

IDENTIFICATION, MITIGATION AND RESPONSE

CDPHE and wildfires

WILDFIRE MATTERS REVIEW COMMITTEE | SEPT. 2, 2021



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Department of Public
Health & Environment

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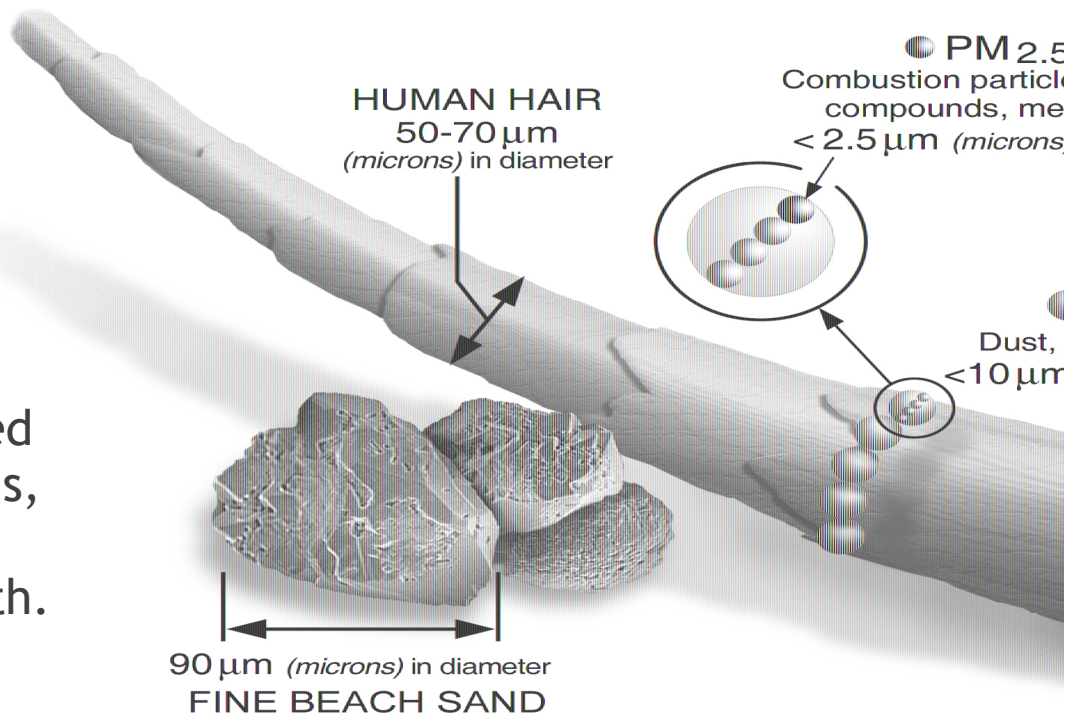
P.E., C.W.P.

Air

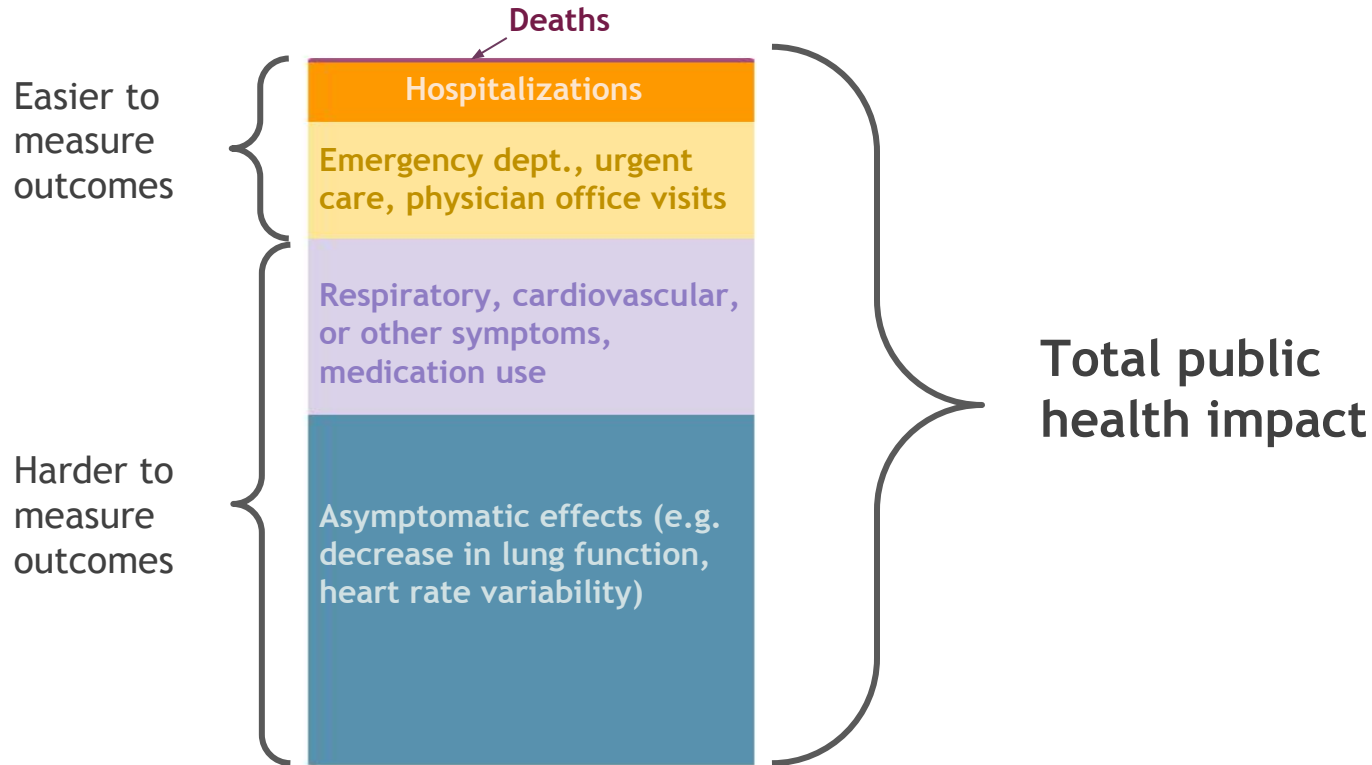


Health impacts of wildfire smoke

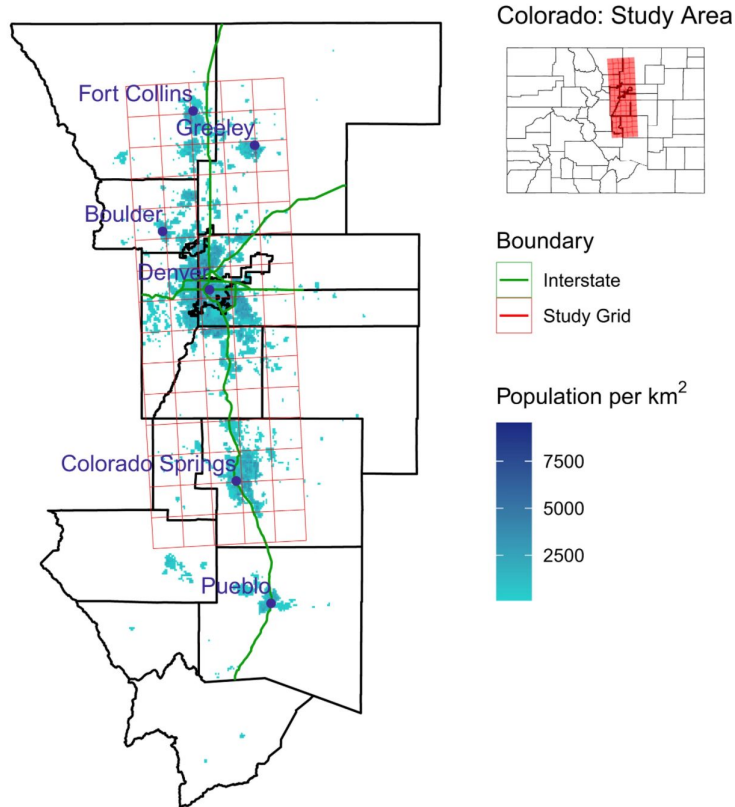
- Particulate matter (PM_{2.5}) is the main health threat from wildfire smoke.
- **Minor effects:** eye and respiratory tract irritation.
- **Serious effects:** reduced lung function, bronchitis, asthma attacks, heart failure, premature death.



Public health impacts can be hard to measure



Health impacts: Colorado research



- PM2.5 from wildfire smoke is associated with increases in respiratory and cardiovascular hospitalizations.
- While people take precautions to reduce exposure when a wildfire is close to home, people farther away from the fire are less likely to protect themselves.

<https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2020GH000330>

How people can protect themselves

Choices for some individuals

- Use the air quality index (AQI) to make decisions about activities.
- Wear N95 or P100 respirators.
- Buy and use HEPA air cleaners.
- Buy and install high-efficiency furnace/AC filters.
- Stay indoors.
- Keep the windows closed and the air conditioning on.
- Relocate during wildfires.



APCD Forecasting Unit

- Issues air quality forecasts twice a day through our own system (via website and email), and once a day through the EPA's AirNow website.
- Updates Colorado Smoke Outlook at least twice daily on the CDPHE APCD website.
- Issues Air Quality Health Advisories anywhere in the state when conditions warrant, including for wildfire smoke.



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Wildfire smoke

- Threat is highest during the summer but can occur at any time of year.
- Source regions
 - In-state
 - Out-of-state transport
- Primary health concern: Fine Particulates ($PM_{2.5}$).



Williams Fork Fire 8/14/20 | Credit: Christopher Laplante

COLORADO SMOKE OUTLOOK:

Tuesday, August 25, 2021, 7:45 AM MDT

An influx of out-of-state wildfire smoke is expected Wednesday morning across the northeastern quarter of Colorado, including the northern Front Range region of Denver, Boulder, Ft. Collins and Greeley. Across northeastern Colorado, unusually sensitive people should consider reducing prolonged or heavy exertion on Wednesday. The threat for wildfire smoke will increase for central and western portions of Colorado starting late Thursday and continuing into Friday. We will continue to monitor the situation and provide updates as more forecast information becomes available.

https://www.colorado.gov/airquality/colo_smoke.aspx



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Now available in English and Spanish

https://www.colorado.gov/airquality/colo_advisory.aspx



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Air Quality Health Advisory for Wildfire Smoke

Issued for northern Routt County

Issued at 2:00 PM MDT, Saturday, July 10, 2021

Issued by the Colorado Department of Public Health and Environment

Affected Area: northern Routt County. Locations include, but are not limited to Glen Eden and Clark.

Advisory in Effect: 2:00 PM MDT, Saturday, July 10, 2021 to 9:00 AM MDT, Sunday, July 11, 2021.

Public Health Recommendations: If smoke is thick or becomes thick in your neighborhood you may want to remain indoors. ***This is especially true for those with heart disease, respiratory illnesses, the very young, and the elderly.*** Consider limiting outdoor activity when moderate to heavy smoke is present. Consider relocating temporarily if smoke is present indoors and is making you ill. ***If visibility is less than 5 miles in smoke in your neighborhood, smoke has reached levels that are unhealthy.***

Outlook: Areas of moderate to heavy smoke can be expected in close vicinity of the **Morgan Creek** wildfire in northern Routt County. Although smoke will generally lift into the free atmosphere through Saturday evening, smoke will begin to drain to lower elevations by late Saturday evening and continue through Sunday morning. This will likely bring periods of heavy smoke to areas below the fire along Morgan and Reed Creeks, eventually draining into the Elk River Valley impacting the communities of Glen Eden and Clark.

For the latest Smoke Outlook, visit:

<http://www.colorado.gov/airquality/addendum.aspx#smoke>

For more information about smoke and your health, visit:

<http://www.colorado.gov/airquality/wildfire.aspx>

For the latest Colorado statewide air quality conditions, forecasts, and advisories, visit:

http://www.colorado.gov/airquality/colorado_summary.aspx

Social Media:

<http://www.facebook.com/cdpheapcd>

<http://twitter.com/cdpheapcd>

Air quality health advisories for wildfire smoke

- 2011: 6
- 2012: 58
- 2013: 43
- 2014: 0
- 2015: 10
- 2016: 42
- 2017: 33
- 2018: 133
- 2019: 46
- 2020: 167
- 2021: 48 (through 8/25)



Near Estes Park, October, 2020 | Credit: Kent Carlson

How do we distribute our air advisories?

- E-mail subscription service
(https://www.colorado.gov/airquality/request_alerts.aspx)
- CDPHE website
(https://www.colorado.gov/airquality/colo_advisory.aspx)
- Twitter (<http://twitter.com/cdpheapcd>)
- Facebook (<http://facebook.com/cdphe.apcd>)
- National Weather Service Office home pages
(<https://www.weather.gov/>)



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Deployable monitors

- Some monitors deployed semi-permanently. Others kept in a cache for short-fuse deployment based on strategic objectives (e.g. drainage below a wildfire).
- **32 Purple Air monitors:** Require a power source and wi-fi connection.
- **7 Canary-S monitors:** Very similar to Purple Air monitors, but solar powered so can be deployed in remote areas.

Canary-S Air Quality Monitoring System



Outdoor burning

Open burning

- Less than 50 small piles per year.
- No reporting requirements.
- No charge for permit.

Smoke management

- Prescribed fire projects to reduce hazardous fuels & mitigate wildfire risk.
- Daily permit conditions.
- Daily notification & activity reporting.
- Fees recover cost of program.



St. Louis Creek, Fraser Experimental Forest February 2021

Smoke Management Program standard permits

- Daily limits based on
 - Fuel type.
 - Type of community (rural or non-attainment area).
 - Distance to nearest residences.
 - Forecasted dispersion conditions.
- Daily acres allowed.
- End time (for ignition).
- Fuel reduction, emission reduction and smoke management considered.



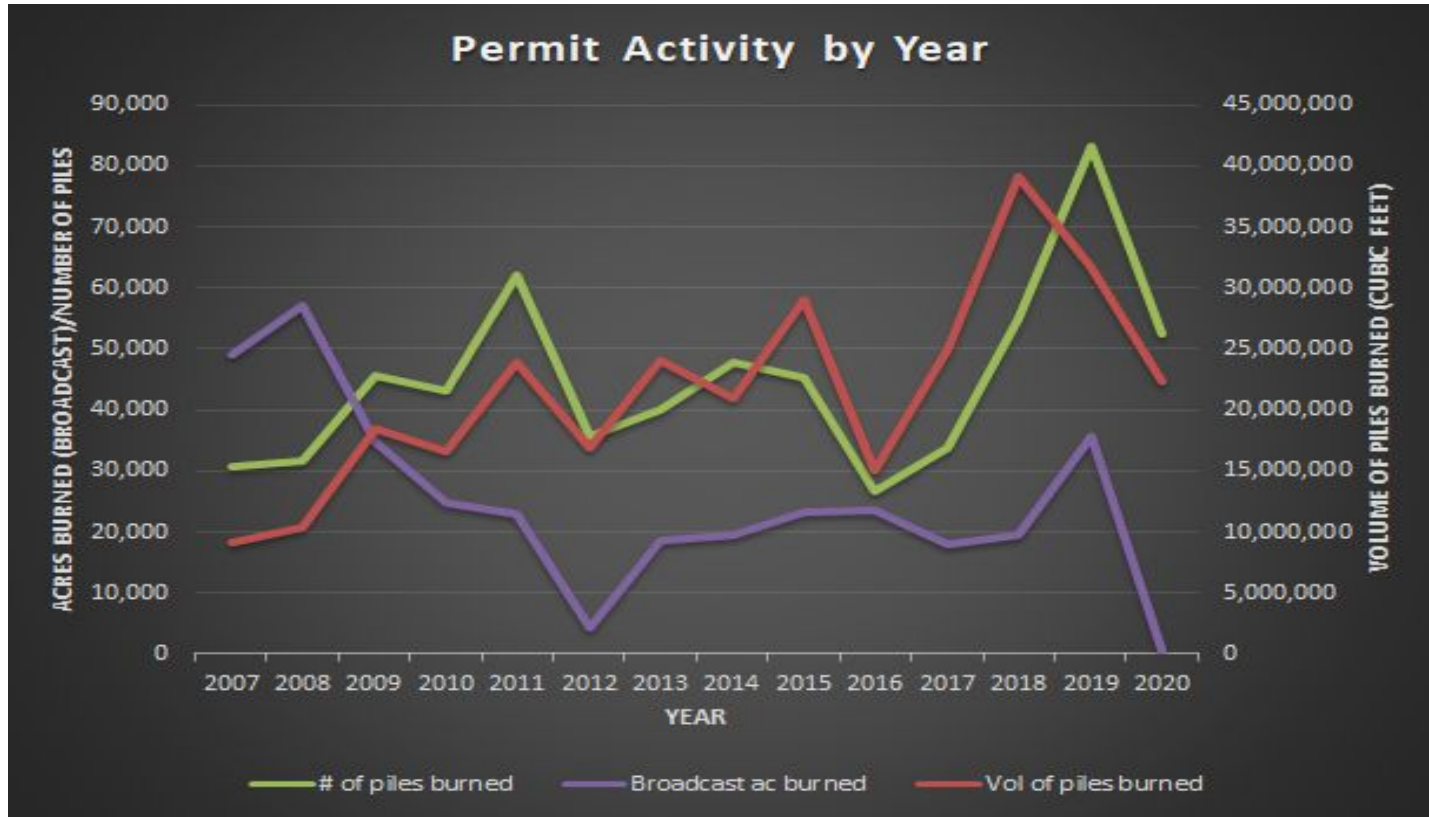
Non-standard permits

- Customized permit conditions for complex projects
- Animas City Mountain, BLM project near Durango
 - 700 acre burn proposed for fall 2021 (earliest)
 - Significant wildfire prevention benefits, with potential for smoke impacts
 - Extensive community outreach by BLM
 - APCD Public Comment Period on Draft Permit closed Aug. 30, 2021
 - Significant fuels reduction in past 10 years
 - Early end times for ignition each day
 - Real-time monitors to be deployed
 - 2nd day permit conditions will be adjusted, if needed, based on monitoring



Animas City Mountain, APCD site visit, May 13, 2021

Smoke Management Program trends



Developing online permitting and reporting system

- APCD and OIT are developing an online system for the Smoke Management Program.
- Should be ready for our customers to use by the end of 2021.
- Will allow permittees to apply for permits and complete Notification and Activity Reports
 - Reduction of time to complete paperwork
 - Reduction of errors in paperwork submittals
 - Reduction in time for APCD to prepare permits and enter notification/activity data
- Will use Hyland OnBase platform.



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CO-CAMP

Colorado Clean Airshed Management Program
Smoke Management Permit and Activity Submission Portal

Water

CDOT



A close-up photograph of a hand holding a clear glass. Water is being poured from above into the glass, creating a large, dynamic splash with many droplets and bubbles. The background is plain white. On the far left of the slide, there are two vertical bars: a dark blue one and a green one.

Health impacts of wildfire-affected water

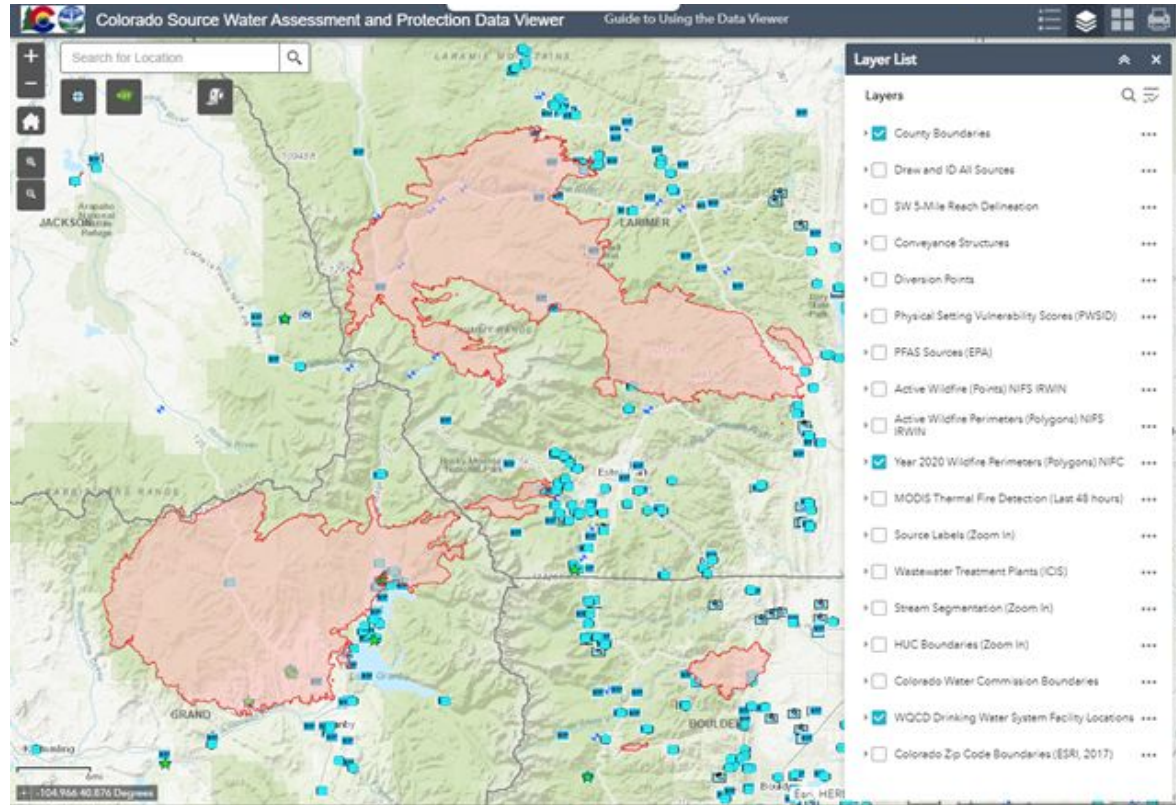
Bacterial contamination

- Destroyed/damaged infrastructure.
- Plant material can interfere with chlorination.
- Short-term risk.

Chemical contamination

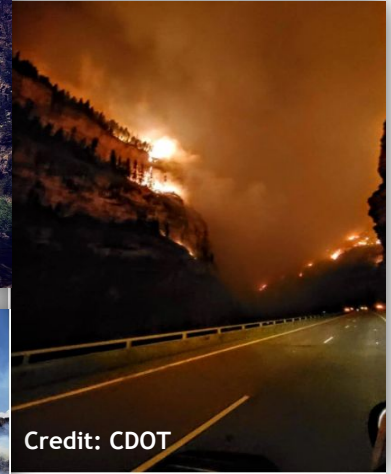
- Plant material can lead to disinfection byproducts.
- Burning produces carcinogens.
- Longer-term, usually addressed through treatment.

Tracking impacts to water and wastewater systems



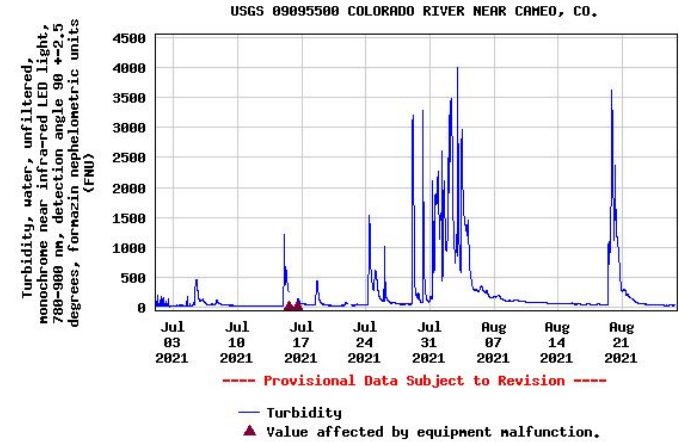
Drinking water warnings

- Based on impacted water wells, pipes, storage tanks.
- Typically warning not to drink the water immediately after the public being allowed back into area.
- Flushing out system, assessing damage, confirming free from bacteria.



Water quality impacts from wildfires

- Erosion/sedimentation.
- Increased metals.
- Increased total organic carbon
 - disinfection byproducts issues.
- Low dissolved oxygen.
- Nutrient loading - harmful algal blooms.
- Increased pathogen/bacteria contamination risks.
- Water treatment challenges (ex: coagulant, chlorine demand).



Post wildfire water quality response

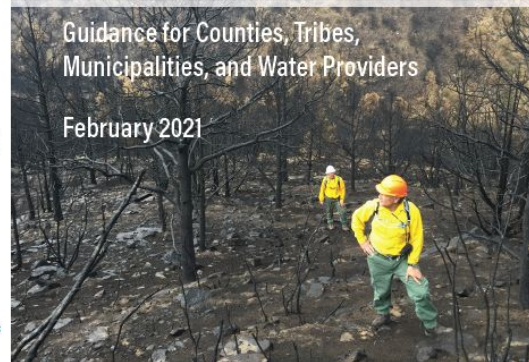
- Coordinate on forest service report and watershed assessments.
- Post wildfire playbook implementation/coordination.
- Share prioritization data (infrastructure and watershed).
- Remediation and stabilization issues.
- Long term water quality impacts and relationship to treatment.



Colorado Post-Fire Recovery Playbook

Guidance for Counties, Tribes, Municipalities, and Water Providers

February 2021



Nonpoint Source (NPS) Program

- Program funds projects
 - Restore and protect water bodies from pollution
- >\$5M Spent on Wildfire-related work
- 38 projects that restore or plan for wildfire-related pollution
- 29 on-the-ground projects to control wildfire pollution
- 6 watershed-based plans relating to wildfires

H₂O Jo and Flo



*Keep it Clean,
'cause we're all Downstream*



Photo Courtesy Denver Water



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