After The Flames

Two-Day Virtual Science Symposium Report

May 19 & 20, 2020

Planning and Organizing Committee

Katherine Rowden, NOAA/NWS
Nina Oakley, UCSD/SIO/CW3E
Jason Kean, USGS
Cara Farr, USFS
Richard Schwab, NPS
Anne Bradley, TNC
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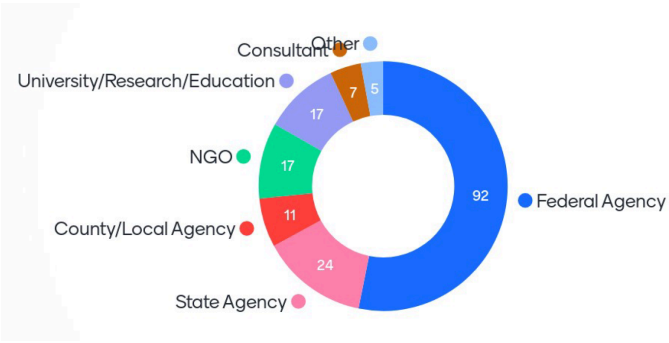
Introduction

Carol Ekarius
Executive Director
Coalitions & Collaboratives, Inc.

In 2019, Coalitions and Collaboratives, Inc. (COCO) hosted the first After the Flames conference, joining hundreds of researchers, practitioners and community members responding to post-fire. Though the 2020 conference was cancelled, researchers and practitioners came together for an interactive two-day webinar. The webinar was successfully hosted to 264 participants on day one and 216 participants on day two, with the majority of attendees working within federal agencies.



The visual above reflects the participation of 173 day-one attendees responding to the question, "What sector best represents you?"

Thank you to Katherine Rowden and Nina Oakley for their vision to pivot the Science Session from in-person meeting to a virtual session, and pull together the expert panels.

Katherine Rowden
Hydrology Program Manager
National Weather Service, NOAA

The After The Flames Post-Fire Science Symposium was not meant to create closer connections within agencies, but to create closer connections *between* agencies.

Advances in post-fire science and tools are not often known, shared or easily accessed between federal, state and local agencies. Organizations may not have resources in-house or have the relationships with fellow agencies to stay up-to-date on research and best practices. This is our biggest challenge: how we make connections between those who have access to the latest research and those that do not.

Summary

Nina Oakley, Ph.D
UCSD, SIO, CW3E

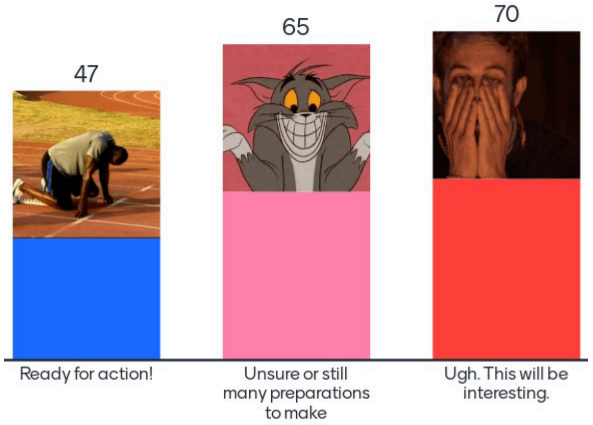
The webinar targeted both researchers and practitioners of post-fire science. The primary discussions related to hazards such as flash floods and debris flows on burn areas. Attendees consisted of researchers and practitioners from federal agencies (53%), state agencies (14%), NGOs (10%) and universities (10%).

The goals of the workshop were to:

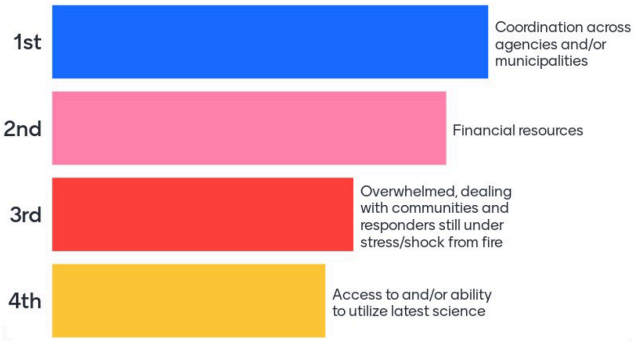
- Assess post-fire science needs and barriers to communication of science.
- Determine effective communication strategies for post-fire science.
- Develop pathways forward for working together in post-fire response.

The webinar was designed to involve heavy participation from the audience. The purpose: to collect feedback for the science community and practitioners steering post-fire science research. Of the 183 day-one attendees that responded, 134 identified themselves as practitioners and 49 as researchers. Of the 130 day-two attendees that responded, 89 identified themselves as practitioners and 41 as researchers.

Of the 182 responding attendees, 74% felt unsure or uncomfortable with their organization's preparedness for the upcoming fire/post-fire season.



The greatest barrier to post-fire response was identified by 174 responses as coordination.



Some of the preliminary insights and takeaways from the conference were:

- There is great interest in post-fire issues and a desire for similar conferences to keep the conversation going (perhaps covering additional post-fire topics such as water quality, soils, revegetation).
- Time for interpretation and application of scientific research was noted as the greatest barrier to use of science. This could potentially be resolved through novel methods of communicating science including webinars, podcasts, or newsletters.
- Communication related to post-fire issues (specifically between whom is unclear) stands out as one of the greatest post-fire challenges.
- Coordination across agencies in post-fire response is also major challenge.
- Assessment and communication of uncertainty around post-fire hazards is a strongly recommended research focus area.
- Downstream impacts, runout, and inundation associated with post-fire flash floods and debris flows were also noted as recommended research focus areas.
- Climate change and its effects on vegetation and fire characteristics as well as rainfall intensity is also a recommended research focus area.

You may access the full list of questions with responses from the science needs and science research panels by visiting the After The Flames website. Here, you will also be able to access the full recording of day one and two.

Post-Wildfire Science: How Far We Have Come

Jeremy Lancaster, PG, CEG, Program Manager, California Geological Survey

This session was a tribute to the late Jerome DeGraff and his work making improvements in quantifying debris flows, watershed recovery and rockfall hazards.

Hazard Recognition – When and Where
Alluvial Fans – Seeing increasing development on alluvial fans, resulting in catastrophic damage from debris flows. Basins can and do overtop. Catastrophic post-fire debris flow events are on the rise from 1914 to 2018.

Hazard Assessment and Mapping
Debris Flow Hazard Assessment and Mapping – advancements in technology assist those responding to communicate the hazard.
Soil Burn Severity Map improvements – satellite aided, basic input for models in post-fire
Debris Flow Probability Mapping Advancements – volume model, USGS mapping on-line
Inversion Model – predict debris flow with rainfall thresholds
Pre-fire Hazard Mapping – debris flow prediction

Fan Mapping – Inundation Modeling
Fan Mapping – where debris flow lands, areas for emergency response planning, safe areas vs. hazard areas.
Inundation Modeling – calibrating models

Hydrology and Precipitation
Precipitation rates that produce debris flow advancements. Can't use rain gauges within watershed for emergency response purposes. Need radar and gauges outside watershed. Rainfall rates that do and do not produce debris flows.

Meteorology and Forecasting
Meteorology and Atmospheric Sciences – NOAA debris flow warning system. Gaps in radar coverage. Need forecasting tools that give time to respond to hazards.

Science Communication
Doing better, several resources on Federal and State levels. Silver Jackets have been very effective.

Post-fire science is making advancements. We do know it takes high intensity, short rainfall to impact the post-fire landscape. We are starting to understand atmospheric conditions, but need more radar. Also need to communicate hazards, and make sure the public understands the terms.

Science Needs Panel

The featured speaker was then followed by a "science needs" panel discussion with seven practitioners; Jeremy Lancaster, CA Geological Survey; David Callery, USFS, BAER; Cara Farr USFS, BAER; Katherine Rowden NOAA/NWS; Don Lindsay, CA Geological Survey; and Stephen Brown, USACE.

Panelists were asked where they felt "blind" in regards to post-fire hazards. The responses were as follows:

- Social science for effective communication of pre- and post-fire hazards.
- Understanding and prediction of run off and debris flows.
- Multi-year monitoring and risk mitigation for evolution of watershed.
- Tools for the immediate response, before BAER and other evaluation.
- Better prediction tools for impacts of precipitation events.
- Coordination with communities and various responding agencies.
- Experienced on-the-ground checks of models and prediction tools.
- Accurate information on alluvial fans and recognition of hazard.
- Hazard delineation beyond FEMA Flood Plan Maps.

Panelists were also asked their number one priory:

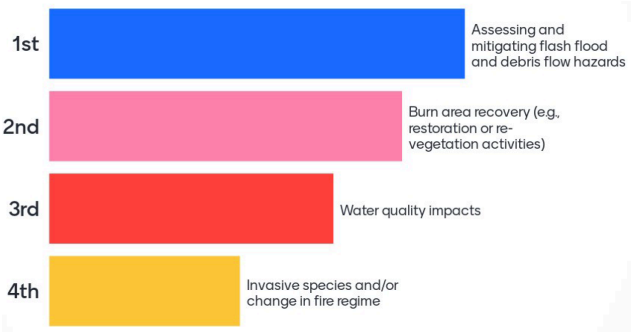
- Complete model data that is ready to use (there are often holes) when an emergency happens.
- Being able to see all the rainfall and having better science on thresholds.
- Better technology to share post-fire data.
- Precipitation patterns and event probabilities to make predictions of runoff response more accurate.
- Research advancements in debris flow modeling for risk mapping that can be employed rapidly after fire.
- From a pre-fire planning perspective, mapping to address the lack of hazard recognition.
- Advancement in predicting post-fire runoff; develop a hydrograph for rainfall events pre- and post-fire.
- Monitoring recovery rates.
- Decision support tools and models to help us to determine values are at risk.

Attendees were asked to list three words or phrases to describe their post-fire challenges:

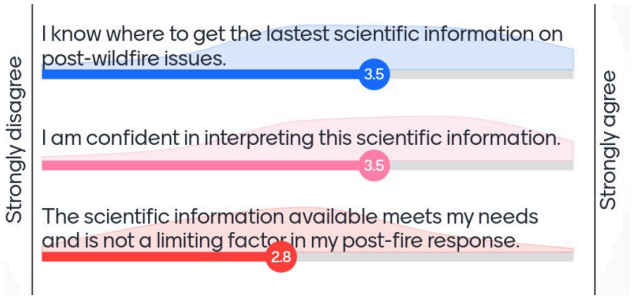
The top ranked words or phrases identified by the audience:

- Communication
- Uncertainty
- Data

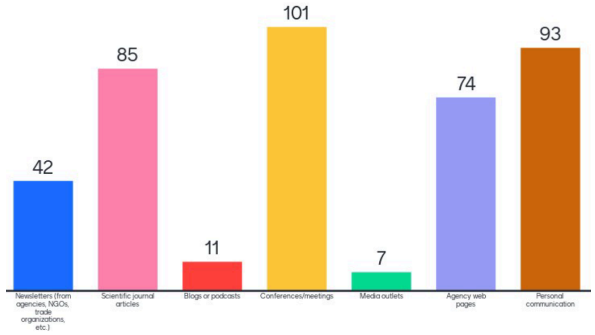
Rank post-fire concerns based on your job responsibilities or research focus (116 responses).



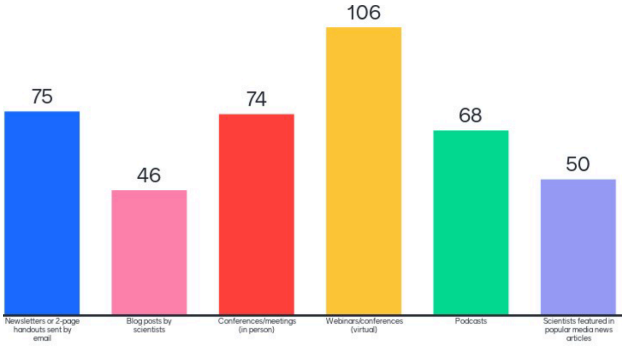
How do you rate these statements? (122 responses)



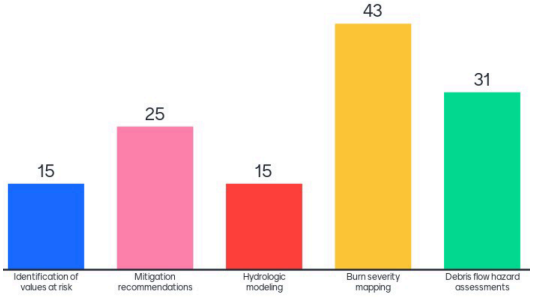
Where do you get your post-fire science information? Choose all that apply. (130 responses)



What mechanisms would you like to see used more frequently for communicating post-fire science? Choose all that apply. (126 responses)



What component of agency post-fire assessments is useful to you? (129 responses)



Science Research Panel

Day two focused on science research for moving forward in post-fire response. The "science research" panel consisted of Pete Robichaud, USFS Rocky Mountain Research Station; Paul Steblin, USGS; Laura Myers, University of Alabama; Sheila Murphy, USGS; Brendan Murphy, University of Utah; Jason Kean, USGS; and Nina Oakley, CW3E/UCSD/SIO.

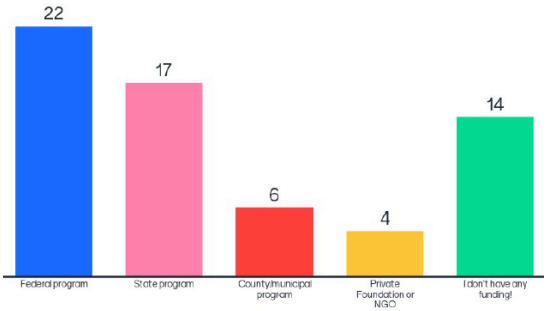
Panelists were asked about limitations to research progress. The responses were as follows:

- Funding for long term monitoring and reporting.
- Uncertainty in factors impacting recovery, including climate change.
- Pre-fire severity modeling.
- Post-fire hydrologic response and debris flow modeling.
- Communication of hazard, both medium and message for understanding and prompting action.
- Higher resolution in burn severity mapping.

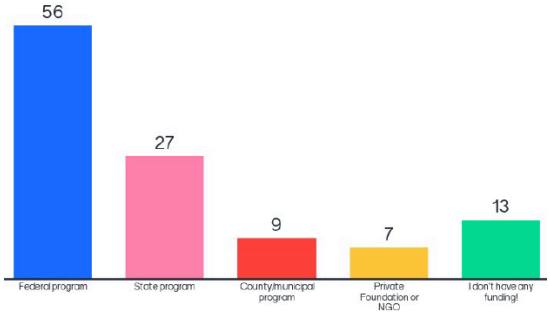
Attendees were asked to identify other aspects of post-fire science they would like to see researchers address:

Attendees were also asked to describe what we need most in post-fire response:

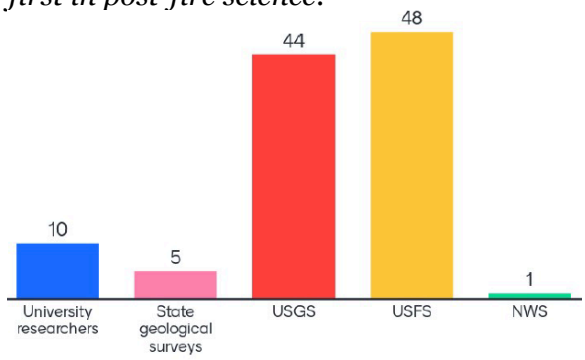
From a poll of participating researchers, 63 identified post-fire research funding from:



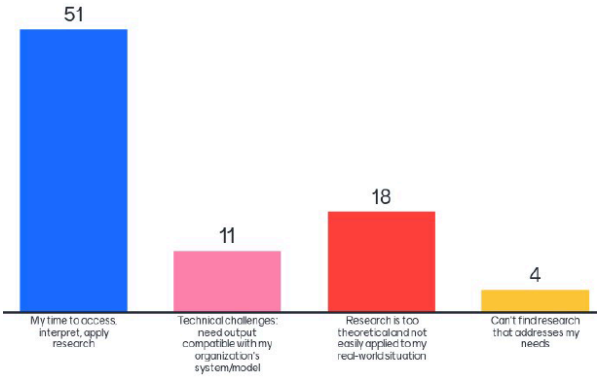
From a poll of participating practitioners, 112 identified funding for post-fire response from:



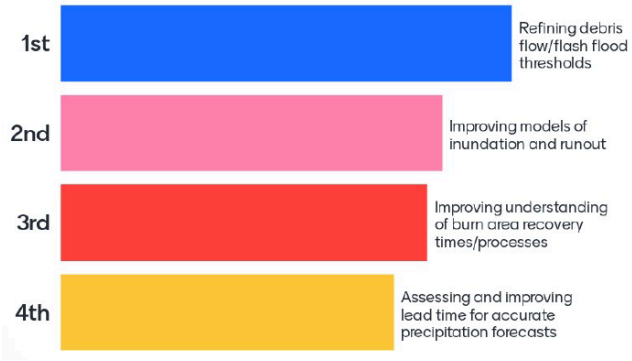
108 participants identified agencies they look to first in post-fire science:



Attendees were asked to identify the greatest barrier to implementing the latest research in post-fire response (115 responses).



Attendees were asked to privatize post-fire research areas (115 responses).



Attendees were asked to list where they needed more or improved scientific information on.

Interagency Wildfire Disaster:

Response & Mitigating Post-Fire Impacts

Mike Zupko
Wildland Fire Leadership council

Troy Timmons
Director of Strategic Initiatives
Western Governors' Association

Post-fire impacts are felt by everyone, so WGA and WFLC have started working jointly to explore approaches for mitigation these impacts. Interagency is key, as we cannot do this work alone and need input from all sectors. Mitigating post-fire impacts is not just an activity for after a fire. There is quite a bit of research and strategy before a fire. The goal is to make things happen more effectively, and quicker, on-the-ground.

Major Concepts:

Incident Management Team Integration – Opportunity for continuity in response to fire through post-fire.

What is the expectation of agency administrators in response and to hand off to community?

How can BAER work with State and local jurisdictions?

Post-fire Impact Roadmap is focused on assistance that is available for restoration. Roadmap of assistance, and how to coordinate it more effectively for immediate response and long-term restoration, particularly in terms of community participation in recovery efforts. Ancillary aspect has been increased awareness for collaboration at all levels, federal, state and communities. Working on opportunities to engage at inter-agency level to figure out the right components of assistance roadmap. Plenty of others doing similar work, creating great templates. Goal to announce something like emergency kit this year.

Identify assistance programs in four different buckets. Pre-fire mitigation on Federal or Non-federal Land. Post-fire on Federal Land or Non-federal. Different buckets of money and what is available. How to put the sources together, include match, shape how money is spent and where. Give information on how programs fit together, what they can be used for, how much it will cost, what they will accomplish.

Navigators – The Roadmap is useless if you don't know how to read it. Concept of Navigators for local communities to assist them in how the assistance can work. What they should focus on? How to deploy resources?

1. Three roles for the Navigators:
   Assist local communities with identifying risk management and restoration needs, funding sources and availability, and application processes.
2. Serve as liaison between communities affected by wildfire and federal agencies conducting risk management and restoration work.
3. Function as subject matter experts on post-fire risk management and restoration needs across a broad range of values – housing, water quality, infrastructure, habitat..

Policy gaps and opportunities – WFLC membership ranked policy considerations. Grouped them into priorities. Focus over the next few years with these policy gaps. Some internal, some may need congressional action.

- Post-fire master agreement
- Data and information sharing/coordination
- Aligning federal post-fire response with community needs
- Improving IMT/post-fire handoff
- Integrating land management and fire management responsibilities
- Statutory issues

Other Networks & Collaborative Efforts

Anne Bradley
Forest Conservation Program Director
The Nature Conservancy, New Mexico

Examples of networks addressing the post-fire environment:

- After the Flames Conference
  https://aftertheflames.com
- Fire Adapted Community Network
  https://fireadaptednetwork.org
- Joint Fire Science
  https://www.firescience.gov/JFSP_exchanges.cfm
- Burned Area Learning Network
  www.conservationgateway.org
- Association for Fire Ecology
  https://fireecology.org/
- International Association for Wildland Fire
  https://www.iawfonline.org/

Using Intentional Networks for the Coproduction of Science

Provide sustained, two-way participation from scientists and stakeholders throughout all phases of knowledge production.
Focus on developing actionable information.
Everyone a learner, everyone a teacher.
Can incorporate multiple ways of knowing western science and practice, and traditional ecological knowledge.

Emphasis on building relationships for future conversation and discovery-good networks are generative.

Value boundary spanners who work to engage a range of expertise and organizations.

Other Networks

- Conservation Districts
  https://usda.nrcs.gov
- Prescribed Fire Councils
  http://www.prescribedfire.net/
- Floodplain Management Association
  https://floodplain.org/
- Healthy Headwaters Alliance
  https://www.carpediemwest.org/our-work/healthy-headwaters/
- NASA Satellite Needs Working Group
  https://earthdata.nasa.gov/esds/impact/snwg
- DOI Remote Sensing
  https://eros.usgs.gov/doi-remote-sensing-activities/2019
- Earth Science Information Partners
  https://www.esipfed.org/
- Silver Jackets
  https://silverjackets.nfrmp.us/