A group of people are gathered in a forest, observing a controlled fire burning on the ground. The fire is producing a lot of white smoke. Several people are standing in the background, some wearing hats and casual clothing. One person in the foreground is holding a yellow tool, possibly a hose or a brush. The scene is set in a wooded area with many trees.

Tools to Reduce Fuels *surface fuels*



Jo Ann Fites-Kaufman
Salmon Mine-East Sages FWC Leader
Board Director Nevada Co Resource Conservation District
Retired USFS Fire Scientist, CA Burn Boss

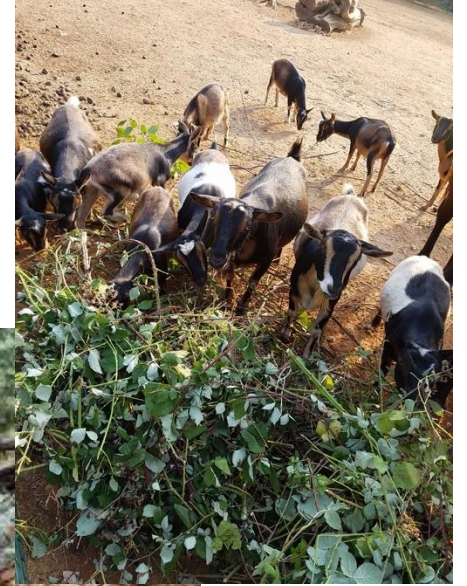
Fuels & Wildfire: past and present

Fuels: types and layers

- *how they affect wildfire*

Tools to treat

- *Pros and Cons*
- *What's right for you?*



Past Fire Regimes – Shaped Vegetation Landscape

Regular, low intensity fire



*Maintained low fuels
Patchy, variable forests*



*Promoted fire-adapted
native plants*



Big Changes in the Last Century

1909



1948



1958



1968



Current Condition

- Dense forests, heavy tree, ladder
And surface fuels
- Vulnerable to high-intensity wildfire,
drought, insects, pathogens
- Deep duff suppress native plants
reduces water infiltration into soil



Fire Behavior Basics

- **How do we get safer? Less damage to homes and landscapes**
- **Know what affects fire**
- **Know how to change wildfire behavior**



Fire Type – What is Burning?

Surface Fire



Passive Crown Fire
Or Torching



Crown Fire



Ground Fire – Creeping or Smoldering



Amount & height = flamelength & intensity



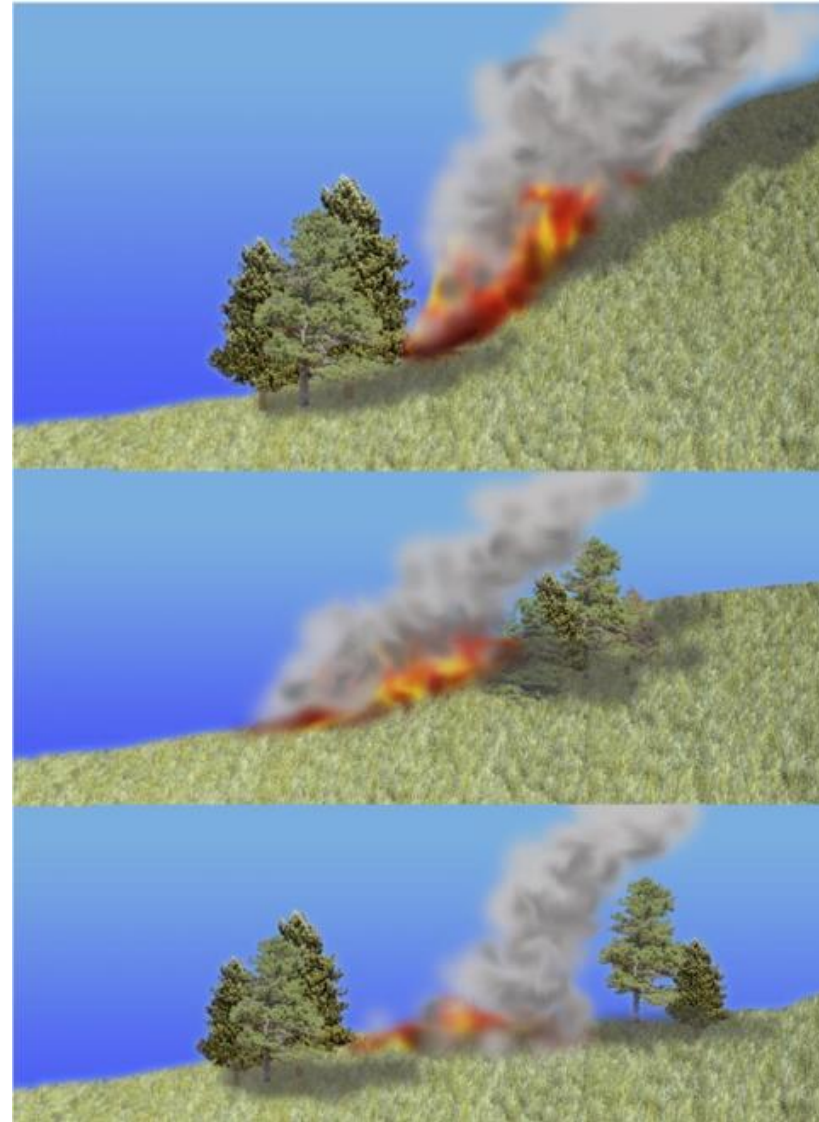
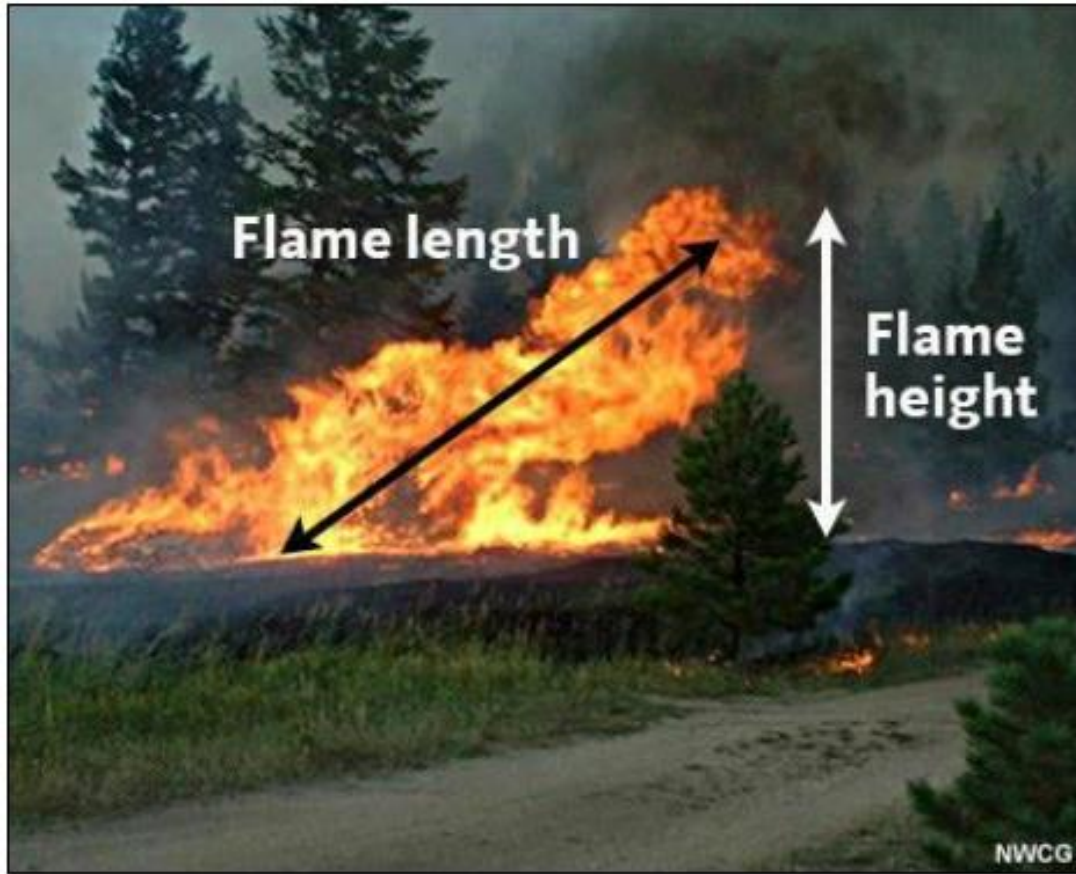
DURING WILDFIRES – HOT, DRY, WINDY
Flames 2-3 times height of fuels

More Fuels = hotter and bigger flames



How much is there?

Slope & Wind



**55%
slope**

**30%
slope**

**0-5%
slope**

Fuel Layer

what carries the fire?

Surface

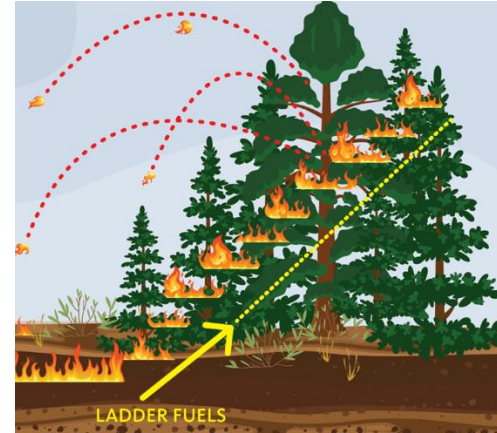


Dead



Live understory

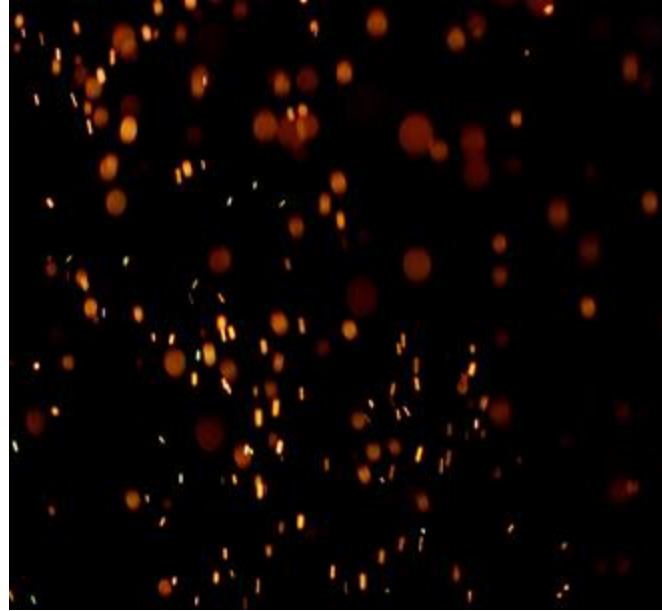
Ladder



Crown

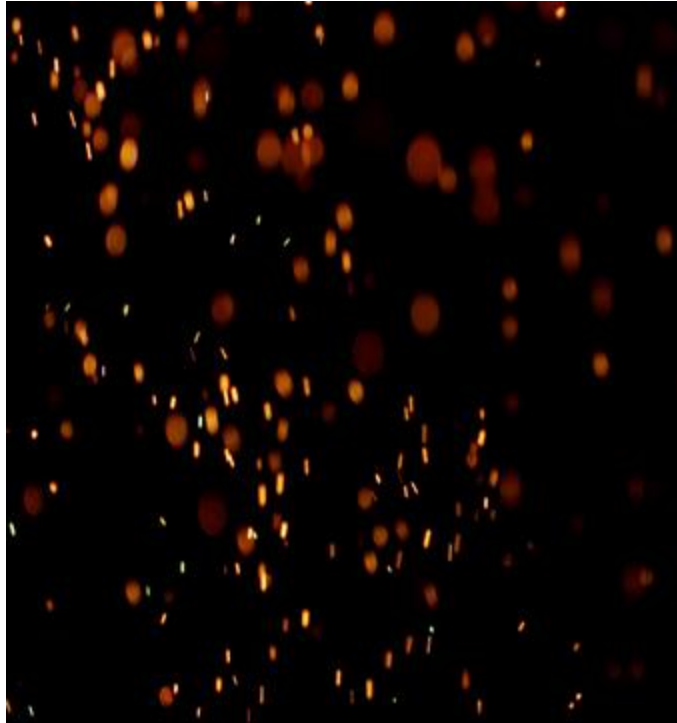


IT ALL STARTS AT THE SURFACE



WE HAVE THE CHOICE

how it burns



King Fire

Treated
prescribed fire and thinning

untreated

*Risk of high intensity fire reduced 64%
in areas burned at low intensity
Science Advances 2023*

Treatment varies by vegetation type

Forest



Shrub/Chaparral



Grass



KNOW YOUR SURFACE FUELS

best treatment varies by type



dead



alive



both

Tools to Reduce Fuels

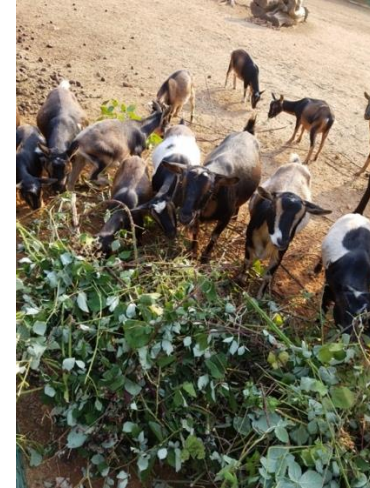
create defensible space reduce hazard and restore forests



EFFECTIVENESS: RE-ARRANGE VS REMOVE



***Flames somewhat shorter
Still burns very hot
Easily catches fire
Can kill trees***



***Flames shorter
Burns lower intensity
Less likely to catch fire***

GRASS FUELS



Shrubs and Vines (i.e. Blackberry)

- Sprouting (regrows)

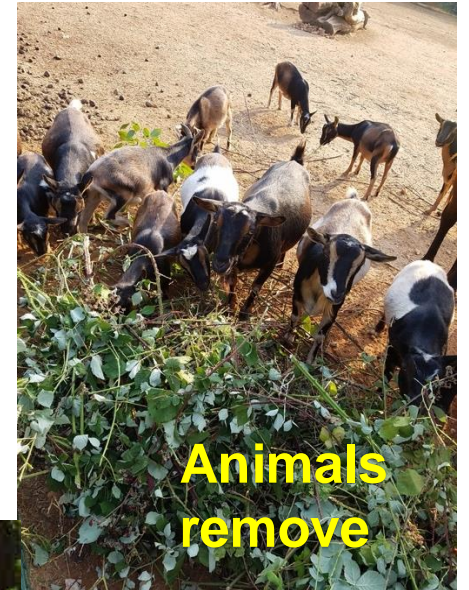
- Pull –scotch broom
- Graze
- Spray (if allowed and accepted)
- Repeat, repeat, repeat!

- Non-sprouting

- Cut and pile
- Chip or burn
- Haul to green waste dump site

- Scotch broom

- Tractors, trucks, masticators & mowers etc can spread seeds



FOREST FLOOR



raking
remove



Composting or
Greenwaste
remove

*takes effort & time
(lots!)*



chipping
remove



chipping
stays

fast, expensive



Rx/broadcast burning
removes



*cheap maintenance
best for healthy forest*

Pros & Cons of Chipping or Mastication



- Effective at
 - reducing fuel height
 - reduce flamelength
- Fast over large areas
- Can be cheaper than hand cut/pile remove or burn
- Adds to surface fuels
- Does not break down fast in our dry climate
- Readily ignites and in wind makes flying embers
- Can cook tree roots and soil
- Requires maintenance – sprouters, new growth
- Suppresses native wildflowers, sucks nitrogen from soil
- Makes it harder to pull scotch broom

What's best for you?

- ***REMOVE*** as much as possible!
- **In city limits – no burning**
- If you can access **green-waste---USE IT**
- **Thin** your forest – you'll get **less surface fuels added each year**
- **Animals and prescribed fire are great maintenance tools**
- If you've removed ladder fuels, property is not too steep, have neighbors and friends to help...Consider prescribe burning safely, legally and responsibly! ***Learn to Burn***

RX FIRE: Careful Use of Low Intensity Fire

BEFORE

plan, prepare, permits



DURING

*burn slowly, carefully
mild weather
permissible burn day*



*watch & control
“holding”*



AFTER

*Make sure its out
Mop up*



***WHY?* Reduce Wildfire Intensity, Smoke Safer Homes, Communities, Firefighters**

REDUCE WILDFIRE INTENSITY

untreated

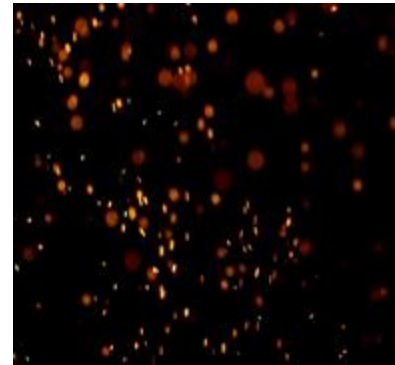


after prescribed fire



REDUCE SURFACE FUELS

Most effective tool



MAKE SAFER

*homes, community,
health. firefighters*



***WHY?* – Restore Forests and Native Plants**

*thin little trees before
they become dense
forests*



*resilient forests, restore meadows
reduce wildfire smoke
recycle nutrients, fertilize soil
stable carbon storage*



*enhances native plants
Improves habitat*



RISK

Manage & Reduce:
plan, permit, control

Simple Negligence

**Perceived Vs Actual
Risk**

- Risk of escape/liability from prescribed fire is <1%
- Demonstrating due diligence



Nevada Co RCD Programs

Education & Technical Support for Private Landowners

RX Fire Education

Courses and Training

Organizing:



Site Visits

*is it the right tool?
advice on plans & prep*



Grazing and fire safety

*Around schools
List of local vendors*



A photograph of a forest fire. Bright orange and yellow flames are visible between several dark tree trunks. The ground is covered in dry grass and some green ferns in the foreground. The background is hazy with smoke.

Thank you!

Contact information:
NEVADA COUNTY RCD
530-798-5529
manager@ncrcd.org
www.ncrcd.org

Ground and Surface Fuels

Litter and Duff



Dead or Alive



Size and Arrangement

Fine - $< \frac{1}{4}$ " - 1 hr *Small - $\frac{1}{4}$ - 1" - 1 hr*



Medium - 1-3" - 100 hr *Large/logs > 3" - 1000 hr*



WHAT IT MEANS

Our Current Problem

Camp Fire viewed from space



Ways to do Fuel Reduction Treatments

By Hand



Machine - Mechanical



Prescribed Fire

