

WILDFIRE

READY WATERSHEDS

2023 CASFM AWARD NOMINATION

PREPARED BY:
CWCB & Enginuity Engineering Solutions

April 7 2023

*Working to understand the susceptibility of
Colorado's watersheds to post-wildfire impacts
and to plan and prepare for them— before fires
occur.*



COLORADO
Wildfire Ready
Watersheds
Colorado Water Conservation Board

www.wildfirereadywatersheds.com

Photo of post-fire debris flow at Black Hollow within
Cameron Peak burn footprint.

WILDFIRE READY WATERSHEDS

CASFM OUTSTANDING PROJECT
AWARD NOMINATION

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BACKGROUND

Wildfires are devastating natural disasters that can occur unexpectedly within a community, which may not have plans in place to mitigate or respond to both the direct impacts from a fire as well as the numerous hazards following a fire. This lack of preparedness has been recognized as a significant challenge by agencies at both the federal and state level in Colorado, particularly following the 2020 wildfire season that saw three of the largest wildfires in Colorado history. Several critical lessons were learned through recent post-wildfire recovery efforts in Colorado including:

1. **Time is of the Essence:** Following a wildfire, it is critical that recovery efforts and implementation of mitigation measures begin immediately
2. **Successful Post-Fire Hazard Mitigation Takes Time:** Considerable time and effort is required to collect and analyze relevant data, perform post-fire hazard evaluations, and plan and implement hazard mitigation.
3. **Point-of-Impact vs. Watershed Scale Improvements:** After a wildfire, everything moves quickly. The rapid schedule of implementing post-fire mitigation measures, funding time constraints, and available resources all influence the types of recovery actions that can be implemented under many post-wildfire recovery programs.



Photo of Calwood Wildfire in the summer of 2020.
Credit: Malachi Brooks.

WILDFIRE READY WATERSHEDS PROGRAM

Recognizing the challenges associated with post-fire risk assessment and recovery efforts, the Colorado Water Conservation Board developed a strategy and program that provides a proactive approach to address post wildfire impacts. Impacts are defined as risks posed by post fire hazards to community values such as water supplies, life and property, and transportation corridors. Common post fire hazards include increased runoff, debris flows, hillslope erosion, water quality impairments, flooding, and associated sediment erosion and deposition. The mission of Wildfire Ready Watersheds is to assess the susceptibility of Colorado's water resources, communities, and critical infrastructure to post-wildfire impacts and advance a framework for communities to plan and implement mitigation strategies to minimize these impacts – before wildfires occur.

The Wildfire Ready Watersheds program has a two-part focus:

"CWCB supports communities in characterizing the susceptibility of their watersheds...to post-fire impacts before a wildfire occurs."

1. Completion of a statewide post-fire susceptibility analysis and
2. Establishment of a framework that communities can use to perform watershed scale planning to address post fire hazards.

Statewide Susceptibility Analysis

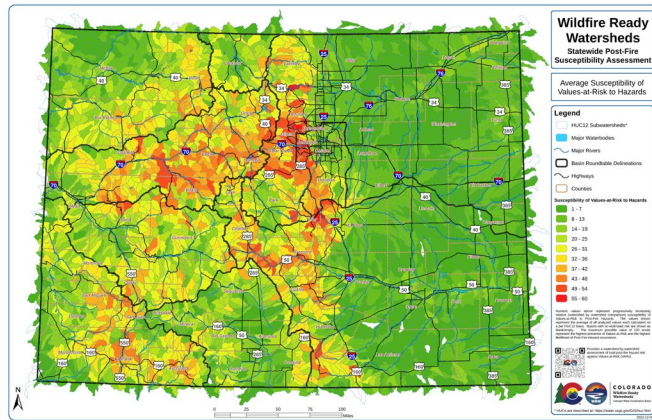
CWCB staff and technical consultants have finished the statewide analysis to determine the susceptibility of Colorado's water resources, communities, and critical infrastructure to post-wildfire impacts. This effort relied on existing statewide datasets for wildfire burn severity, critical water supplies, populations at risk, and infrastructure. The identification of post-fire hazards used a combination of existing hazard mapping, geologic and topographic data, and other related information to determine potential impacts on values at risk. Collaboration with basin roundtables, state and federal agencies, universities, and other community partners was critical in determining the best, most applicable data and data analysis methods.

Several maps are available that display statewide post-wildfire susceptibility for life and property, water infrastructure, and overall susceptibility that combines both types of values at risk. The map legends shows values that represent increasing relative susceptibility of values at risk (VARs) to post-wildfire hazards. This is more easily explained in the accompanying graphic.

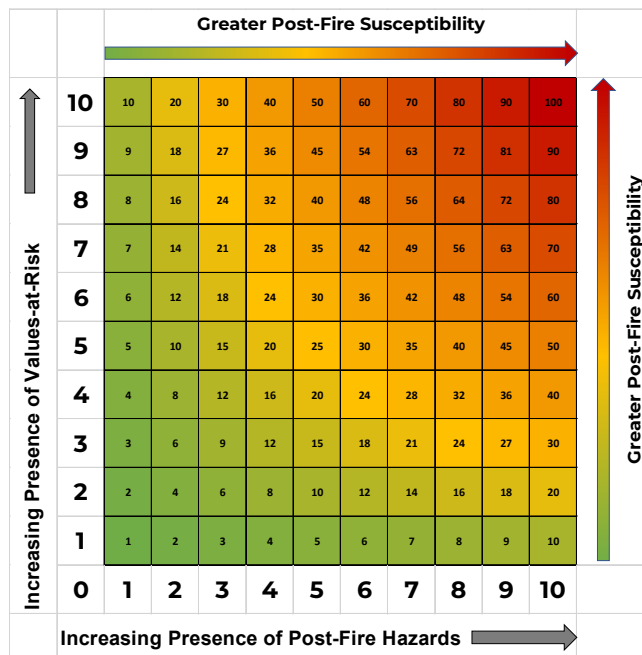
The Wildfire Ready Watersheds website also includes a statewide [post-fire susceptibility explorer](#) where interested parties can actively explore the data by turning on and off different values at risk and post wildfire hazard data layers. A single value at risk, e.g. reservoirs, can be explored with different hazards, e.g. debris flows or sedimentation, to better understand variables used to determine overall susceptibility.

Wildfire Ready Watersheds Framework

In order to assist and guide community-level planning, the WRW Framework was developed to guide communities and their watershed stakeholders to comprehensive **Wildfire Ready Action Plans (WRAPs)**. The

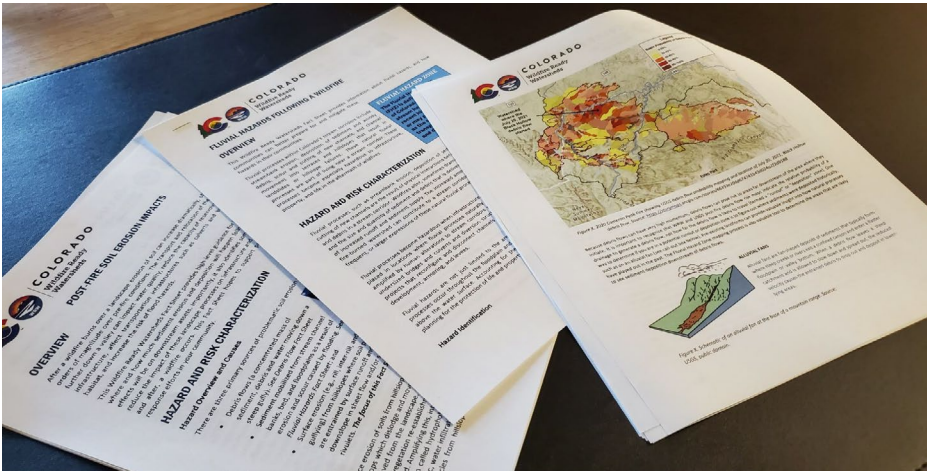


Statewide watershed-by-watershed assessment of values-at-risk from post-fire hazards (increased runoff, flooding, sediment, debris flow, fluvial hazards)



Risk assessment was performed by intersecting values-at-risk against hazards using the following scoring strategy:

- » VARs and Hazards are classified from 0-10.
- » Highest values represent greatest presence of value or hazard.
- » VAR and Hazard scores are intersected to generate overall risk score from 0-100.



A family of fact sheets has been developed providing high level overviews of post-fire hazards, GIS preparedness, post-fire planning, and water infrastructure.

WRAP is a planning process that develops two types of implementation plans:

- **Pre-disaster Preparedness Plan.** A plan that considers susceptibility and identifies projects and mitigation that can occur **before a wildfire occurs.** These mitigation actions are likely to be implemented with traditional forest treatment projects to maximize resiliency at landscape scales
- **Post-Disaster Preparedness Plan.** A plan to address threats to life and property **after a wildfire occurs.** These plans will support local, state, and federal agencies immediately following a fire, reducing response time, accelerating implementation of important mitigation activities.

Mitigation improvements identified and planned as part of a WRAP will include project types that can be implemented before and after wildfire. Many projects implemented after a fire are for immediate protection of life, property, and water supplies and have limited success as they are treating point of impact type problems with little regard to watershed health or stream function. Projects constructed before fire provide the same or better protections while also addressing multiple objectives in watershed health and water supply protection. These project types are designed to protect and enhance ecosystem structure and function within the watershed drainage network. Most implementation strategies will involve a mosaic of different project types employed across the watershed.

The WRW framework further describes and provides guidance on how to refine the susceptibility evaluations for local communities to utilize at watershed scales. It serves as a guide for best planning

practices in advance of a wildfire and also supports post-fire mitigation strategies.

The framework includes guidance on data collection and GIS preparedness, permitting and compliance, stakeholder identification and communication, hazard analysis and evaluations, engineering/modeling, pre and post fire management actions, design, and construction. All of this information is available on the program's website at www.wildfirereadywatersheds.com.

Award Criteria

How does the project enhance the public health, safety, and welfare?

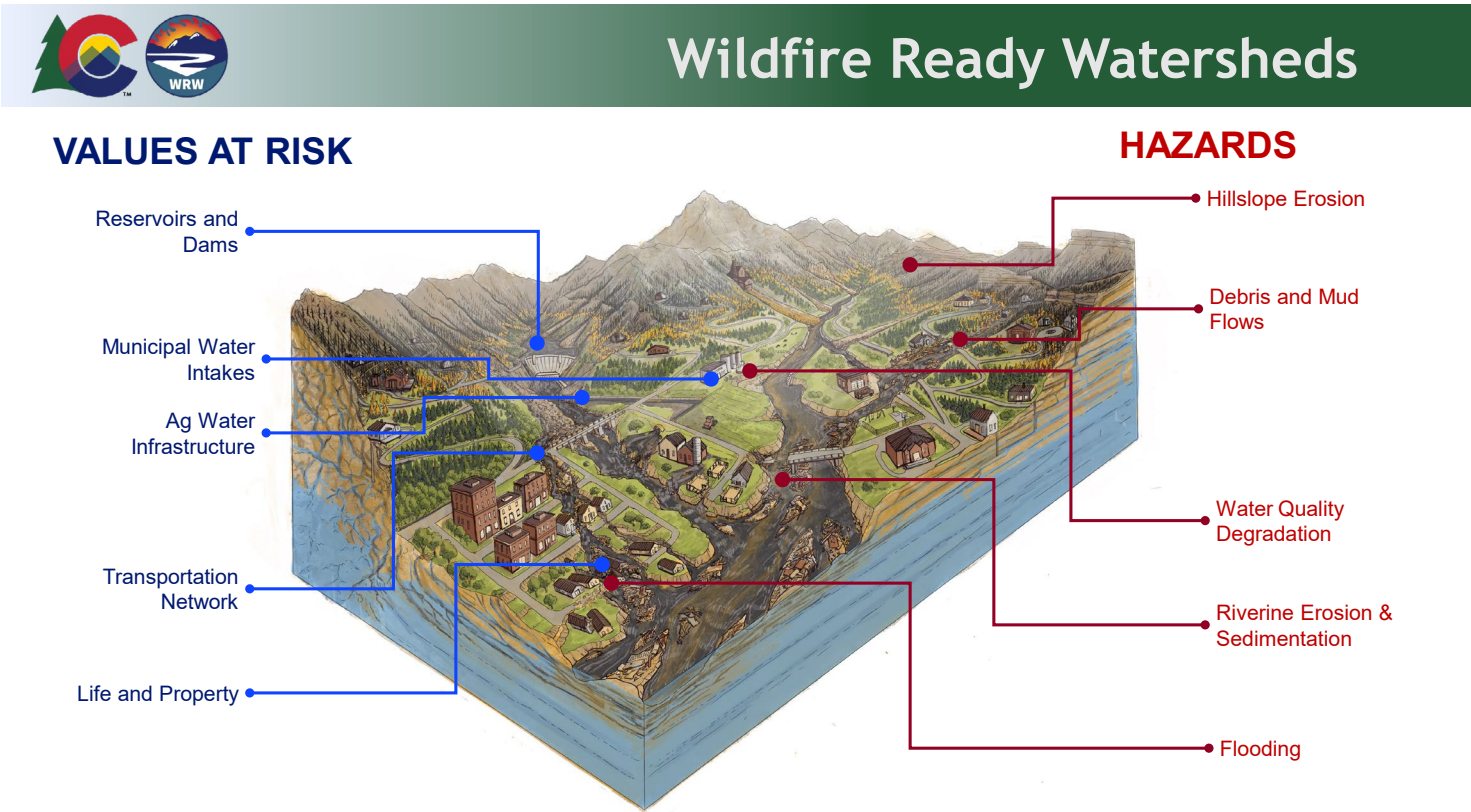
Nobody knows where the next wildfire will occur, but this program enables communities everywhere to be ready before one takes place. WRW seeks to identify and plan for post-fire hazards before

and agencies so that they can better plan for wildfire mitigation via forest management projects as well as planning for and implementing post-fire hazard mitigation.

Additionally, communities that are susceptible are being encouraged to develop detailed landscape-scale susceptibility and mitigation plans to address these hazards. These plans will not only be useful after a fire occurs to immediately implement mitigation, but will be used to inform holistic watershed-scale projects to mitigate post-fire hazards.

Does the project incorporate creative, unique, or innovative solutions?

Historically, post-fire hazard assessment has occurred immediately after a fire, but WRW offers a unique approach to performing these analyses before a fire occurs allowing for better planning and mitigation strategies ahead of a disaster.



Graphic displaying typical values-at-risk and associated post-fire hazards. This is the foundation for performing a Wildfire Ready Action Plan (WRAP) under the Wildfire Ready Watersheds program. Credit: Maisie Richards. Graphic developed under CWCB WRW Program.

wildfires occur. On a statewide level the CWCB has determined, and made publicly available, watershed susceptibility mapping presenting risk to reservoirs, water delivery systems, aquatic resources, transportation systems, and life and property to several post-fire hazards including changes in runoff, flooding, hillslope erosion, debris flow, and fluvial/erosion zones. These multi-hazard susceptibility maps can be used to inform communities

WRW seeks to address the challenges of post-fire hazards by seeking not only to develop a plan to implement mitigation after a fire occurs (Post-Disaster Preparedness Plan), but to develop a plan to implement watershed- or corridor-scale projects that mitigate post fire hazards before a fire occurs (Pre-Disaster Preparedness Plan). These pre-disaster actions are meant to be multi-benefit, not only addressing post-fire hazards, but also improving watershed and stream function.

Can the project serve as a model for other communities and/or projects?

WRW is already generating significant interest in many Colorado communities as well as other states and federal agencies. The program and associated framework has been set up to be implemented in any location susceptible to wildfires. The fact sheets, Wildfire Ready Action Plan scope of work template, and susceptibility methodology is well documented and available for communities to use to evaluate their post-fire susceptibility and implement planning measures to determine mitigation measures to protect life and property.

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