



The Marshall Fire

December 30, 2021

Before, During and After – Lessons Learned

Jill and Douglas Minter
Louisville, Colorado
February 10, 2022



Words used to describe the Marshall Fire:
“apocalyptic” “surreal” “a hurricane of smoke and fire” “like a war zone”

Background - Some Important Fires

2012 – Waldo Fire, Colorado Springs, CO

2018 – Camp Fire, Paradise, CA

2020 – Cameron Peak Fire, Larimer County, CO

2020 – East Troublesome Fire, Grand Lake and Granby, CO

2020 – Calwood Fire, Boulder County, CO



Waldo Canyon Fire

Colorado Springs, CO

June 2012

- Wildland-Urban Interface (WUI) fire
- Spread by embers
- 32,000 evacuated from Colorado Springs, Manitou Springs, Woodland Park and US Air Force Academy
- Burned 18,247 acres, 346 homes, 2 lives lost
- 10 years later, survivors are helping those impacted by Marshall Fire

Wildfire Today story on Waldo Canyon Fire with link to NIST report -
<https://wildfiretoday.com/2015/11/10/nist-releases-report-on-waldo-canyon-fire-that-burned-344-homes/?hilit=waldo+canyon+fire>

Camp Fire

Paradise, CA

Nov 2018 (late season)

- Deadliest and most destructive fire in CA history
- WUI fire spread by wind and embers
- *Fast and furious - “a football field a second”*
- 95% of town burned in 6 hours
- Burned 153,336 acres, 18,804 structures (11,000 homes), 85 lives lost

Must view - *Fire in Paradise* (full film) | PBS FRONTLINE

<https://www.youtube.com/watch?v=F3OX1PR2SCM>





Cameron Peak Fire

Larimer County, CO

Aug-Dec 2020 (late season)

- Largest fire in CO history (megafire)
- Fast - grew sixfold in 24 hours
- Burned 208,663 acres, 469 structures
- 20,000 people evacuated including Town of Estes Park
- With East Troublesome Fire, burned 9% of Rocky Mountain National Park
- Post-fire mudslides in 2021, 3 lives lost

Feb 2022 Estes Park *Trail Gazette* story on \$2 million grant for wildfire recovery –

<https://www.eptail.com/2022/02/04/congressman-neguse-announces-2m-grant-for-cameron-peak-east-troublesome-wildfire-recovery/>



East Troublesome Fire

Grand Lake and Granby, CO

Oct 2020 (late season)

- Second largest fire in CO history (megafire)
- Wind driven, 80 – 120 mph gusts, exploded in size
- Fast - 15 minutes to pack up and run
- Embers carried by wind crossed the Continental Divide
- Burned 193,812 acres, 580 structures, 2 lives lost
- Evacuation of over 35,000 people in Grand Lake, Granby and Estes Park
- Survivors are helping those impacted by Marshall Fire

Denver 7 story on resilience and recovery -

<https://www.thedenverchannel.com/news/wildfire/the-untold-stories-of-resilience-and-recovery-in-grand-lake-after-the-east-troublesome-fire>

Calwood Fire

Boulder County, CO

Oct 2020 (late season)


- Largest fire in Boulder County in terms of acreage
- Burned 10,106 acres, 24 structures, 16 homes
- Fast - 15 minutes to evacuate and drive through flames to escape
- Could see fire from Louisville

CPR News story, October wildfires unusual and sign of things to come -

<https://www.cpr.org/2020/10/19/october-wildfires-like-boulders-calwood-fire-are-unusual-and-a-sign-of-things-to-come/>



Before the fire

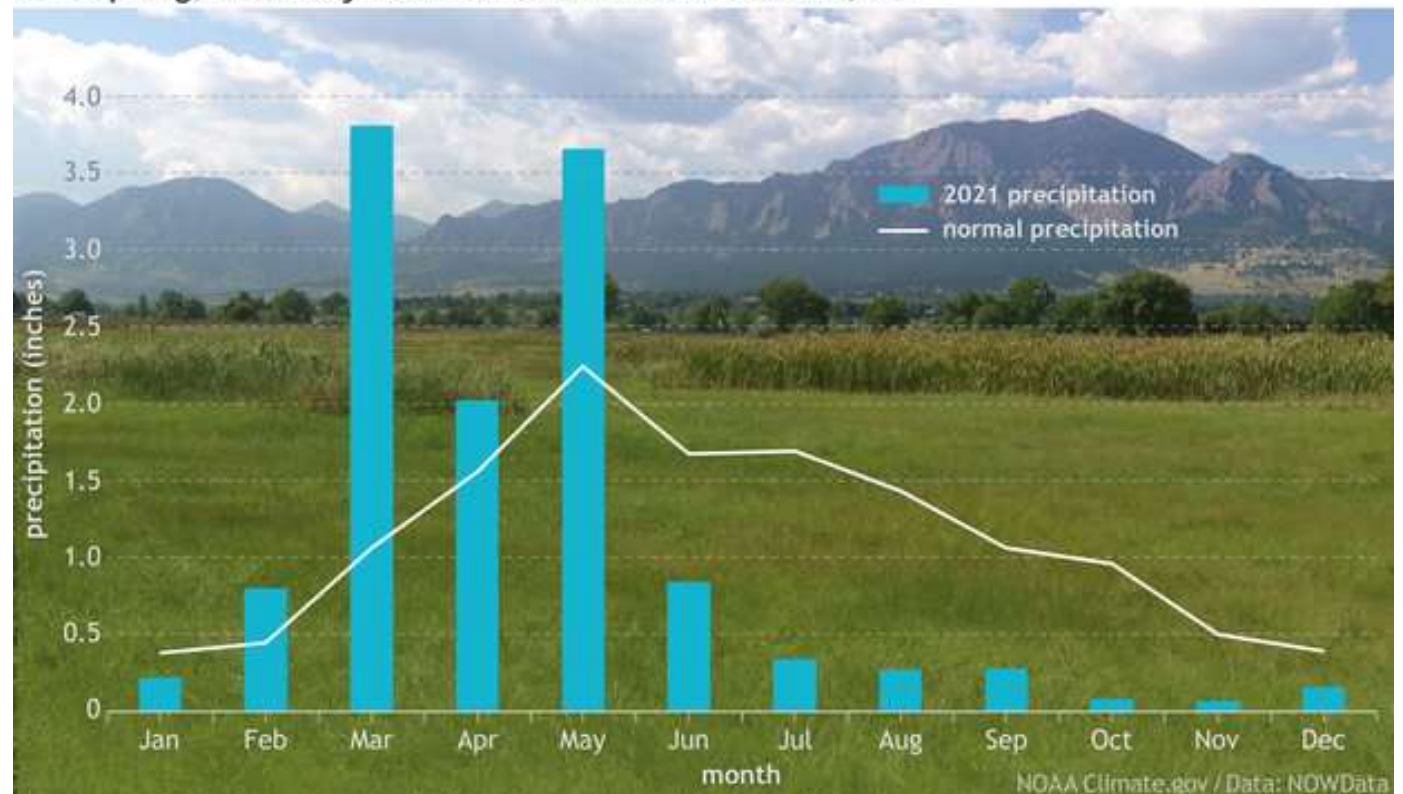


Should a grassland wildfire on the Front Range in December have been surprising?

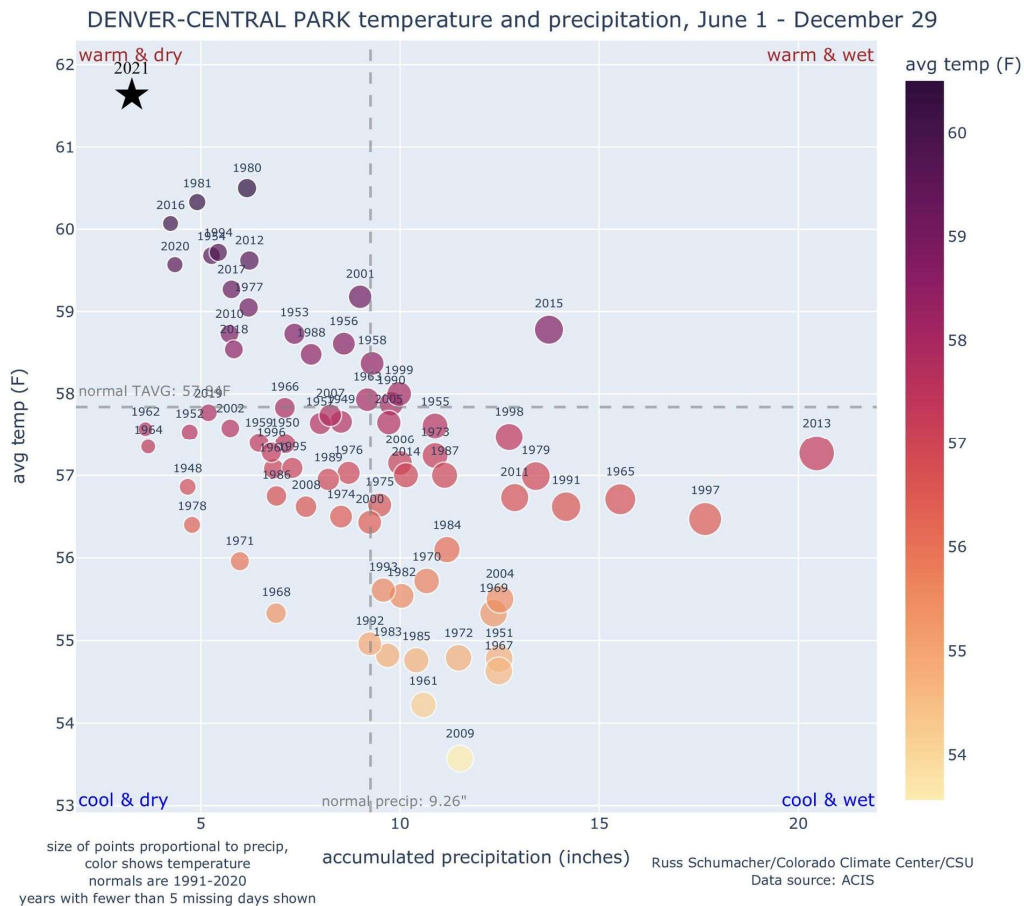
2021 Precipitation Compared to Normal

- Exceptionally wet spring.
- Summer and fall were exceptionally dry.

Wet spring, bone-dry summer and fall near Boulder, CO



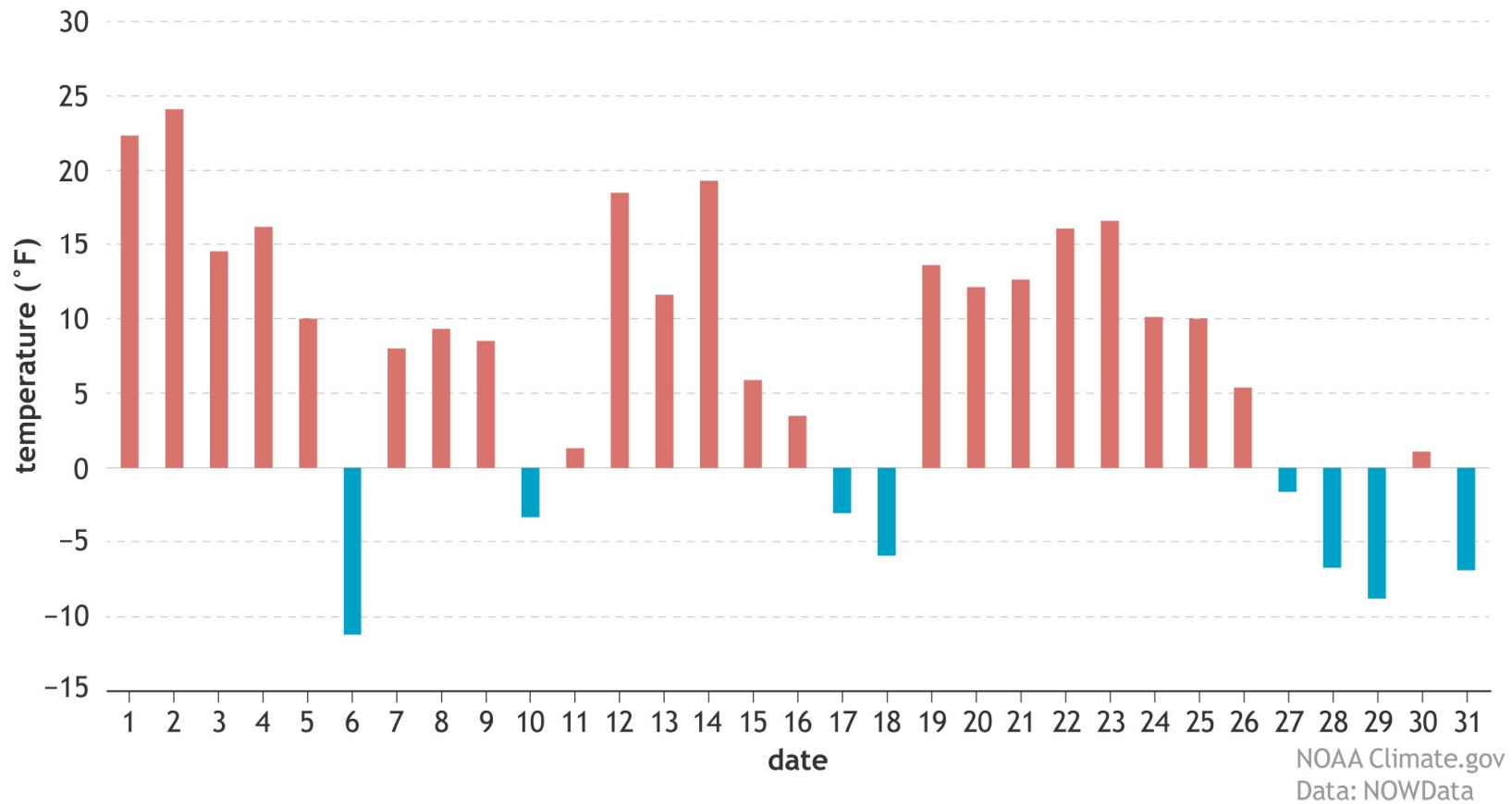
Precipitation and Temperature – June 1-Dec 29



- Graphs allows comparison of 2021 June 1-Dec 29 precipitation and temperature to past years.
- Note that 2021 (star on top left) is exceptionally warm and extremely dry.
- 2013 (far right) is the year of the Colorado flood.

Very Warm December

Difference from normal temperatures for Boulder, Colorado (December 2021)



Snow Drought

- Late and minuscule first snowfall.
- First snowfall was on December 10, 2021.
- Total snowfall was 0.3 in.
- No additional snow in December.
- Average Oct-Dec snowfall for Boulder County is ~25 in.



NWS Boulder @NWSB... · 12/10/21 · · ·

With snow today, Denver also ends up in a tie for the longest snowless streak on record at 232 days! ❄️ The previous record was set in 1887. [#cowx](#)

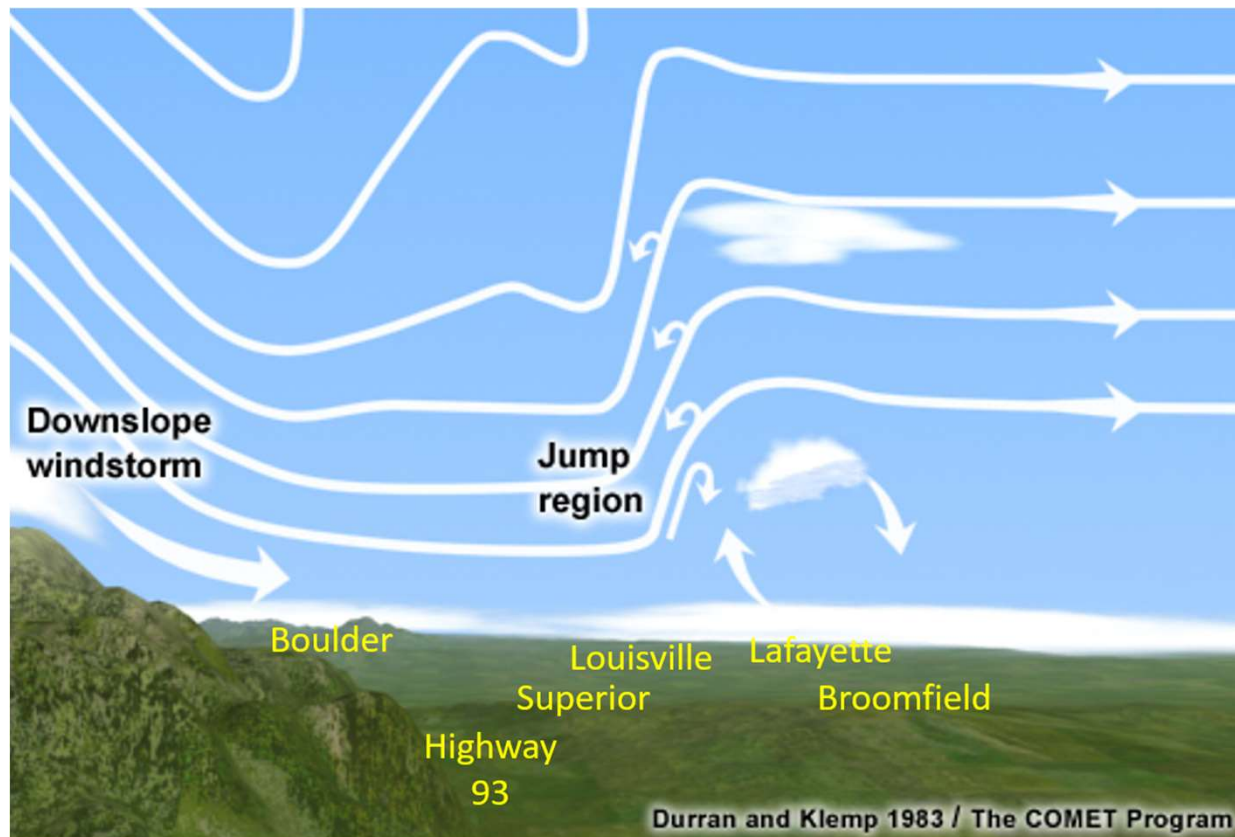
weather.gov/bou/DenverSnow...

(1/3)



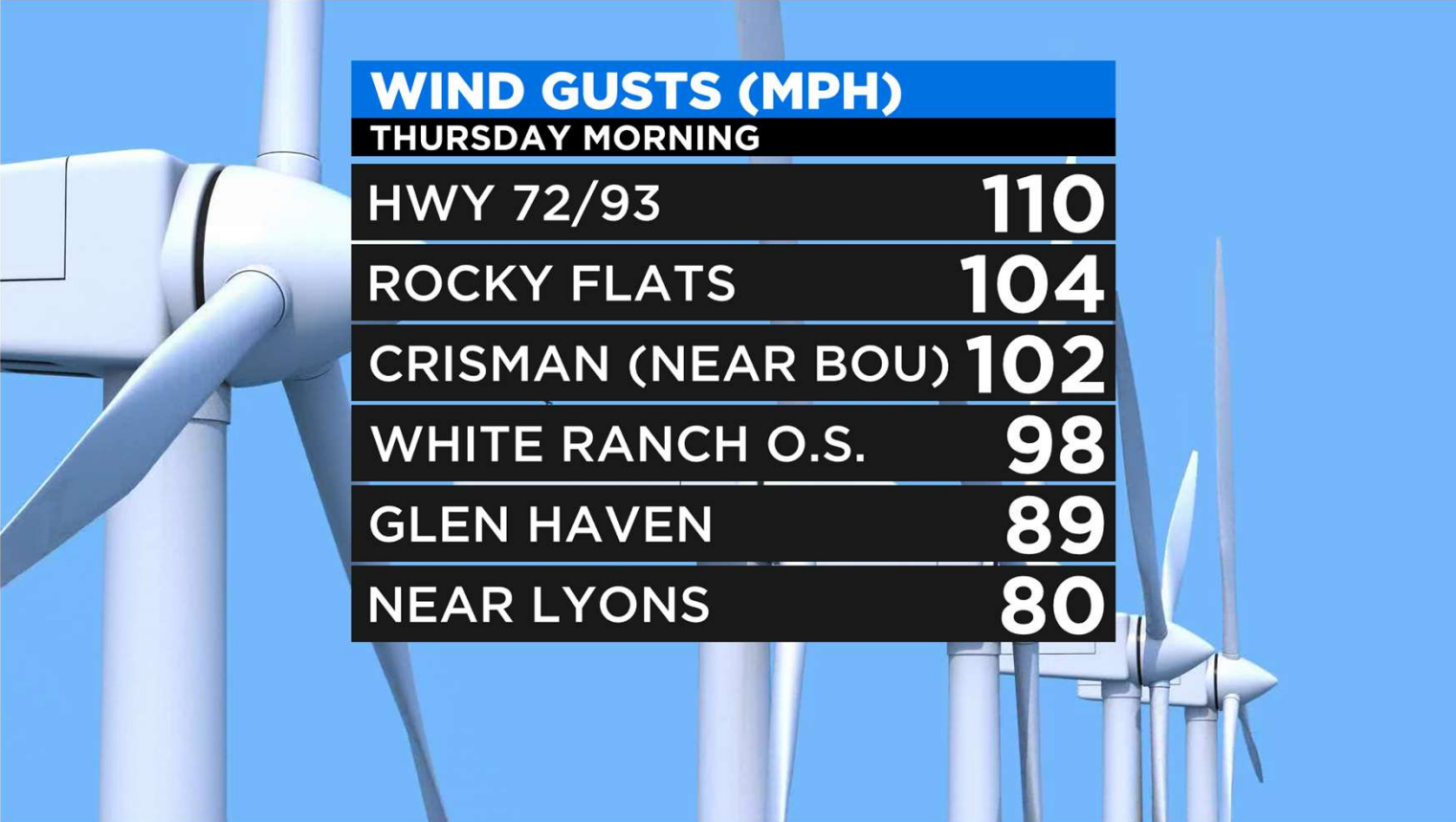
3 46 138

Downslope Winds - December 30, 2021



National Weather Service - https://www.weather.gov/bou/HighWinds12_30_2021

Wind Gusts – morning of December 30, 2021



WIND GUSTS (MPH)	
THURSDAY MORNING	
HWY 72/93	110
ROCKY FLATS	104
CRISMAN (NEAR BOU)	102
WHITE RANCH O.S.	98
GLEN HAVEN	89
NEAR LYONS	80

CBS 4 Denver - <https://denver.cbslocal.com/2021/12/30/high-wind-warning-denver-weather-coal-creek-canyon/>

Perfect Storm for a Catastrophic Wildfire

1. ***Wet spring*** – above average growth of grass
2. ***Followed by exceptionally dry*** July through December
3. ***Heat*** - Unusually warm summer, fall and winter
4. ***Snow drought*** – No significant snowfall
5. ***Wind*** – Downslope winds with gusts 80-100+ mph

If any one of these conditions were absent, there probably would not have been a catastrophic wildfire.

Add the
following

A source of
ignition



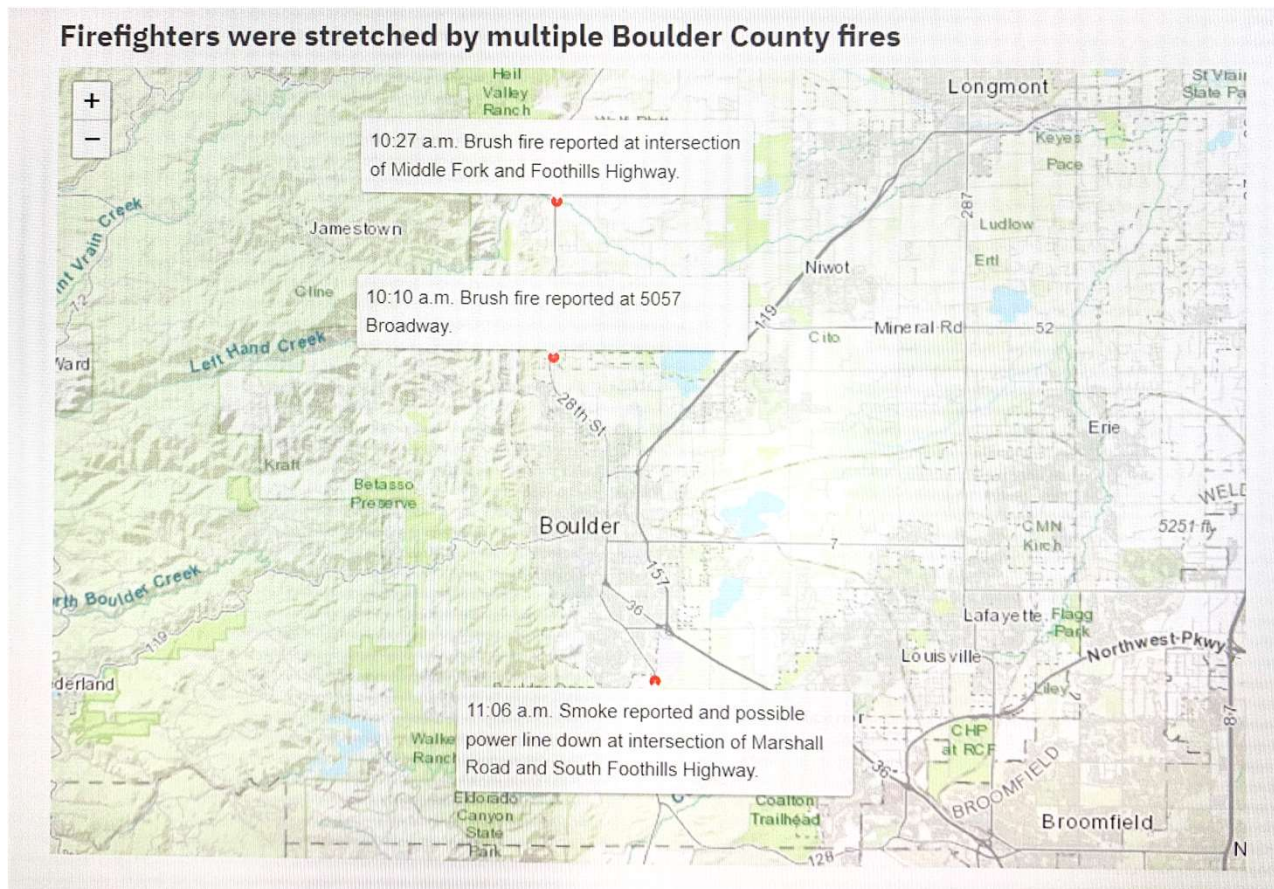
Three sources under investigation: 1) Human activity; 2) Downed power lines; and 3) Underground coal fire.

Denver 9 News January 27, 2022

<https://www.9news.com/video/news/local/wildfire/marshall-fire/marshall-fire-origin-may-have-more-than-one-site/73-9f6b5b27-9d9c-4e83-b953-c273a15a04fd>

Last, firefighters stretched thin by multiple fires

- No “red flag” warning. High wind warning.
- Fed Ex truck blew off road. Power lines down.
- Two grassland wildfires in County earlier that morning.
- Middle Fork fire had potential to become catastrophic.
- New fire at 11:06. Reached in 4 minutes. Couldn’t find fire for 11 minutes. 3 minutes later, Marshall Fire was beyond control.
- **Improvement needed** – Coordination between 3 dispatch centers. Response based on wildfire risk and weather.





October 16, 2020

Smoke from the Cameron Peak and East Troublesome
Fires from our backyard and from Boulder



October 17, 2020

Smoke from the
Calwood Fire
seen from
our front yard





June 1, 2021
Coalton Trail, Superior

“looks like Ireland”



June 11-13, 2021
Wildfire Restoration
Poudre Canyon
Cameron Peak Fire



December 25, 2021
Davidson Mesa, Louisville

Five days before the Marshall Fire and bone dry

December 27, 2021
Grass fire near Chatfield Reservoir, Littleton



Three days before the Marshall Fire

During the fire

Thu, Dec 30, 12:22 PM

It is real Smokey outside. Do you know why?

Confusion & Chaos

Note: You will not be able to think clearly

- It is suddenly smoky. What is happening?
- Can't find anything on tv, radio, internet.
- No “tornado” siren. No police car or fire truck sirens.
- No emergency notification.
- Text and call neighbors.
- Neighbor with police scanner – brush fire in Marshall.
- Persuade neighbors to pack and leave.



What to take?

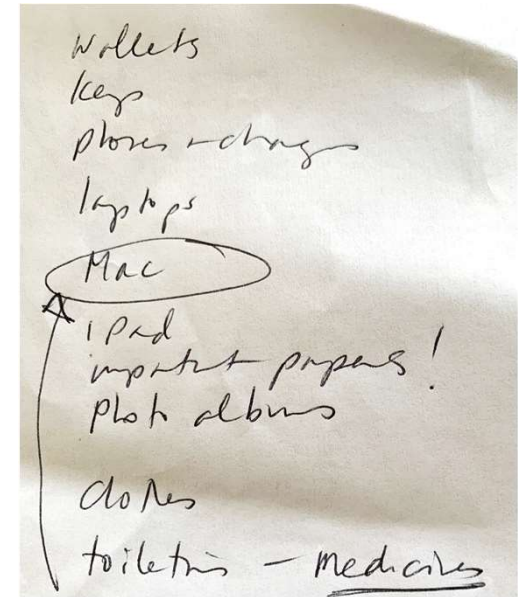
The List (*Post inside cupboard*)

- Family members
- Pets and care items (dog leash, cat carrier)
- Phone, wallet
- Computers and hard drives
- Prescription medicines, glasses
- Important papers (**fire safes are not fireproof**)
- Photos
- Change of clothes (grab dirty laundry basket to save time)

If more time

- A few things of value and sentiment (*Make this additional list ahead of time and post*)

Note: You may have only 1-15 minutes to grab things and leave.



The departure

- Check on neighbors!
- Decide route of escape and know it might change.
- Decide meeting place if more than one vehicle.
- Know how to open garage if no electricity.
- Don't wait for evacuation order.
- If you see fire, leave immediately.

Note: If ordered to evacuate, it means leave *now*.

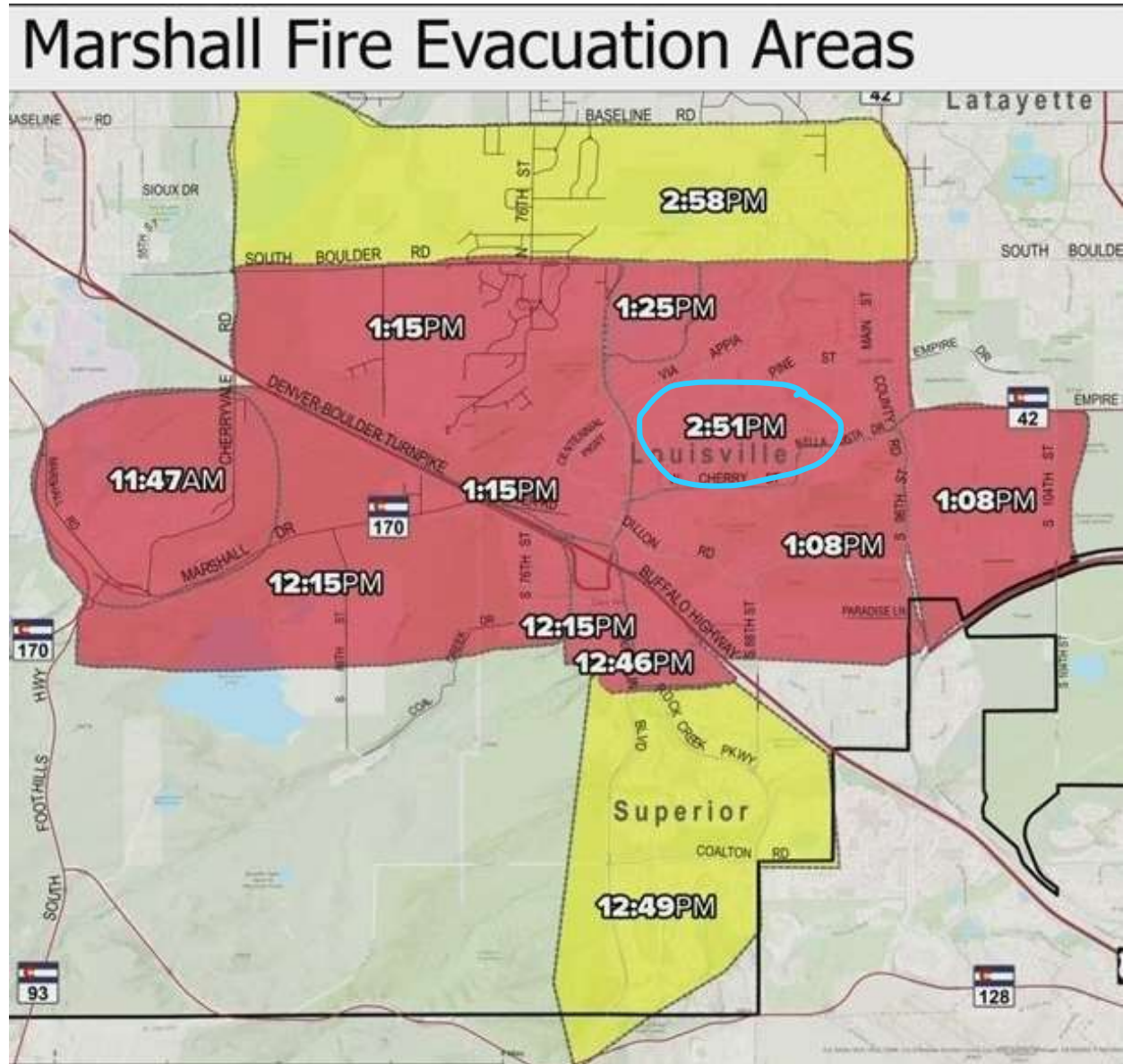
The evacuation

- Expect a traffic jam.
- Expect to see spot fires or worse.
- Expect a lot of smoke. May be poor visibility.
- *Stay calm* and focus on driving - don't want accidents.
- Expect poor cell phone service. Use text messaging.
- Don't expect to see police or firefighters. They are busy.



Evacuation Order

- Make sure you are signed up for your area's emergency notification system!
- Boulder County uses Everbridge - reverse 911 opt-in and land lines and zone system.
- Many people did not get phone alert. Some not signed up.
- Something went wrong. We are in Zone 8. Order to evacuate sent at 2:51. Houses already on fire.
- **Improvement needed** - County acquired Amber alert- type system in 2019 but not yet set up. Turned down State offer to alert. Deploy multiple notification systems.



Important to Know

- Social media (Twitter, Facebook) used for real-time emergency notifications and updates.
- Know how to check for emergency information where you live.



Boulder OEM
@BoulderOEM

...

Boulder OEM is getting many calls about residents seeing fire. IF YOU SEE FIRE, EVACUATE. Go east, go north, but leave immediately. More info to come through OEM channels.

12:23 PM · 12/30/21 ·



Boulder OEM
@BoulderOEM

...

Fire Command has issued an order of evacuation for the City of Louisville. If you're in the area, please act quickly.

2:17 PM · 12/30/21

Where are the First Responders?

- Knocking on doors
- Rescuing people without cars
 - Children/teens home alone
 - Elderly
 - People with disabilities
- Evacuating hospitals
- Evacuating several assisted living facilities



Avista Adventist Hospital in Louisville



Marshall Fire

Urban Firestorm

- Grassland wildfire to urban firestorm as fuel shifted from grass and brush to homes/buildings.
- Strong winds with gusts 80-100+ mph. Large embers carried by wind 1-2 miles.
- Fire in the air crossed 6-lane highway and vast parking lots.
- Spot fires burned some interior neighborhoods.
- Peak fire temperature nearly 2500 degrees F.
- Everything in homes burned. Toxic smoke, ash and debris.

Hero stories

Neighbors saving neighbors

- Family on vacation asked next door neighbor, Sheryl Buchman, to keep an eye out for their daughter Madalyn, 26, who doesn't drive.
- Morning of December 30, Madalyn finished up 8-hour shift at Target. Walked back home at 5:30 am. Turned her phone on silent and headed to her room in basement to sleep.
- Sheryl was working from home with her three children.
- Smelled smoke just after noon. Saw two fire engines passing slowing not using sirens.
- Alerted her children to get a few things. Saw fire behind the house. Embers and ash flying.
- Madalyn's parents at Copper Mountain got emergency notification. Sheryl had trouble with security code, got inside, fell down basement stairs, woke up Madalyn, got her out of the house.
- Climbed in car. Crawled out of neighborhood. Visibility very low and traffic backed up. Notified Madalyn's parents.

Boulder Daily Camera, As Marshall Fire closed in, Superior woman saved sleeping neighbor - <https://www.dailycamera.com/2022/01/28/as-marshall-fire-closed-in-superior-woman-saved-sleeping-neighbor/>



Laura Peters, left, with sister Madalyn Peters, who was rescued from the Marshall Fire by Sheryl Buchman, on right.

Firefighters

- Although many homes lost, many more were saved by firefighters.
- Fire departments from up and down the Front Range came together with very little notice and did their part.
- Video (link below) includes interviews with firefighters from the West Metro Fire Rescue who helped save homes in the Mulberry neighborhood.
- This is our neighborhood. We know these homes and many of the families who live here.
- 384 homes in neighborhood. 62 lost. 322 saved.

Fox 31 Denver News - West Metro details heroic efforts during Marshall Fire
<https://www.youtube.com/watch?v=RVqW5C5FpTo>





Louisville Water Treatment Team

Must view - 4 CBS Denver – Louisville Water Treatment Team Battle Marshall Fire Behind the Scenes
<https://denver.cbslocal.com/2022/01/18/marshall-fire-louisville-superior-water-treatment/>

- Louisville Water Treatment Team stayed behind while homes burned.
- “Can’t fight a fire without water.”
- Superior treatment plant lost electricity. Back-up generator burned up. Hydrants without water.
- Louisville connected to Superior.
- Louisville’s back-up power is gas. Drove gas truck through flames.
- Checked water levels by climbing on storage tanks in hurricane force winds. Only 2 feet remaining.
- Decision to run raw water through system to get more water to hydrants.
- Still not enough water pressure.
- Went to each burning home and manually shut off water.
- Without them, would have run out of water to fight the fire and most of Louisville and Superior would have burned.

The immediate aftermath



A photograph showing the aftermath of the Marshall Fire. In the foreground, a dark-colored car is heavily damaged, with its front end crushed and its body panels melted. The car is surrounded by a large pile of debris, including charred wood and metal. In the background, there are more destroyed vehicles, including a white van, and some standing trees without leaves. The sky is clear and blue, and distant mountains are visible in the background.

Marshall Fire

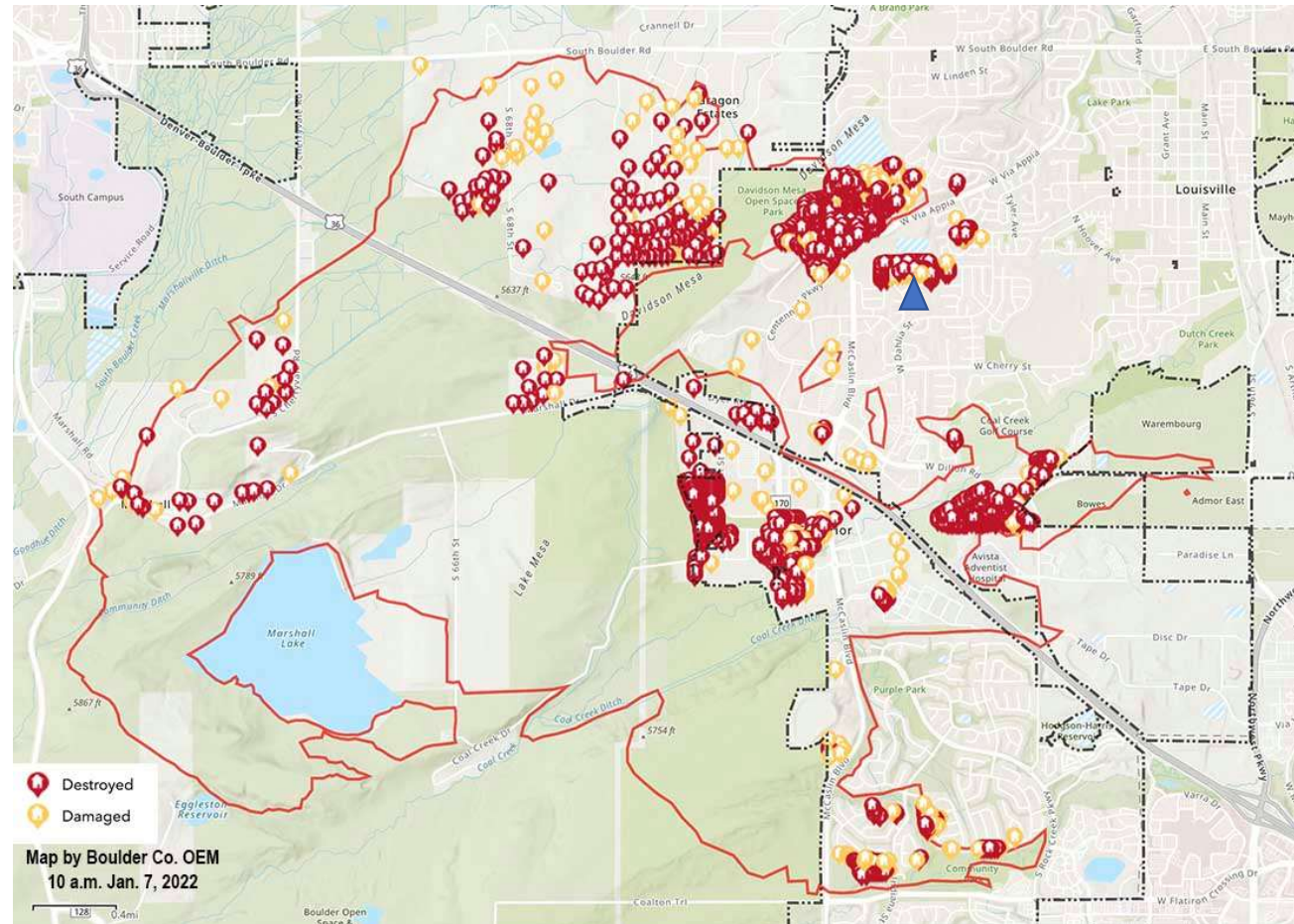
Boulder County, CO

December 30, 2021

- Most destructive fire in Colorado history.
- Burned 6,026 acres, 1,084 homes destroyed, 149 damaged, 7 businesses destroyed, 30 damaged, and 2 lives lost.
- Hundreds of pets left behind and lost in rush to evacuate.
- In addition, thousands of homes with smoke damage.
- One of most expensive fires in US history. Damage estimated at more than \$1 billion.
- Fast-moving fire “like a football field in seconds”. People in the fire’s path were caught off guard. Some barely escaped.
- 35,000 people evacuated. Most people had only a few minutes to leave their homes.
- A miracle there were not more deaths.

Map of destroyed and damaged structures

- Map showing homes and businesses destroyed (red) and with structural damage (yellow).
- Our home is the blue triangle.
- Note how the fire moved from West to East. The fire traveled by ground and also by air with wind-driven embers.
- Multiple spot fires ignited a home then fire spread to surrounding homes.
- Surrounding homes caught fire due to groundfire, embers and/or radiant heat.



List of Environmental Impacts and Concerns

- **Debris removal** of toxic ash and debris from burned areas. Most hazardous waste consumed by fire.
- Composition of ash and smoke (heavy metals, dioxin, asbestos, VOCs)?
- **Smoke remediation** of smoke damaged homes (VOCs, PM2.5). Toxic smoke damage to home's soft contents.
- Debris removal from smoke and wind damaged homes.
- Outdoor air quality when warm, dry and windy and during debris removal. Apply hydromulch.
- **Drinking water concerns**. 6 public water systems impacted. Boil Water Advisory, damage to distribution systems, contamination of source water, backflow of ash and debris, VOCs, taste and odor.
- Private drinking water wells – heat and fire damage and contamination.
- **Clean-up and remediation of BVSD schools** – indoors and outdoors. Recess restrictions?
- Clean-up of publicly-owned parks and playgrounds.
- Soil testing outside of burned areas (ball fields, gardens, yards).
- Stormwater runoff from burned areas.
- Marshall Landfill Superfund Site in burned area.

Lessons Learned

1. **Colorado Front Range communities not prepared for wind-driven grassland wildfires.**

The Marshall Fire is a paradigm shift in the way we think about wildfire risk in Colorado.

The Colorado Sun, *Where do we go to escape this?* The Marshall fire is Colorado's new reality. <https://coloradosun.com/2022/01/02/marshall-fire-climate-change-new-reality/>

5280 Denver's Mile High Magazine, *Why Grassland Fires Still Surprise Us.*
<https://www.5280.com/2022/02/why-grassland-fires-still-surprise-us/>

Big Pivots, *Manipulating from the margins: climate change and the Marshall Fire*
<https://bigpivots.com/marshall-fire-the-face-of-climate-change/>

Lessons Learned

2. Review homeowner or renter insurance coverage on regular basis.

Most people are underinsured!

Note: 75% of those impacted by Marshall Fire are underinsured. Some renters are uninsured.

3. Create a home inventory.

4. United Policyholders and Colorado Division of Insurance are good sources of insurance information.

United Policyholders - <https://uphelp.org/>

Colorado Division of Insurance - <https://doi.colorado.gov/>

Lessons Learned

5. **Make list of essential items to take and post.**
6. Make second list of a few items of value or sentiment to take if you have more time and post.
7. **Practice evacuating with pets** (especially cats).
8. Know multiple evacuation routes.

Lessons Learned

- 9. **Sign up for emergency notification system where you live!**
- 10. **Don't wait to be told to evacuate.** Evacuation order means evacuate *now*.
- 11. Check social media (Twitter, Facebook) for emergency information. Know where to look.
- 12. Expect confusion and chaos.
- 13. **Stay calm.**

Denver 9 News – How to sign up for your county's emergency alerts

<https://www.9news.com/article/news/local/wildfire/marshall-fire/sign-up-emergency-alerts-text-cell-phone-colorado-denver/73-ddbfb002-6ac8-4f87-b1b0-ed30cf05be12>

Lessons Learned

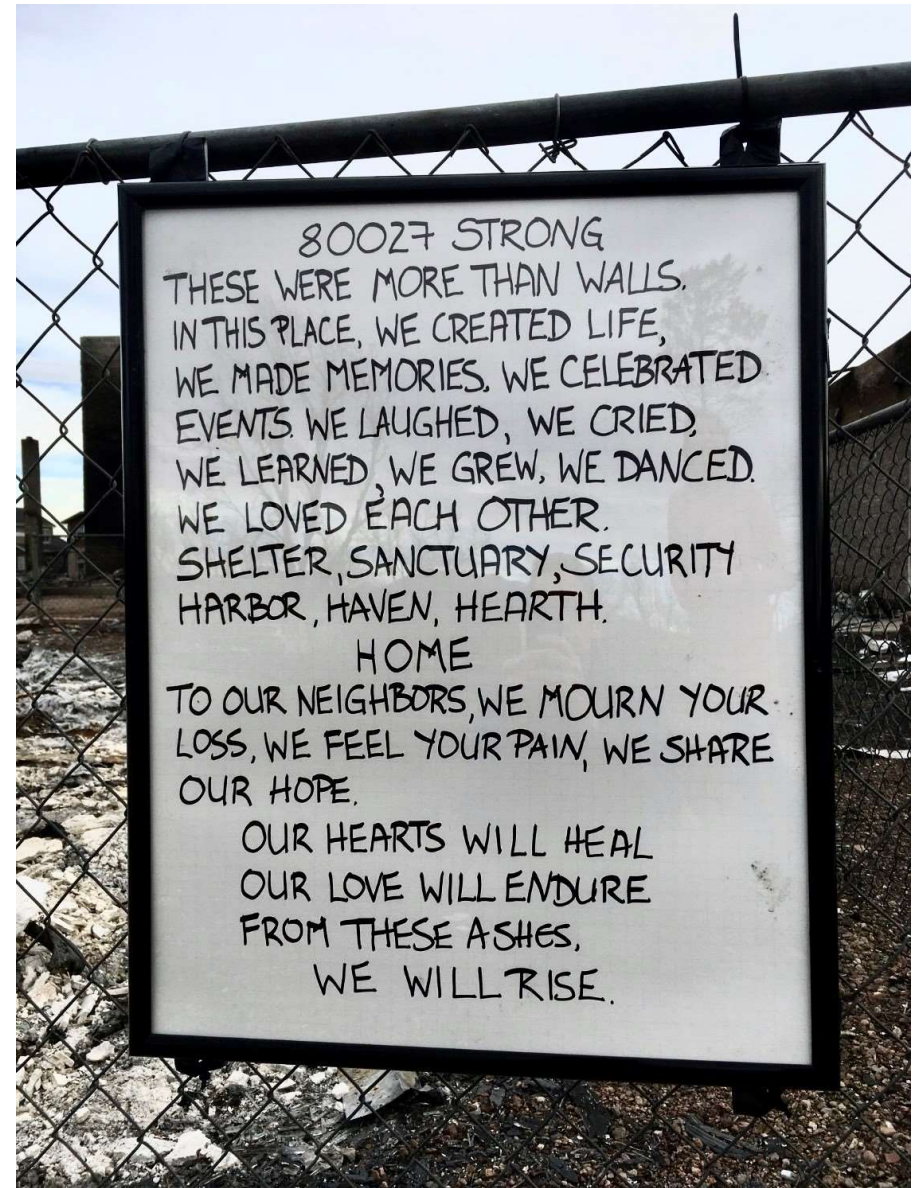
- 14. Be prepared to save yourself and check on your neighbors.
- 15. Leave house key or code with a trusted neighbor(s) or hidden outside in case you are not home.



15 Lessons Learned

1. Colorado Front Range communities not prepared for wind-driven grassland wildfires.
2. Review homeowner or rental insurance coverage on regular basis. Make sure coverage adequate. 75% of fire victims underinsured.
3. Create a home inventory.
4. United Policyholders and Colorado Division of Insurance are good sources of information.
5. Make list of essential items to take and post. Include important papers – fire safes are not fireproof.
6. Make second list of a few items of value or sentiment to save if you have more time and post.
7. Practice evacuating with pets (especially cats).
8. Know multiple evacuation routes.
9. Sign up for emergency notification system where you live!
10. Don't wait to be told to evacuate. Evacuation order means evacuate now.
11. Check social media (Twitter, Facebook) for emergency information. Know where to look.
12. Expect confusion and chaos.
13. Stay calm.
14. Be prepared to save yourself and your neighbors.
15. Leave house key or code with trusted neighbor(s) in case you are not home.

Questions?



80027 STRONG
THESE WERE MORE THAN WALLS.
IN THIS PLACE, WE CREATED LIFE,
WE MADE MEMORIES. WE CELEBRATED
EVENTS. WE LAUGHED, WE CRIED,
WE LEARNED, WE GREW, WE DANCED.
WE LOVED EACH OTHER.
SHELTER, SANCTUARY, SECURITY
HARBOR, HAVEN, HEARTH.

HOME

TO OUR NEIGHBORS, WE MOURN YOUR
LOSS, WE FEEL YOUR PAIN, WE SHARE
OUR HOPE.

OUR HEARTS WILL HEAL
OUR LOVE WILL ENDURE
FROM THESE ASHES,
WE WILL RISE.