After Fire: Toolkit for the Southwest

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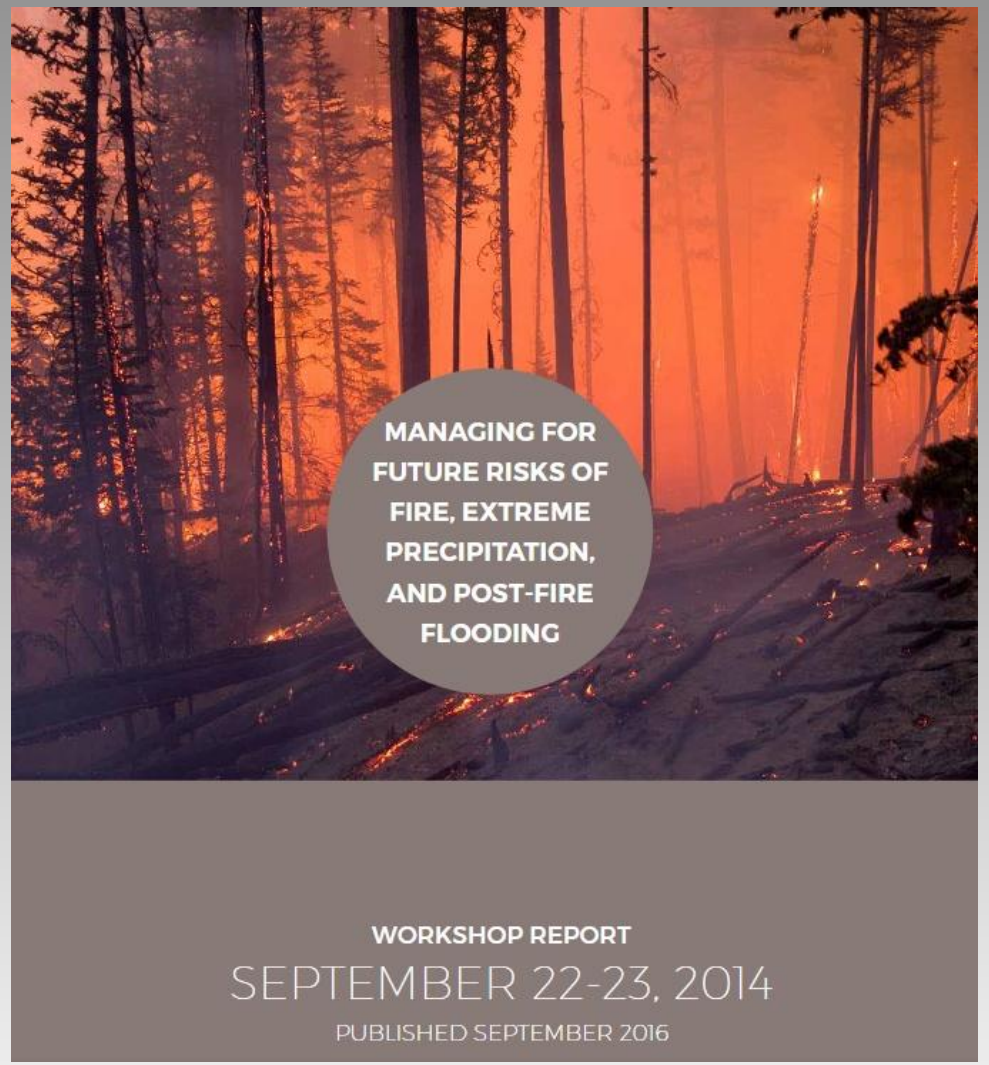
USFS Rocky Mountain Research Station

Post-fire environment challenge

2014-15 Workshop Series

- *Fostering Resilience in Southwestern Ecosystems*, Feb 2014- Southwest Fire Consortium
- *Managing for Future Risks of Fire, Post-fire Flooding and Extreme Precipitation*, Sept 2014- University of Arizona, Bureau of Reclamation
- *Planning for the Next Big One: Managing the Postfire Environment in a Time of Change*, April 2015- Fire Learning Network, Southwest Fire Science Consortium



DOI: 10.13140/RG.2.2.12750.05448

USDA Southwest Regional Climate Hub

2016 RFP for Forest Service Projects:

Online toolkit to help resource managers plan for and mitigate post-fire flood impacts

United States Department of Agriculture

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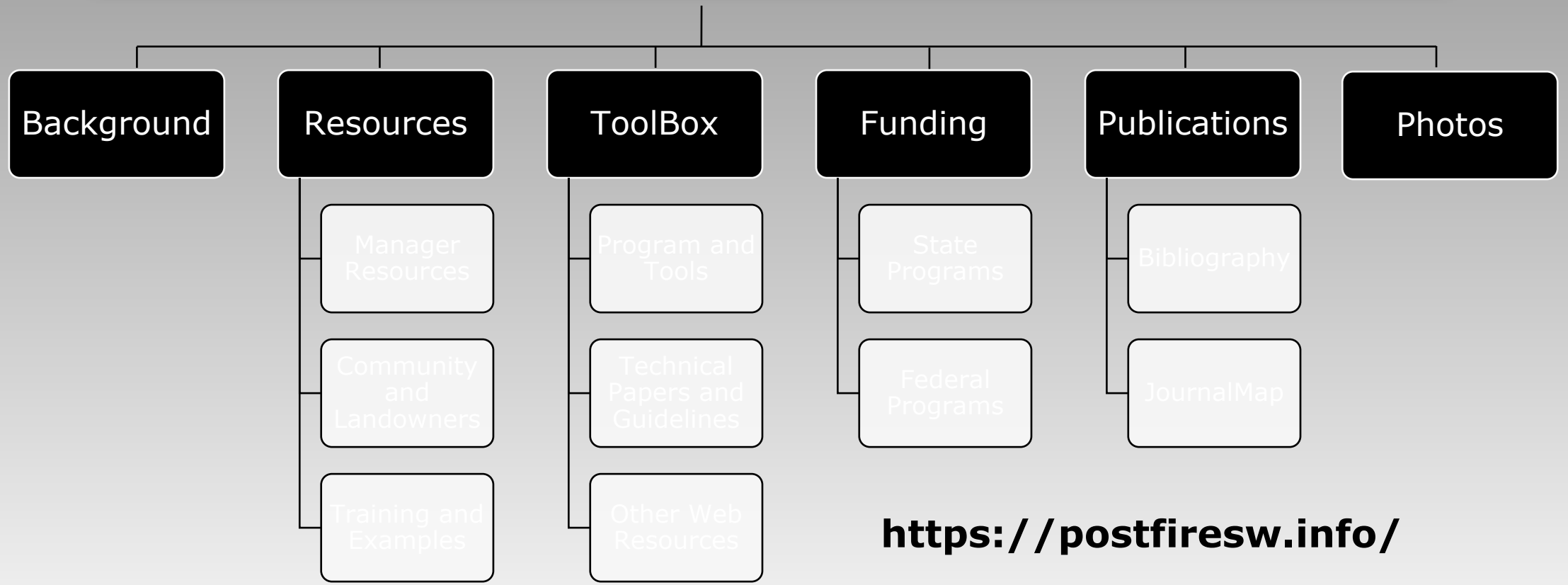
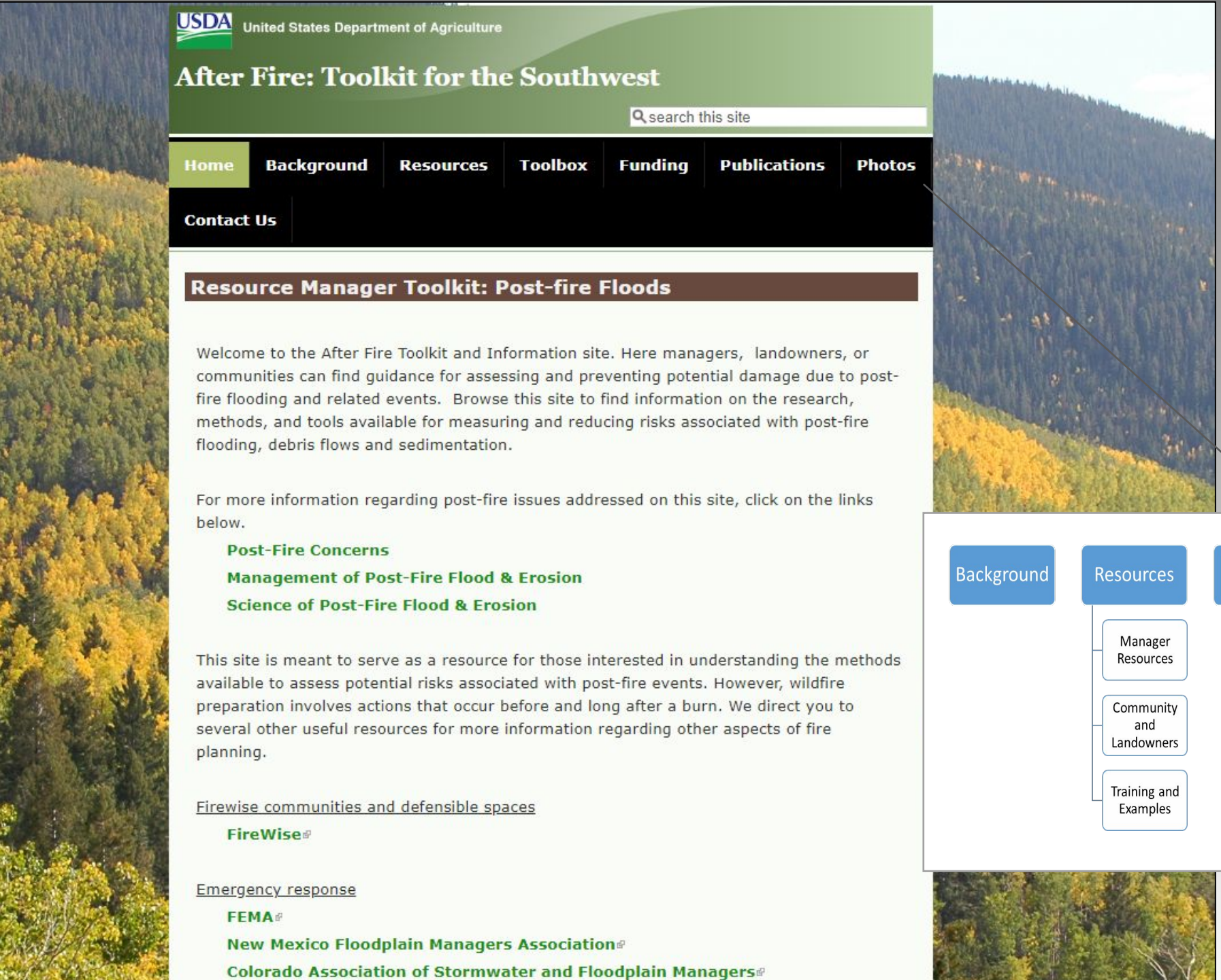


https://postfiresw.info/



United States Department of Agriculture

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Resource Manager Toolkit: Post-fire Floods

Welcome to the After Fire Toolkit and Information site. Here managers, landowners, or communities can find guidance for assessing and preventing potential damage due to post-fire flooding and related events. Browse this site to find information on the research, methods, and tools available for measuring and reducing risks associated with post-fire flooding, debris flows and sedimentation.

For more information regarding post-fire issues addressed on this site, click on the links below.

- **Post-Fire Concerns**
- **Management of Post-Fire Flood & Erosion**
- **Science of Post-Fire Flood & Erosion**

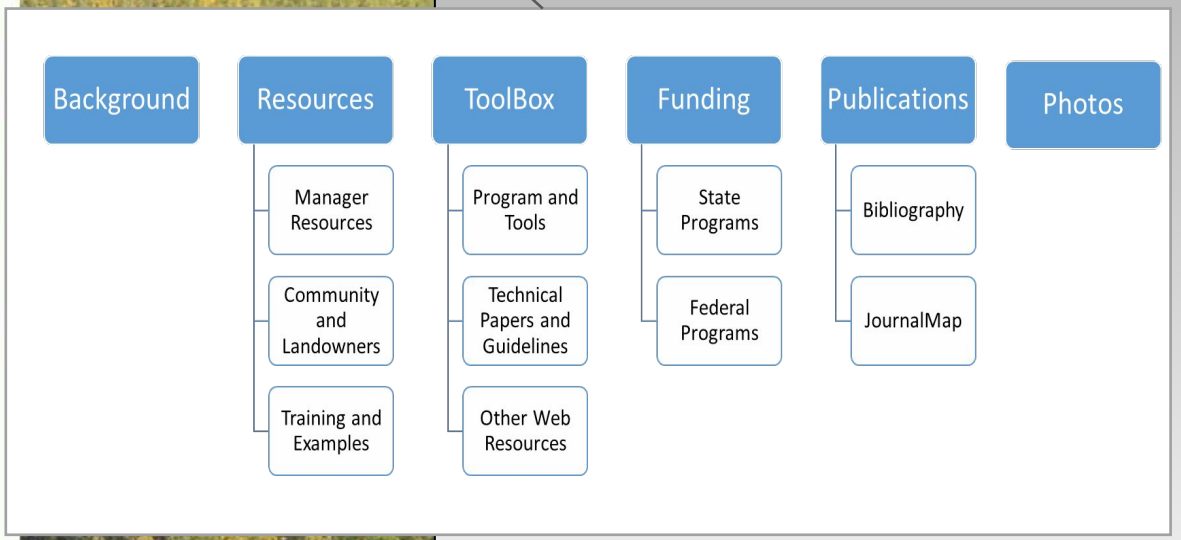
This site is meant to serve as a resource for those interested in understanding the methods available to assess potential risks associated with post-fire events. However, wildfire preparation involves actions that occur before and long after a burn. We direct you to several other useful resources for more information regarding other aspects of fire planning.

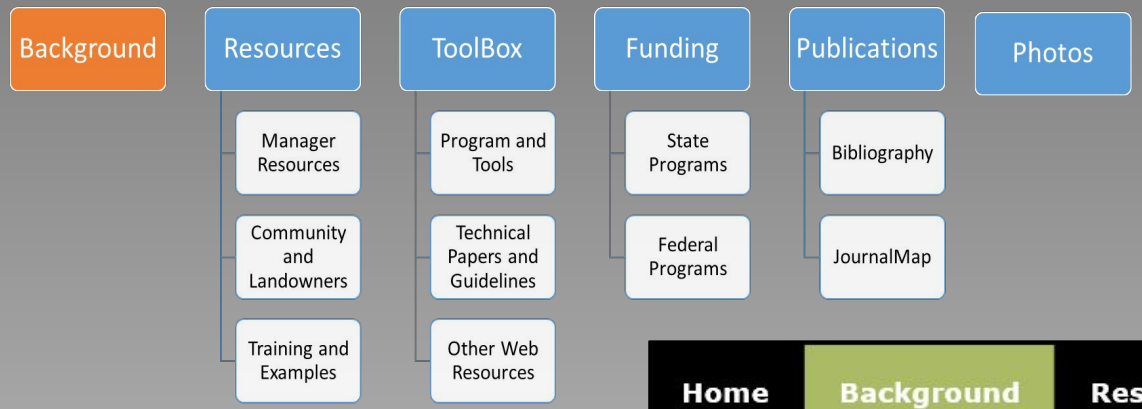
Firewise communities and defensible spaces

- **FireWise**

Emergency response

- **FEMA**
- **New Mexico Floodplain Managers Association**
- **Colorado Association of Stormwater and Floodplain Managers**

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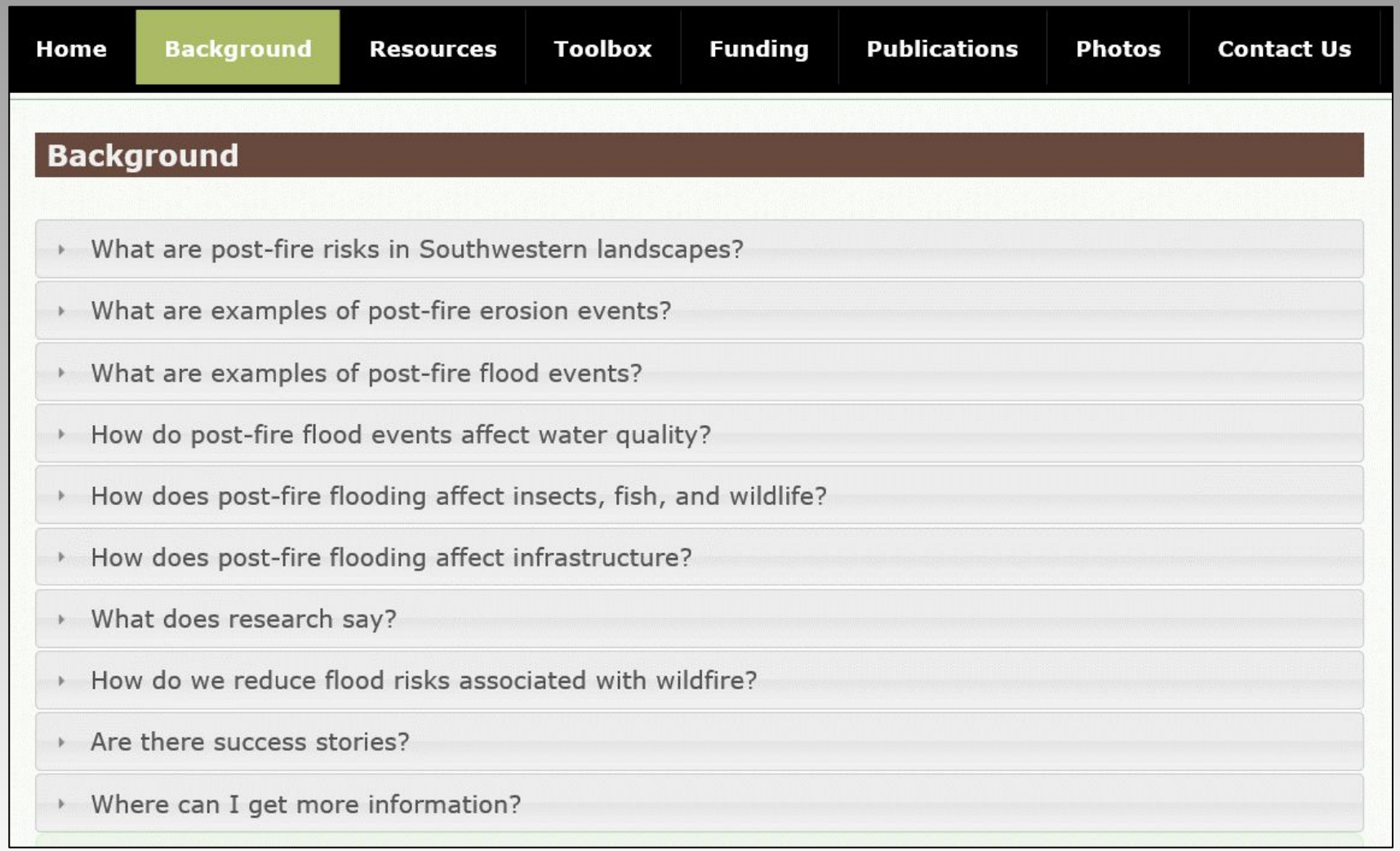
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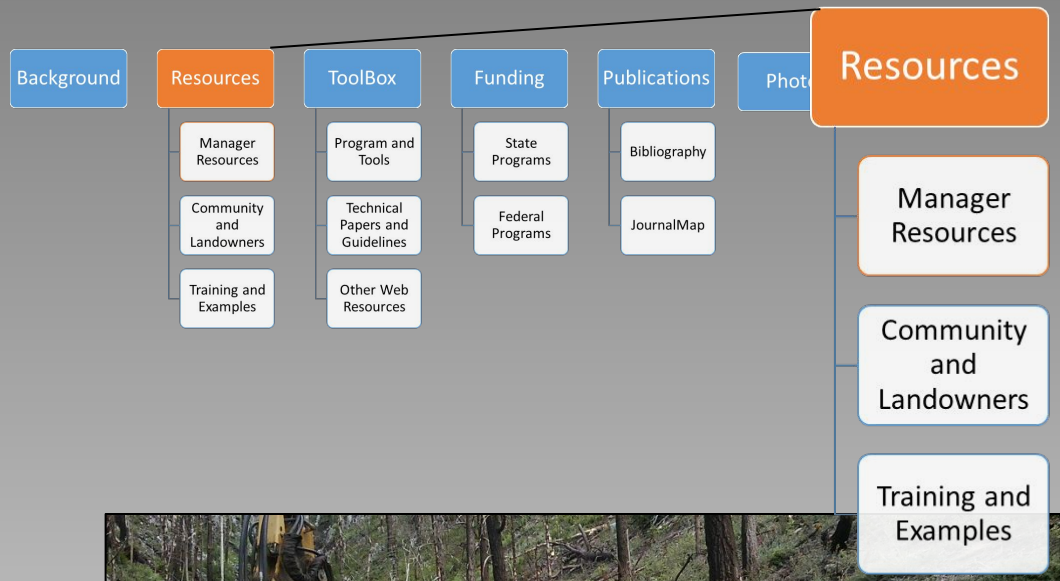
Background
What are post-fire risks in Southwestern landscapes?
What are examples of post-fire erosion events?
What are examples of post-fire flood events?
How do post-fire flood events affect water quality?
How does post-fire flooding affect insects, fish, and wildlife?
How does post-fire flooding affect infrastructure?
What does research say?
How do we reduce flood risks associated with wildfire?
Are there success stories?
Where can I get more information?



1. **How to Measure Risk**

One example of an especially effective method for mitigating post-fire threats are Burned Area Emergency Response (BAER) teams that operate on federally owned lands. BAER assessment procedures require identification and quantification of values-at-risk (VAR) from the secondary effects of wildfire including flooding and erosion (see BAER or Library]. Values-at-risk are defined as the values or resources under threat of damage or loss. For example, a post-fire hazard may be soil erosion and the VAR threatened would include life and safety, water quality, culverts and road systems.

Information Needed to Measure Risk

Threats to VAR can be quantified and mapped using spatial data and geographic information systems (GIS). This process requires the following information:

1. Map of burn severity
2. Map of Values-at-Risk (i.e., road to a remote community)
3. Map of Threats (i.e., dead tree snags along road corridor)
4. Estimates of the cost to repair, replace, or restore and/or the value of VAR
5. Estimates of the probability of a threat occurring with and without treatment
6. Map of VAR and threat associations
7. Treatment recommendations and their costs

The results of this process include a map summarizing all VAR-threat associations in the burned area, treatment recommendations, and justification for treatment. For more information, see Assessing Post-Fire Values-at-Risk With a New Calculation Tool

2. **Strategies for Management**

BAER teams use various tools and computer models to estimate post-fire increases in runoff and sediment. The starting point for many management strategies is creating soil and vegetation burn severity maps that identify areas of concern and prioritize response. These maps are generated using geospatial data, commonly collected by remote sensing, and ground truth information. Many managers use hydrologic and erosion models adapted and developed for burned landscapes to determine flooding and erosion risks. Post-fire treatment decisions are also made using certain calculations focused on the appropriateness, cost, and effectiveness of different treatments. A spreadsheet calculation tool developed to assess post-fire VAR in connection with treatment decisions is used by many BAER teams to select and justify treatments. Many of these tools are available in web-based formats and are in the public domain, allowing for their use by land managers, state and local governments, and community groups worldwide. For more information on these tools explore our sections on post-fire flood and erosion tools.

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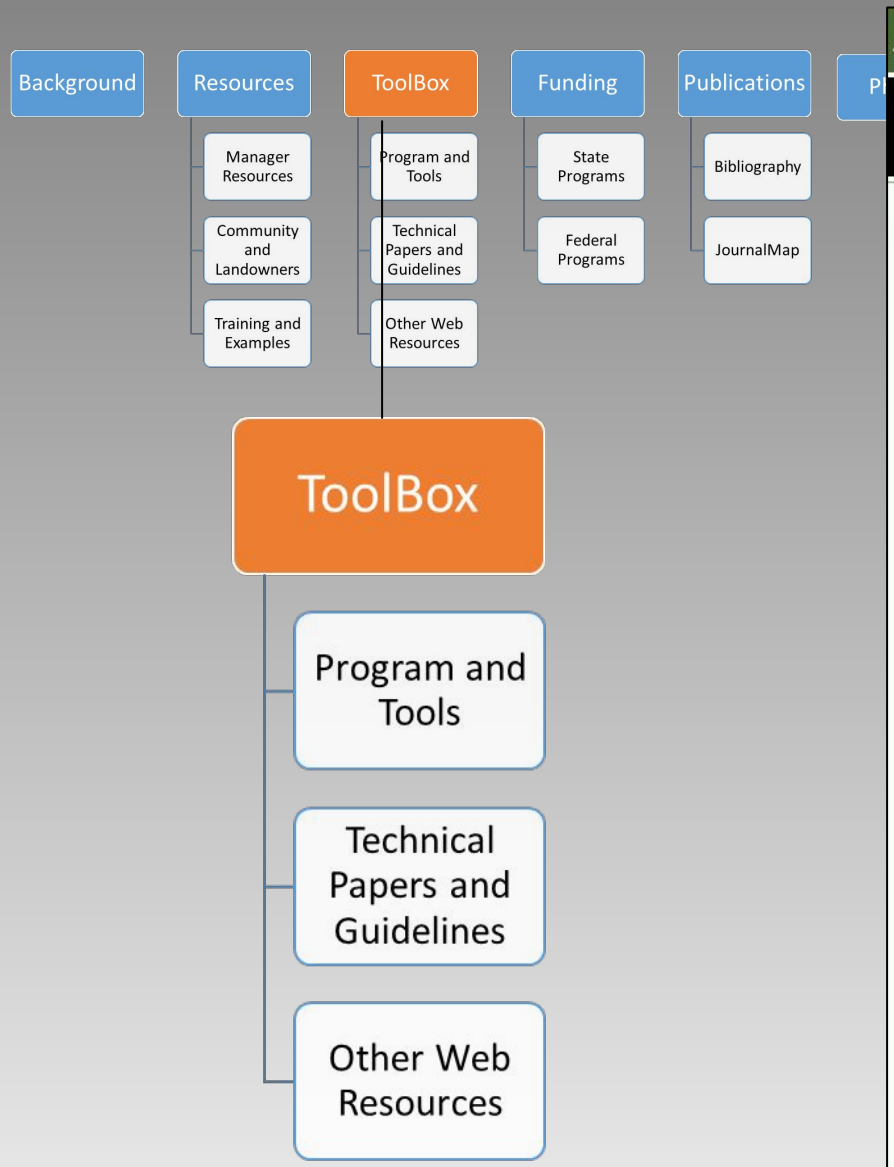
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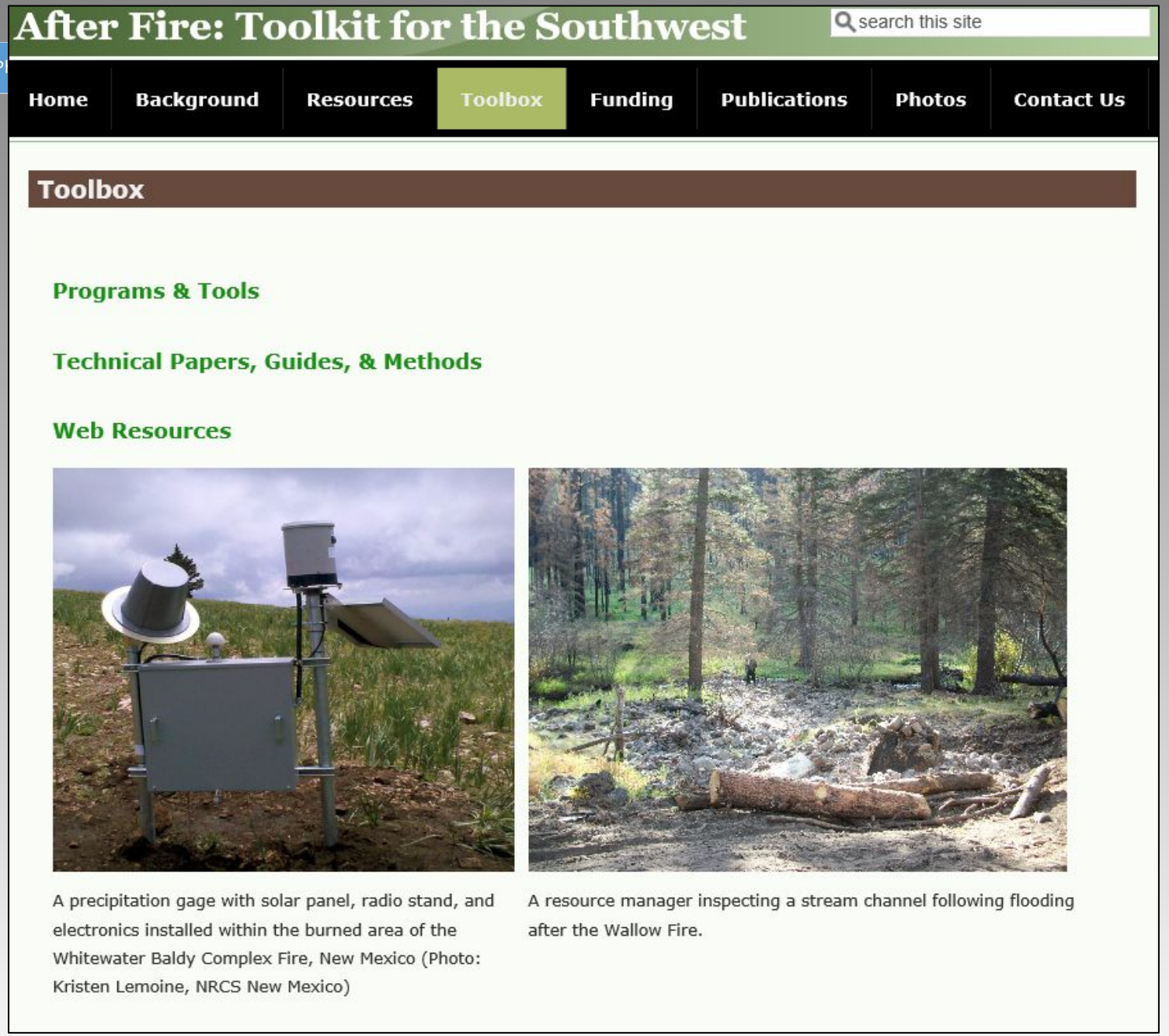
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A precipitation gage with solar panel, radio stand, and electronics installed within the burned area of the Whitewater Baldy Complex Fire, New Mexico (Photo: Kristen Lemoine, NRCS New Mexico)
A resource manager inspecting a stream channel following flooding after the Wallow Fire.

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State Programs

Many state agencies have programs to mitigate the impacts of wildfire. These include:

Arizona: Arizona State Forestry Grant Programs

Colorado: Natural Resources Grants & Assistance Database

New Mexico: Flood Risk Evaluation Prior to Flooding and Hazard Mitigation Grants, General Forest Restoration Assistance, Public Water Infrastructure Funding, Other Grant Notices

Nevada: Nevada Division of Forestry Grants

Utah: Utah State Forestry Grant Programs

Federal Programs

Many federal agencies including NRCS, FEMA, and the U.S. Army Corps of Engineers manage programs and provide funding to communities and private landowners to respond to post-fire threats. Some of these programs require partnerships with Conservation Districts or local governments. To find out information about groups working in your area, check out our Community Groups page.

Catalog of Federal Funding Sources for Watershed Protection

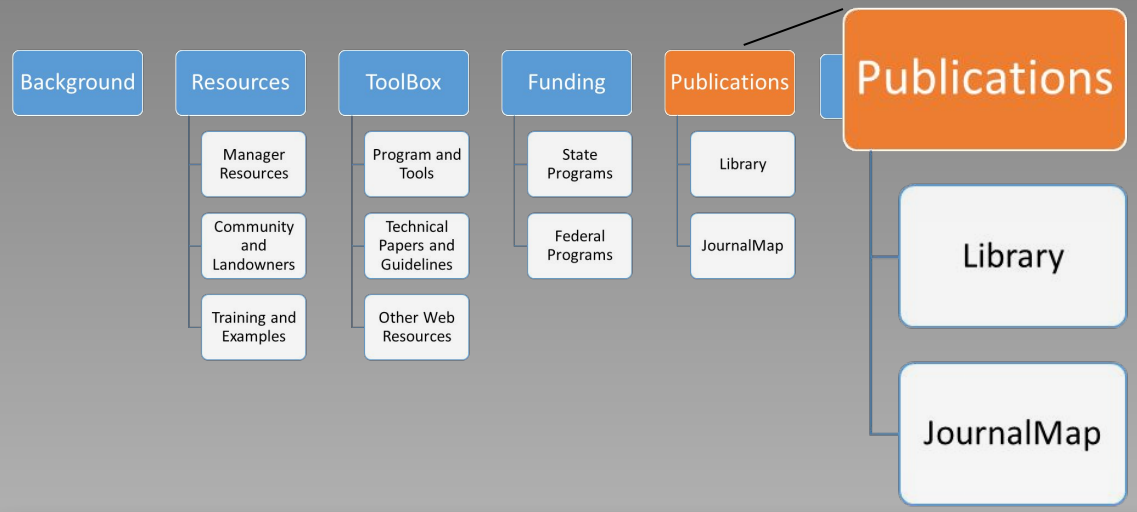
The Environmental Protection Agency (EPA) maintains the Catalog of Federal Funding Sources for Watershed Protection Website. It is a searchable database of various financial assistance sources, including grants, loans, and cost-sharing programs. The site is searchable based on the type of assistance, the organization applying, match requirements, or keyword.

EWP-Emergency Watershed Protection Program

The Emergency Watershed Protection Program (EWP), administered by NRCS, aims to alleviate threats to lives and property within watersheds after disasters, including wildfire. EWP can help landowners reestablish vegetative cover, control gully erosion, protect stream banks, remove debris, and install levees. Requests to the EWP must be sponsored by local subdivisions of state government, such as conservation districts, or by the states themselves. EWP may provide up to 75 percent of funds needed to restore natural watershed function. The community or local sponsor is responsible for the remaining 25 percent of the cost, however volunteer hours count toward the local match.

EQIP-Environmental Quality Incentives Program

The Environmental Quality Incentives Program, administered by NRCS, can be used in some cases to aid landowners in post-fire restoration. EQIP provides cost-share assistance to private landowners for restoration that includes tree planting and forest health improvements.



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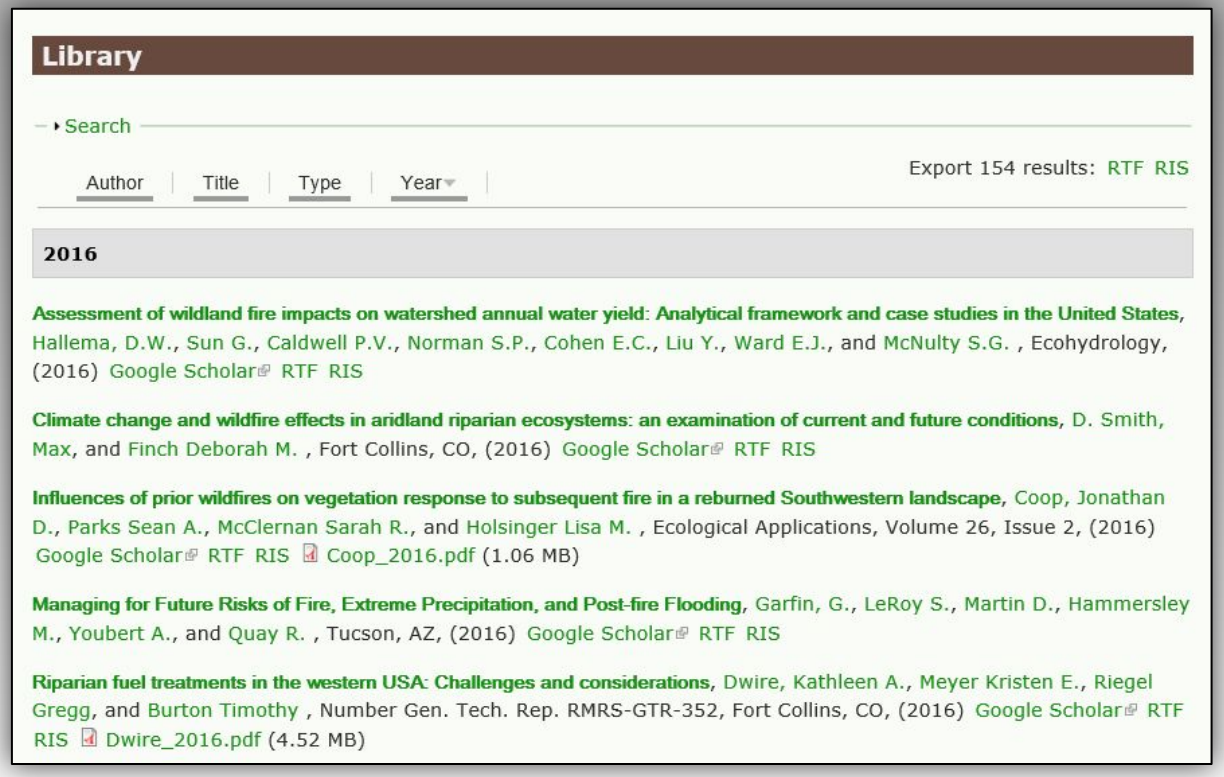

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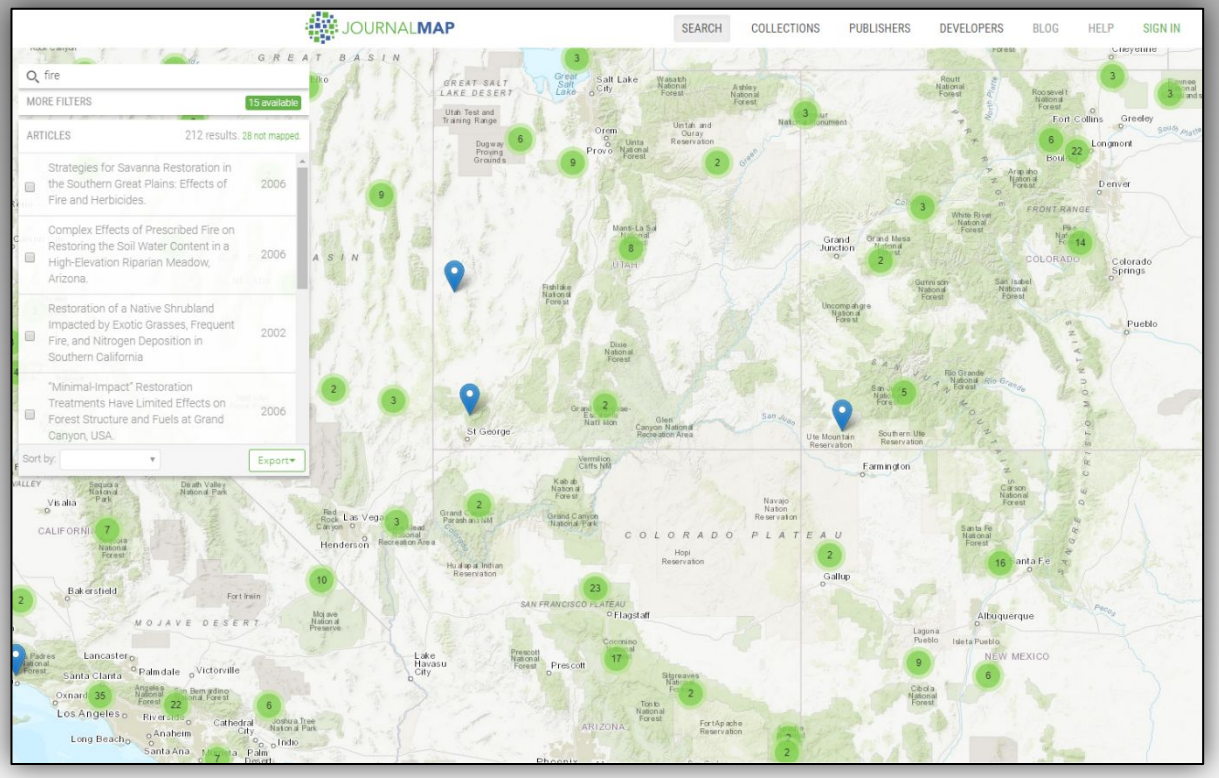





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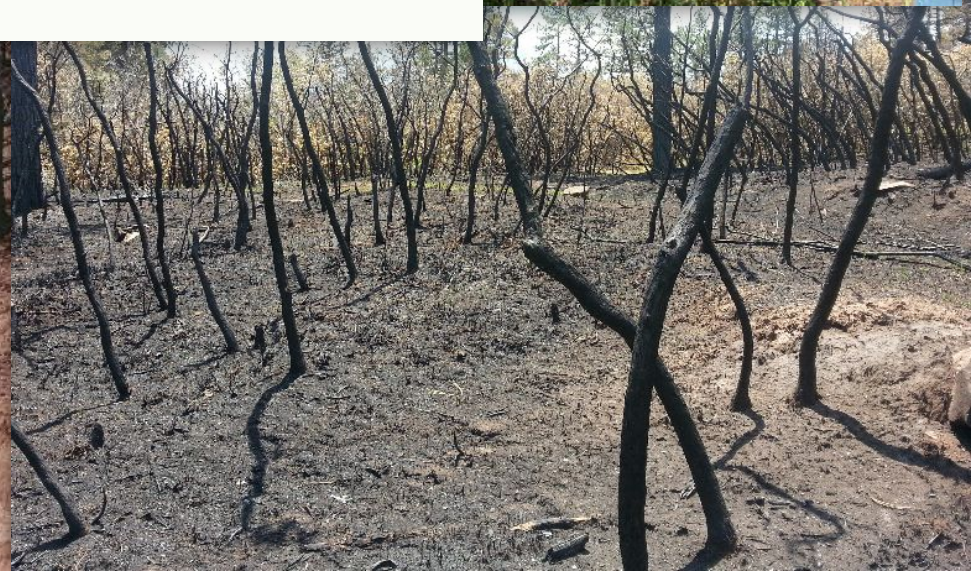

Assessment of Programs and Tools Available

Conservation Issues

Assessing Risk in a Postfire Landscape: Are Currently Available Tools Good for the Local Land Owner?

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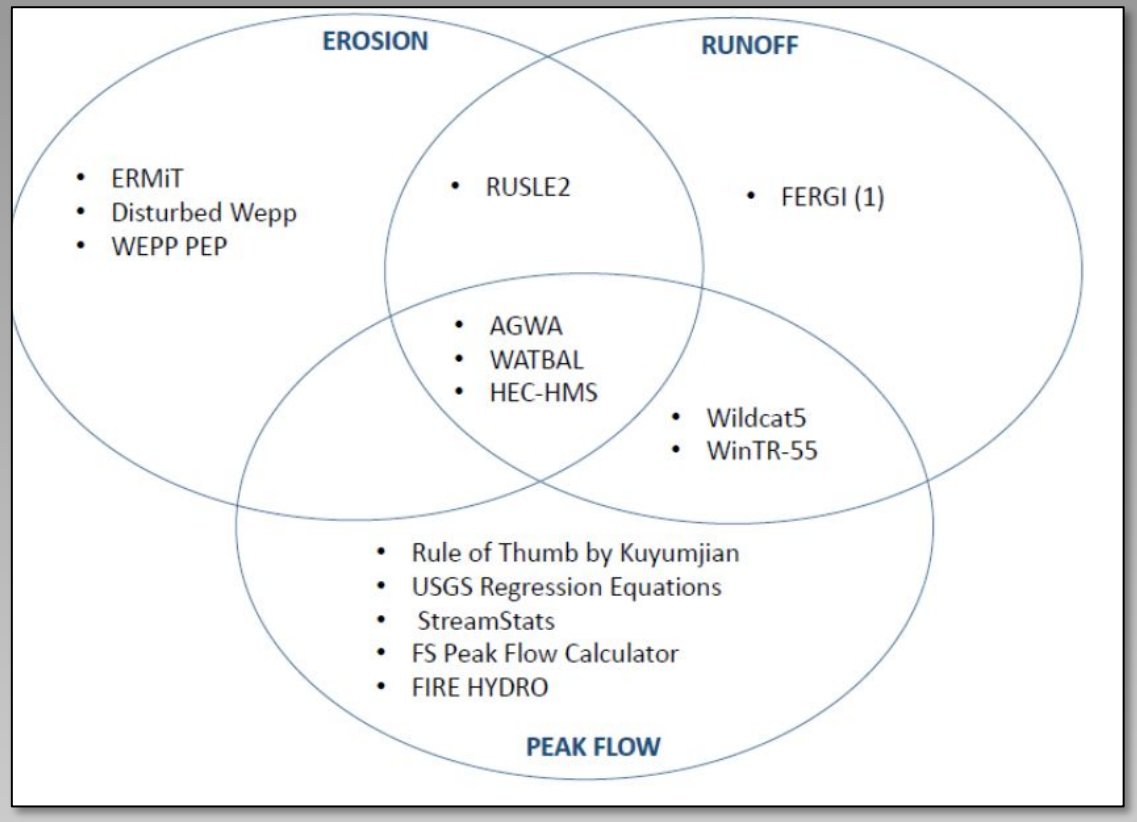
Associate Editor: John Vickery

ABSTRACT

Wildfires and events that follow such as flooding and erosion are natural disturbances in many ecosystems. However, when these types of postfire events threaten life, property, and resources they become a concern for resource managers, communities, and private landowners. A procedure for rapid assessment that uses different tools exists for federally owned lands, however after wildfire many non-federal landowners wonder how to manage and reduce risk on their lands. For this reason it is important to understand whether tools used by federal teams are accessible and approachable for non-federal users. We critically assessed tools for evaluating postfire landscapes that are used by federal teams through a scoring system for practicality of use by private or community land managers. Each tool was scored based on three criteria: required inputs, required equipment, and available guidance. Tools were further characterized by scope, scale, use of Curve Numbers, and capacity to incorporate treatments. Results show that the Soil Burn Severity Datasheet, the Burned Area Reports Database, the Rule of Thumb by Kuyumjian, and USGS Regression Equations are most accessible for non-federal audiences. FERGI and HEC-HMS are the least transferable. Currently available postfire assessment tools are usable by non-federal audiences, with some more approachable than others. As new tools are developed, opportunities exist to build tools that are more accessible to more diverse user groups.

Index terms: debris flows; erosion; flooding; postfire evaluation tools; risk assessment



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  - Pictures
  - Case Studies (success stories)

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