

Effects of Fire on Raw Water Quality

Stay on Top of the Situation

Exercise and maintain your plan, and keep informed of current conditions in your area.

Create a Maintenance Plan

- Identify and schedule seasonal tasks
- Review and update the plan as operations at your utility change

Conduct Drills for your Staff

- Test your contact lists every six months to ensure accuracy of information
- Make sure all staff understand where to find information and help during a wildfire emergency

Monitor Conditions

- Rocky Mountain Research Station, USDA, Forest Service, <http://fireweather.info>
- Colorado State Forest Service, <http://csfs.colostate.edu/>
- Colorado Division of Emergency Management, http://dola.colorado.gov/dem/public_information/firebans/fireinfo.htm
- USGS Real-Time Water Data, <http://waterdata.usgs.gov/co/nwis/rt>

More Information

Emergency Preparedness Tools for Utilities, www.cowarn.org

Firewise Communities, <http://www.firewise.org/>

Fire Resistant Landscaping, <http://csfs.colostate.edu/pdfs/06303.pdf>

Grass Seed Mixes to Reduce Wildfire Hazards, <http://csfs.colostate.edu/pdfs/06306.pdf>

Creating Wildfire-Defensible Zones, <http://csfs.colostate.edu/pdfs/06302.pdf>

Prescribed Fire in Colorado, <http://csfs.colostate.edu/pdfs/rxfire.pdf>

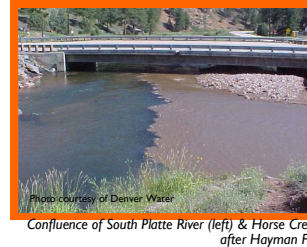
Firewise Construction, http://csfs.colostate.edu/pdfs/construction_booklet.pdf

Soil Erosion Control After Wildfire, <http://csfs.colostate.edu/pdfs/06308.pdf>

Ready Colorado, <http://readycolorado.com/>

When a wildfire burns vegetation that secures the soil, runoff rates increase, bringing a surge in sediments and debris to streams and reservoirs that can result in numerous water quality concerns:

- Low dissolved oxygen (DO)
- Fish kills and other ecological changes
- Increased turbidity, suspended solids, and conductivity
- Increased total organic carbon (TOC)
- Increased ammonia from fire retardants
- Clogged intakes and increased sludge handling
- Elevated phosphorus, iron, manganese, and nitrate levels
- Unpleasant taste and odor
- Changes in pH and alkalinity



What can you do at your drinking water treatment facility?

Join CoWARN to become part of a network of utilities helping each other to recover quickly from emergencies. www.cowarn.org

Build detention ponds to mitigate some of these issues by allowing solids to settle before entering the plant.

Keep intakes clear of sticks, logs, and other debris.

Monitor filters and increase backwashing, as necessary.

Plan for increased maintenance and operator workload.

Identify alternate water supplies and fill finished water storage prior to an anticipated poor water quality event.

Monitor raw water frequently, and perform jar testing to predict treatment needs.

Keep necessary chemicals on hand, and be prepared to tweak the dosage within accepted operating parameters.

If in doubt, check with the Engineering Section at the Water Quality Control Division. <http://www.cdphe.state.co.us/wq/engineering/techhom.html>

COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT

Water Quality Control Division
Drinking Water Security & Preparedness Program
<http://www.cdphe.state.co.us/wq/drinkingwater/EmergencyResponse.html>

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Fire Management Planning for Public Water Systems



Neva Fire, Plant at Left Hand Canyon

Colorado's forests have been devastated by the pine beetle, and the plains regions are extremely dry. Throughout Colorado, conditions are perfect for large-scale wildfires.

Is your water system ready for another major wildfire?



COLORADO DEPARTMENT OF
PUBLIC HEALTH & ENVIRONMENT

**Safe Drinking Water Program
Water Quality Control Division**

Create a Fire Management Plan for Your Water System

Use the steps outlined below to identify and prioritize hazards, develop and implement an action plan to mitigate fire hazards, and create an annual maintenance schedule to ensure your water system is as fire safe as you can make it.

- Talk to your local fire officials
- Create a defensible zone
- Identify vulnerabilities
- Remove fuels
- Reduce structure ignitability



Defensible Zone Around Plant at Left Hand Canyon After Neva Fire

Talk to your local fire officials

Ask them for suggestions about state and local fire codes.

- Team up to identify hazards at your site.
- Discuss the ways you can help them protect your utility, such as creating fire breaks and maintaining fire roads.
- Pool your resources by setting up or joining a community wildfire protection planning group.

Create a defensible zone

Consider the effects natural and man-made features have on the spread of fire.

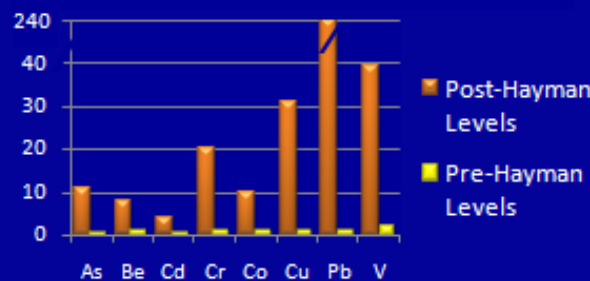
- Ridges can retard the speed at which a fire advances.
- Canyons and steep slopes can easily double the rate of spread.
- Fire breaks and fire roads create a buffer zone and provide a vantage point for fighting fires.

Identify Vulnerabilities

Think about facility components that can be damaged by wildfire.

- Protect your power. Remote control of system components, such as tanks, may be disabled if fire takes out power to those components.
- Protect your pump and well houses, wellheads, chemicals, and chlorinators.
- Help firefighters protect your assets by using GIS to map remote components. Keep a copy of the map in a secure offsite location.
- Understand the effects fire can have on raw water quality and the water treatment processes.

Metals Levels in South Platte River after Thunderstorm in Burn Area ($\mu\text{g/L}$)



Data courtesy of Denver Water



Pine Beetle Kill, Berthoud Pass

Remove Fuels

Fuels can consist of vegetation, chemicals, and many other materials such as oily rags, trash, cardboard boxes, and wooden pallets.

- Prescribed burns can effectively remove understory fuel. Conduct prescribed burns under the direction of a fire manager.
- Remove tree branches within six feet of the ground.
- Store fuels a safe distance from structures.
- Ask the local power utility to trim tree branches near power lines.
- Thin out continuous tree and brush cover around structures. All flammable vegetation should be removed within 15 feet of a structure.

Reduce Structure Ignitability

Fires can take hold quickly. Making structures less ignitable is an important part of a fire management plan.

- Trim tree branches overhanging a roof.
- Keep gutters clear of leaves and debris. Inspect at least twice yearly.
- For new construction, repairs, or remodels, use fire-resistant roofing and building materials.