of resilience and aid managers, community members, and researchers in considering strategies and priorities for social-ecological resilience to wildfire.
- A second framework for expanding the definition and consideration of resilience beyond “basic resilience” to include adaptive and transformative resilience, specifically for systems undergoing directional change due to climate, land use, and other global change.
- A practical guide and structured approach to applying these frameworks to help natural resource managers and other stakeholders develop strategies to support social-ecological resilience in flammable landscapes.
- A master’s thesis that documents insights into community resilience from survey results and key informant interviews.

Post-Fire Recovery and Management

In FY 2016, the program solicited proposals to investigate the effectiveness of post-fire management activities in forested and nonforested ecosystems. These projects have led to several regional syntheses and guides for approaching management of burned landscapes under climate change. Here are some key findings from five of the funded studies.

16-1-05-8: Quantifying the effects of post-fire decision-making on forest recovery in a severely burned southwestern landscape

In the southwestern U.S., distance to seed source and hot, dry conditions in high-severity patches is limiting tree regeneration. Researchers sought to determine how planted seedling survival and growth would vary as a function of aspect and vegetation cover type in the footprint of the 2011 Las Conchas Fire in northern New Mexico. They found that topographic wetness index and topographic roughness index were good predictors of both survival and growth. They also found that increasing fire probability can prevent the establishment of tree seedlings following high-severity wildfire, causing the transition from forest to nonforest to be reinforced.

16-1-05-11: Post-fire landscape management and fire severity influences in Western Oregon forests

Researchers quantified total aboveground biomass and composition in forest stands following low-, moderate-, and high-severity fires 15 (2002 Apple Fire) and 29 years (1991 Warner Creek Fire) following fire in low elevation, old-growth forests dominated by Douglas-fir. They also sampled post-fire responses in forest plantations (harvested prior to fire) and salvage-logged sites (harvested after fire) in the same fires. In spite of differences in overstory mortality, there was no significant difference in the total aboveground biomass between the low-, moderate-, and high-severity fires 15 years following fire (Apple Fire). Similarly, there was no significant difference between the low- and high-severity burns 29 years following fire (Warner Creek Fire). Modeled reburn at 15 and 29 years following fire had reduced rates of spread and flame length in low-severity plots, while salvage logged (Apple Fire only) and high-severity plots (Apple and Warner Fires) had higher intensity fire behavior. Reaction intensity was greater than 40% higher in plantation plots than any other plot type due to increased density of small live and dead shrubs and trees. This research highlights the management tradeoffs involving values relating to carbon storage, wood harvest, and reburn risk reduction following wildfires.

16-1-05-13: Effects of post-fire management on vegetation and fuels following successive wildfires in mixed conifer forests

The results of the study suggest that post-fire vegetation structure and woody fuels play an important role in subsequent fire severity patterns and ultimately influence the resilience of post-fire landscapes to future fire. In areas where high-severity reburn is undesirable, managers should consider treatments that reduce the density and continuity of vegetation, standing snags, and large woody surface fuels. In areas where proactive reforestation is necessary, planting in areas that are in rough or mesic terrain may reduce the likelihood of high-severity reburn. The results also suggest that active post-fire management may be necessary in areas that have burned at low to moderate severity in order to maintain or promote the restorative benefits of an initial fire or to restore the dominance of fire resilient tree species.

16-1-05-20: Post-fire restoration to avert novel conditions in Sierra Nevada forests

Investigators in this study suggest that high-severity fire can be both restorative and degradative in areas that historically evolved with regimes dominated by frequent, predominantly low- to moderate-severity fire regimes. Because patches of high-severity are becoming so much larger, applying post-fire interventions uniformly across such patches would promote a different kind of homogeneity, associated with potential loss of biodiversity and high fire hazards posed by young forest. Rather than focusing exclusively on the “black” areas of high tree mortality, the surrounding “green” forests that were unburned or burned at low severity warrant attention particularly for prescribed burning, possibly in conjunction with thinning to reduce fuels where needed to safely apply fire. Because changes in climate may affect ecological site potentials, it may be important to modify restoration targets from the historical range of variation.

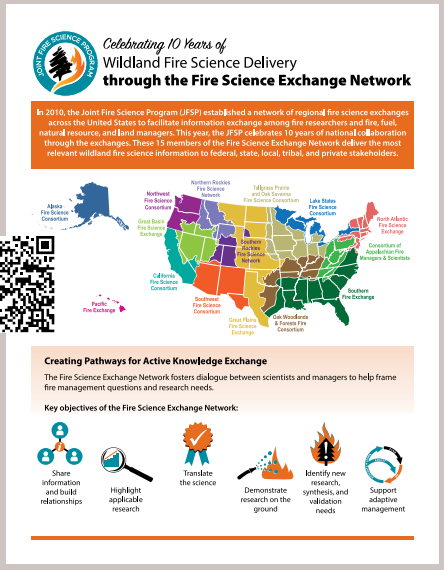
16-1-05-24: Landscape evaluations and prescriptions for post-fire landscapes

Researchers analyzed wildfires to understand drivers of fire severity and post-fire vegetation development, with an emphasis on how pre- and post-fire management and prior disturbance history modulate these responses, and by evaluating the degree to which fire reduced landscape departure and restored fire-prone forest landscapes. The team used field and remote sensing methods to investigate these topics, with forests of northeastern Washington as a model system for their work. Post-fire landscape management principles synthesized from their work include:

- Protect fire refugia and legacy large diameter trees.
- Use places where fire reinitiated or strengthened stabilizing feedbacks as core areas from which to grow forest landscape resilience.
- Differentiate irreversible conversions to nonforest due to climate-limited tree establishment from reversible transitions due to dispersal limitation.
- Align species composition and structure with future fire regimes and climate.

FIRE SCIENCE EXCHANGE NETWORK

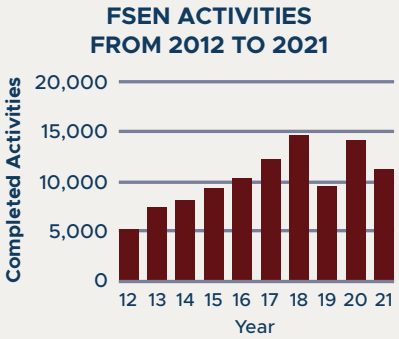
The JFSP established a network of regional fire science exchanges in 2010 across the United States to facilitate information exchange among fire researchers and fire, fuel, natural resource, and land managers. These 15 members of the Fire Science Exchange Network (FSEN) deliver the most relevant wildland fire science information to federal, state, local, tribal, and private stakeholders. In 2020, the JFSP celebrated 10 years of national collaboration through the exchanges. Access the 10-year accomplishment summary by clicking on the infographic image or scanning the QR code.

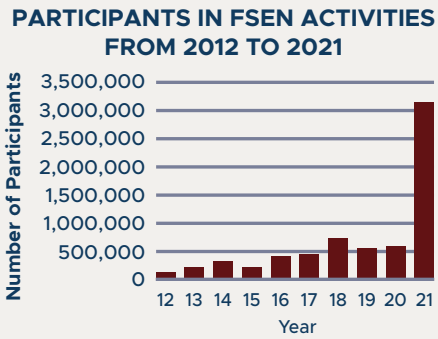


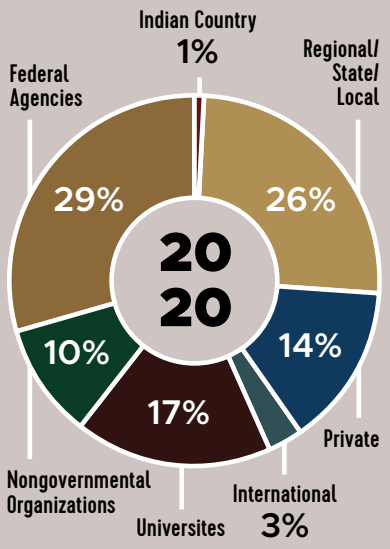
Highlights from 2020 and 2021:

- Produced 352 newsletters
- Published 366 blog posts
- Hosted 376 webinars
- Developed 36 syntheses
- Hosted 211 conferences/workshops
- Developed 606 short courses and continuing education units
- Created 576 video productions

Annual FSEN activities and participation generally have increased from 2012 to 2021. With a continued shift to virtual work, the number of participants attending FSEN activities saw a significant increase from prior years. This increase in participation came from social media-related activities (e.g., tweets, posts). Exchanges were able to reach audiences beyond their region that they would not have interacted under the former exchange business model.







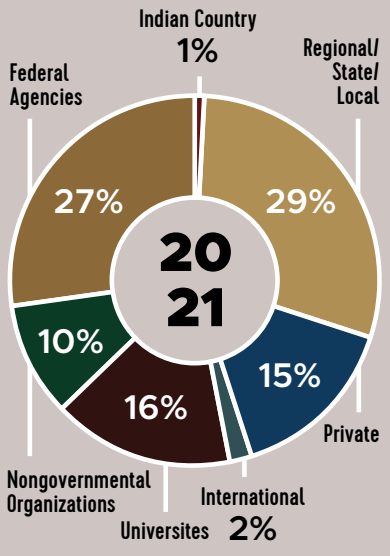


FIGURE 1. Number of Fire Science Exchange Network participants by organizational group in FY 2020 and FY 2021.

Like many other programs in FY 2020, the work carried out by the FSEN was significantly affected by the global pandemic. From March through the end of the fiscal year, all in-person engagements, conferences, workshops, trainings, and leadership briefings were canceled or postponed. Even with these challenges, the exchanges demonstrated a remarkable ability to adapt by finding new and innovative ways to connect with various audiences and successfully carry out their mission and work. Access the FY 2020 annual summary by clicking on the summary image or scanning the QR code.

In FY 2021, exchanges submitted their annual accomplishments in a new format, including stories related to societal impact. Societal impacts are the ways that research influences the world beyond the academic realm, optimizing engagement with societal partners. Various categories of societal impact include instrumental, conceptual, capacity building, connectivity, and socio-environmental. Stories in the FY 2021 annual summary demonstrate the value and impact of FSEN investments in carrying out on-the-ground science delivery activities. Access the summary by clicking on the summary image or scanning the QR code.

Instrumental	Exchange activities or products were instrumental in changes to plans, decisions, practices, or policies related to wildland fire management.
Conceptual	Exchange activities or products contributed to changes in people's knowledge about or awareness of an issue related to wildland fire management.
Capacity Building	Exchange activities or products contributed to enhancing the skills, expertise, or resources of an organization or group of people related to wildland fire management.
Connectivity	Exchange activities or products led to new or strengthened relationships, partnerships, or networks related to wildland fire management that endure after the activities or project ends.
Socio-environmental	Exchange activities or products led to changes to social and/or ecological systems (such as improved health and well-being or ecosystem structure and function) related to wildland fire management.

FSEN Exchange Resource Group

Diversity, equity, inclusion, and justice (DEIJ) are important topics to address, incorporate, and promote in everyday work. Our wildland fire science delivery work is no exception. The FSEN Exchange Resource Group (ERG) supports an organized, intentional approach to DEIJ-centered work within the FSEN. After many fruitful discussions, the ERG team has created a two-page fact sheet to assist exchanges and its partners to thoughtfully and successfully incorporate DEIJ principles into their respective operations. Included in the fact sheet are some suggestions on actions one could take to incorporate DEIJ-centered work in their fire science delivery. Access the fact sheet by clicking on the images or scanning the QR code.

FIGHTING FOR FIREFIGHTER SAFETY

Firefighter safety is the top priority in wildland fire response. With an increase in wildfires across the nation, more firefighters are being mobilized to help. Due to this critical need, the program funded research related to improving wildland firefighter safety. The Southwest Fire Science Consortium—one of JFSP's 15 fire science exchanges—summarized relevant research by assembling a story map focused on three important areas: entrapment avoidance, safety zones, and escape routes. Recognized for its valuable information, the story map was shared nationally and used by many in RT-130 Wildland Fire Safety Training Annual Refresher classes in 2021. To learn more, click on the image or scan the QR code.

Interactive figure on wildland firefighter entrapments.

GRADUATE RESEARCH INNOVATION

Every year, the JFSP invites current master and doctoral students enrolled at colleges or universities within the U.S. in the field of wildland fire and related physical, biological, and social sciences to apply for a Graduate Research Innovation (GRIN) award. The purpose of the award is to enhance student exposure to the management and policy relevance of their research to achieve beneficial outcomes of funded work.

The GRIN program has received kudos from across the fire science community. GRIN funding helps fire science students dig deeper into their thesis or dissertation research. In addition, it gives students a leg up in the professional community, provides experience in developing proposals, helps students become more competent scientists, provides connections with the research and management communities, and more.

In FY 2020, 21 proposals were received, of which 11 were selected for funding. In FY 2021, 35 proposals were received, of which 12 were selected for funding. Click on the images or scan the QR codes to access GRIN recipients and their projects.

Students are asked to address one of the following topic areas in their proposals:

- Fuels management and fire behavior
- Changing fire environment
- Emissions and air quality
- Fire effects and post-fire recovery
- Relative impacts of prescribed fire versus wildfire
- Human dimensions of fire

2020 Graduate Research Innovation (GRIN) recipients

Project Title	Student	University
Less fuel for the fire: How will drought amplify effects of shortinterval fire?	Braziunas, Kristin H	University of Wisconsin-Madison
Effects of prescribed fire restoration treatments on wild bee communities within Colorado	Gelles, Ryleigh V	Colorado State University
Quantifying the effects of heat and drought on southwestern tree seedling mortality	Crockett, Joseph	University of New Mexico
Advancing post-fire tree mortality models to limit fire-induced oak mortality	Jones, Abigail M	Humboldt State University
Refining Post-Fire Hazard Management Tools with Advanced Geomorphic Assessment	Guilinger, James	University of California-Riverside
Goats, Smoke, and Oaks: Prescriptive goat browsing and prescribed fire as a means to halt mesophication and promote biodiversity in Ozark Hardwood Ecosystems	Beebe, Gina R	University of Missouri-Columbia
Demand for prescribed fire on private lands in the MidAtlantic United States	Regmi, Arun	Pennsylvania State University
Evaluating canopy fuels across multiple spatial scales for improved fire modeling	Forbes, Brieanne K	Sonoma State University
Impacts of historical disturbance regimes on avian conservation in eastern tallgrass prairies.	Del Valle, Antonio	Northern Illinois University
Prescribed Fire Effects on Soil Hydraulic Properties and Ecohydrological Function	Quinn, Dylan S	Washington State University-Pullman
Insects and post-fire restoration: Manipulating habitat to encourage beneficial insect communities	Mott, Christine	Northern Arizona University
Mapping the immediate and prolonged impacts of, and adaptations to, fire in the Kenai River fishery	Lamborn, Chase C	Utah State University

2021 Graduate Research Innovation (GRIN) recipients

Title	Contact	Agency/Org
Measuring post-fire resilience of microbial richness, composition, and functions in Chaparral	Pulido-Chavez, M. Fabiola	University of CaliforniaRiverside, Center for Conservation Biology
Forecasting Prescribed Fire Smoke within Vulnerable Communities in Southern Appalachia	Jones, Katherine E	North Carolina State University-Raleigh, College of Natural Resources
Determinants of flammability in the critically imperiled pine rocklands of Long Pine Key	Schneider, Owen P	University of Florida, Department of Wildlife Ecology & Conservation
Patterns of phylodiversity, endemism, and community assemblage in pyrogenic pine savannas	Kinser, Taliesin J	University of Florida, Department of Biology
Southeastern populations impacted by smoke: recent patterns and possible shifts under climate change	Johnson, Megan M	North Carolina State University-Raleigh, College of Engineering
Does high-severity patch structure scale consistently with fire size across the Northwest US?	Buonanduci, Michele S	University of Washington, School of Environmental and Forest Sciences
Tree growth response to multiyear drought events in fire-maintained and fire-excluded semi-arid forests	Willson, Kevin G	University of New Mexico, Department of Biology
Modeling the impacts of urban fire and vegetation management on flooding and sedimentation	Hunt, Danielle S	San Diego State University, Civil, Construction, and Environmental Engineering
Abducted by avians: the presence of avifauna in pinon-juniper woodlands in the post-fire environment	Woolet, Jamie	Colorado State University, Department of Forest, Rangeland & Watershed
Stewardship Modeling for Management Decision Support: Tools for tracking long-term post-wildfire hydrologic recovery	Ammon, Jaz K	University of Idaho, Department of Biological & Agricultural Engineering
Low-cost UAS platforms to quantify and predict post-fire recovery in arid shrublands.	Zaiats, Andrii	Boise State University, Department of Biological Sciences
Soil Microbiome Recovery Across a Multi-Decadal Severe Wildfire Chrono-sequence	Nelson, Amelia R	Colorado State University, Department of Soil & Crop Sciences

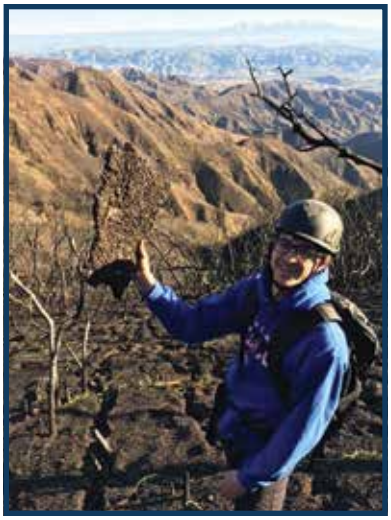
GRIN Profile: James Guilinger

James J Guilinger received a GRIN award as a PhD candidate at University of California, Riverside, Department of Environmental Science. He is now a postdoctoral scholar at University of California, Irvine, Department of Civil and Environmental Engineering.

JFSP PROJECT 20-1-01-12: Refining post-fire hazard management tools with advanced geomorphic assessment

What do you hope to accomplish through your research?
In my JFSP GRIN project, we are interested in using high-resolution airborne laser mapping data (lidar) to understand what controls the amount of sediment available for erosion following wildfire in steep headwater catchments that are prone to producing hazardous debris flows. Thus far, we found that a significant amount of sediment eroded in burned headwater catchments in southern California is sourced from longer term sediment accumulations in swales and valley bottoms and that fire history (e.g., time between fires) is well-correlated with the degree of sediment removed from channels by post-fire runoff events.

Are you interested in a particular fire science career path?
During graduate school, I found that I really enjoyed teaching and found a passion for advancing geological research that has applications to hazard and natural resource management, which I am continuing with in my postdoctoral position. Thus, my ideal career would be a professor at an institution that strongly values teaching and supports student-led applied research, with an emphasis on field work and remote sensing.



GRIN Profile: Kristin Braziunas

Kristin Braziunas received a GRIN award as a PhD student at the University of Wisconsin-Madison, Department of Integrative Biology. She is currently a postdoctoral researcher at the Technical University of Munich, School of Life Sciences.

JFSP PROJECT 20-1-01-6: Less fuel for the fire: How will drought amplify effects of short-interval fire?

What do you hope to accomplish through your research?
I hope to improve our understanding of how forests will respond to simultaneous changes in climate (warming and drying) and more frequent fire that are expected over the 21st century. With GRIN funding, I measured post-fire forest recovery in the Greater Yellowstone Ecosystem, Wyoming and Montana, in forests that historically burned infrequently (every 100-300 years) but have recently burned twice in less than 30 years. Fire in these subalpine forests tends to be severe, killing all of the trees. I also hope to show how emerging technologies can support science communication and to develop methods that can help measure forests and fire effects. To do this I collected photos, videos, and data with a drone in young, recently burned forests and will be creating a short video and step-by-step guide outlining my process.

Are you interested in a particular fire science career path?
I am interested in a career in applied research at the intersection of forests, fire, climate change, management, and the wildland urban interface. I will be looking especially for career opportunities with federal or state government agencies. For me, what is most important is asking interesting and actionable research questions, collaborating with partners and stakeholders, and supporting and mentoring the next generation of young scientists with a focus on diversity, equity, and inclusion.

LOOKING AHEAD

The JFSP has a bright future, thanks to continued interagency support from the Department of the Interior and USDA Forest Service and other wildland fire partners at the national, regional, and local levels. Read on for what you can expect to see from the program in the next 2 to 5 years:

2022 Program Review

- The purpose of a program review is to take stock of the JFSP and help the JFSP program office, Governing Board, and agency/departmental leaders confirm or alter the strategic direction of the program. To date, the program has undertaken four reviews—2002, 2009, 2013, and 2017. The program review in October 2022 will help the Governing Board and program office evaluate the effectiveness of program components and suggest refinements or new directions the program should pursue.

Bipartisan Infrastructure Law (Infrastructure Investment and Jobs Act)

- Section 40803(c)(9) of the Bipartisan Infrastructure Law makes $20 million available for activities conducted under the Joint Fire Science Program over a 5-year period. That is, $10 million each from the Department of the Interior and the Department of Agriculture.
- The program will use funds toward projects focused on social and ecological recovery of communities impacted by wildfire and collaborative development of ecosystem mapping products for fire and fuels management.

FY 2023 and Beyond

- Moving forward, the JFSP will work with interagency partners to launch sustained research topics on fuels management strategies in a changing climate and firefighter health needs assessment and science plan which build off previously funded work.

As chair and co-chair of the JFSP Governing Board, we feel honored to lead a dynamic, interdisciplinary, and cross-agency 12-member group as we make fiduciary decisions for the JFSP. With strong administration support for wildland fire science and additional funding available through the Bipartisan Infrastructure Law, the future is exciting! It will afford us an opportunity to continue funding high science needs and delivering those results through the FSEN, while also giving us a chance to develop new partnerships and fund collaborative projects at local, regional, and national scales. With increasing and year-round wildfires, building additional collaboration at all scales is imperative to addressing this challenge. The JFSP is willing, ready, and able to continue leading this charge with its partners.

Dana Skelly and
Paul Steblein

Chair (Forest Service) and
Co-Chair (U.S. Geological Survey),
JFSP Governing Board

science for a changing world