

Science and Technology Gaps and Priority Areas in Wildland Fire

Rebecca K. Miller,¹ Hannah L. Kirk,¹ Kristin A. Ludwig²

1. IDA Science and Technology Policy Institute (STPI) 2. White House Office of Science and Technology Policy
Contact information: RKMILLER@ida.org

SUMMARY

The Science and Technology Policy Institute (STPI) analyzed 8 reports to synthesize research gaps and science priorities for wildland fire mitigation, response, and recovery. Results informed the 2024 Wildland Fire Science, Data, and Technology Needs workshop.

BACKGROUND

- Multiple reports point to the need for increased science coordination for wildland fire.
- *ON FIRE: The Report of the Wildland Fire Mitigation and Management Commission (2023)* recommends “a review of existing reports on known research needs.”

METHODS

- STPI analyzed 8 publicly available reports published between 2014 and 2023 to synthesize science and technology (S&T) recommendations.
- STPI organized recommendations across **7 cross-cutting priorities** and **6 focus areas**.



RESULTS: CROSS-CUTTING PRIORITIES

The cross-cutting priorities describe broad needs in the wildfire S&T space and reflect the need for new, creative, and collaborative approaches for wildfire management and resilience.

	Priority Area	Primary Recommendations from Reports
	1. Education and Training	<ul style="list-style-type: none"> • Provide public education on fire prevention and mitigation • Create trainings for new products and technologies
	2. Interagency and Cross-Sector Coordination	<ul style="list-style-type: none"> • Develop partnerships (e.g., government, nonprofit) • Leverage funding based on agencies' niche areas
	3. Practitioner-Informed Science and Technology	<ul style="list-style-type: none"> • Establish research-to-operations and operations-to-research pathways • Target research to end users
	4. Data Management	<ul style="list-style-type: none"> • Improve data discoverability • Follow consistent data principles
	5. Research Leadership	<ul style="list-style-type: none"> • Lead, coordinate, and assess multidisciplinary S&T programming and planning
	6. Information at Appropriate Spatial Scales	<ul style="list-style-type: none"> • Provide data and products at local spatial scales with national coverage
	7. Diversity, Equity, Inclusion, and Accessibility	<ul style="list-style-type: none"> • Incorporate equity and environmental justice into wildfire resilience • Consult with Tribal nations, recognizing Tribal sovereignty

RESULTS: GAPS & FOCUS AREAS

STPI described each S&T gap identified from the 8 reports as a recommendation and organized within a focus area and a sub-focus area. Each focus area has 3 or 4 sub-focus areas.

	Focus Area	Sub-Focus Areas
	1. Detection and Monitoring	<ul style="list-style-type: none"> • Fire Potential and Prediction • Fire Detection • Fire Behavior Modeling
	2. Firefighter Operations and Safety	<ul style="list-style-type: none"> • Deployment and Decision Support • Communication • Firefighting Technology
	3. Land and Fuels Management	<ul style="list-style-type: none"> • Land Management • Fuel Treatments • Impacts of Climate Change and Other Stressors • Traditional Ecological Knowledge
	4. Construction and Zoning	<ul style="list-style-type: none"> • Ignition-Resistant Construction • Codes and Standards • Education and Decision-Making
	5. Public Health and Safety	<ul style="list-style-type: none"> • Alerts and Warnings • Evacuations • Wildfire Smoke • Physical and Mental Health
	6. Relief and Recovery	<ul style="list-style-type: none"> • Post-Fire Data and Risk Assessments • Societal Impacts • Ecosystem Impacts • Post-Wildfire Environmental Health and Safety

CONCLUSION

- The STPI analysis compiled 266 S&T-related recommendations from the reports.
- Over 300 agencies and organizations have equities in wildfire S&T, highlighting the complexity of future wildland fire S&T coordination.
- STPI plans to publish the results of this analysis in Summer 2024.



JUNE 2024 WORKSHOP

- Wildfire resilience is a priority of the Biden-Harris Administration.
- The Wildland Fire Leadership Council, with input from the Science for Disaster Reduction Interagency Working Group, held a Meeting Science & Technology Needs for Wildland Fire Risk & Resilience workshop in June 2024.
- Approximately 60 national fire science, technology, and management leaders from over 20 federal agencies and organizations attended.
- The workshop used the STPI analysis to identify high-leverage recommendations within the land, fire, and community management sectors.
- Recommendations identified for future review and analysis include technology roadmaps, national guidance for smoke standards, and incorporation of Indigenous knowledge and values into wildfire resilience.