



Flood After Wildfire

Matthew Buddie - FEMA

Brian Varrella - CDOT

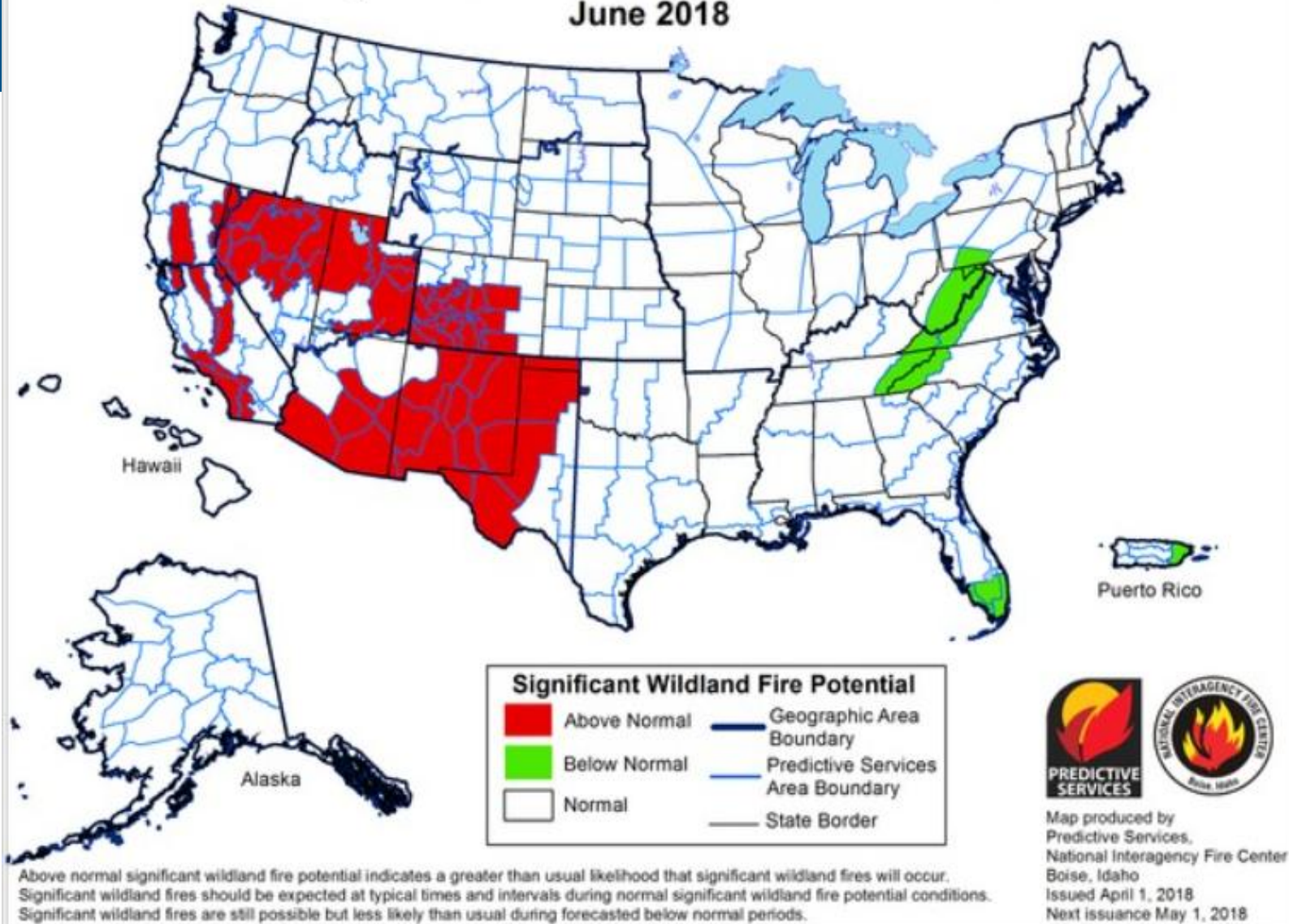
May 15 & 17, 2018

Grand Junction & Greeley, CO

A picture is worth a 1,000 words



Significant Wildland Fire Potential Outlook June 2018



Wildfire Mitigation



“Homeowners, landowners, and communities bear the ultimate responsibility to help protect themselves, their property and their local values at risk from the threat of wildland fire.”

-Colorado State Forest Service Website

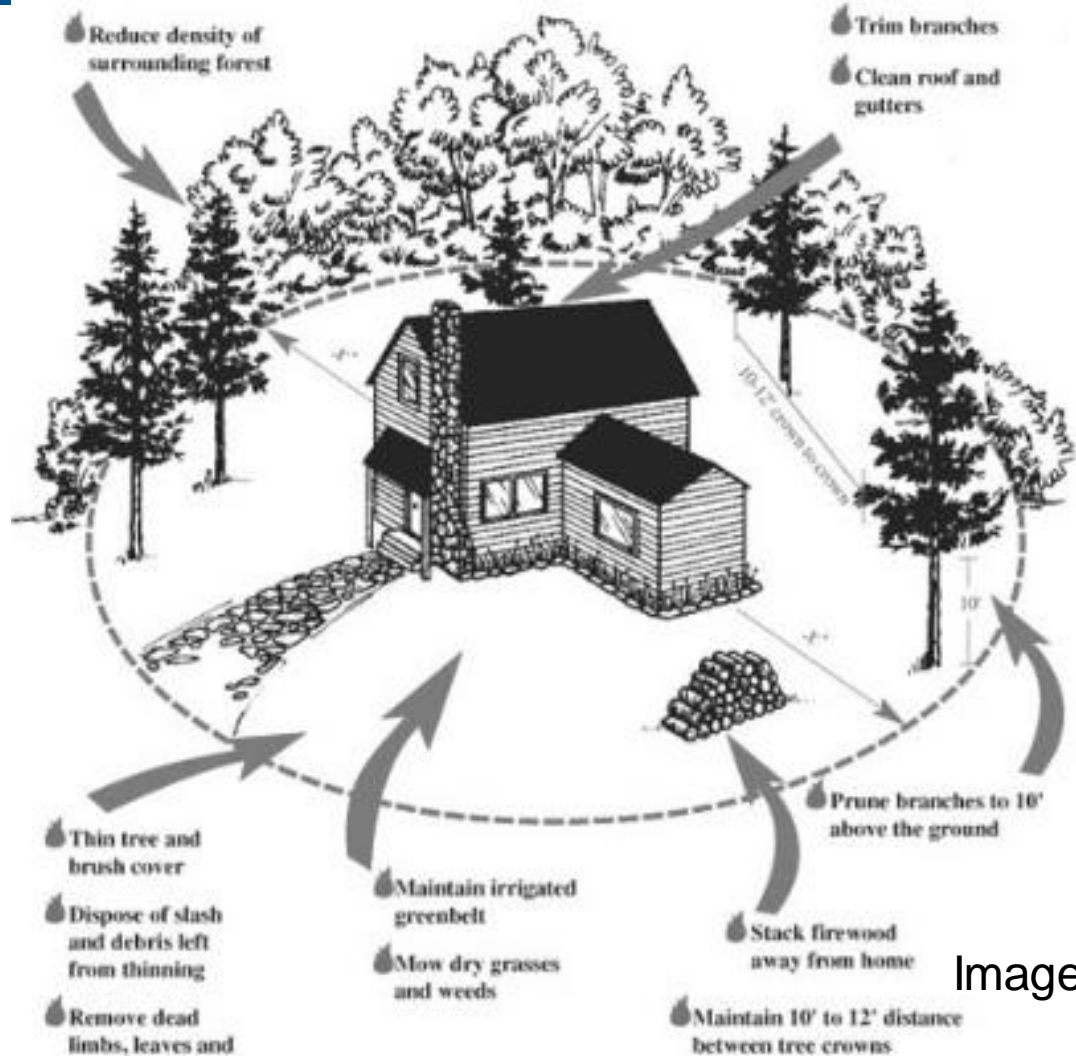


Image: CSFS

In 2016, a community took an innovative approach to
wildfire mitigation: goats!



**“Goats have proven to be useful tools
when it comes to fire mitigation.**

Unlike machinery, goats eat weeds and oak from the root,
which helps decrease its return.”

–Einar Jensen, South Metro Fire and Rescue in Colorado



FEMA



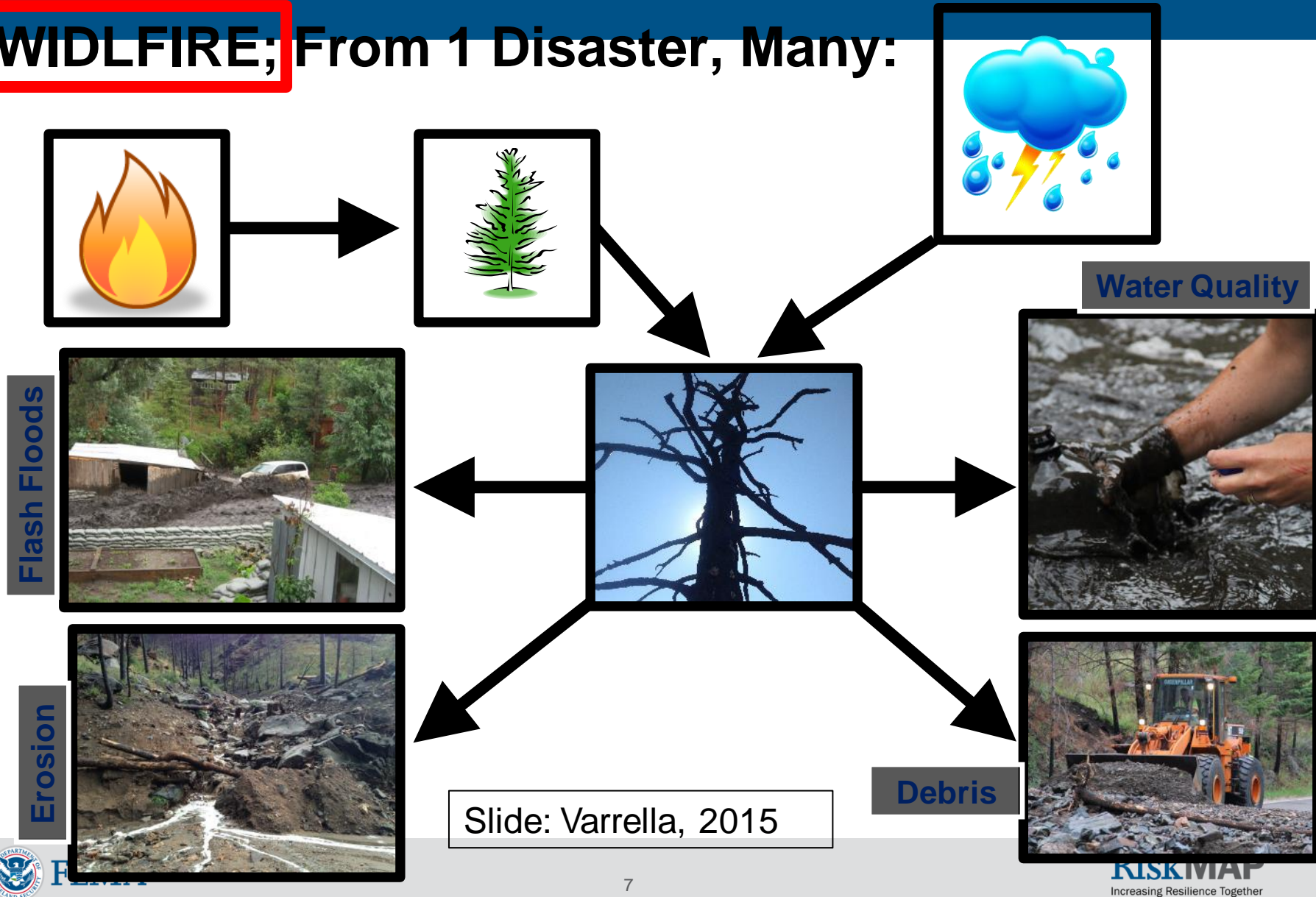
FEMA

How Hot Does the Surface Get?

- An average surface fire on the forest floor might have flames reaching 1 metre in height and can reach temperatures of 800°C (**1,472°F**) or more. Under extreme conditions a fire can give off 10,000 kilowatts or more per metre of fire front. This would mean flame heights of 50 metres or more and flame temperatures exceeding 1200°C (**2,192°F**).
 - - Natural Resources Canada

Colorado Disaster History & Challenges

WIDLFIRE; From 1 Disaster, Many:





FLOOD AFTER FIRE

Did you know that wildfires dramatically alter the terrain and increase the risk of floods?

**Reduce your risk.
The time to buy flood insurance is now.**

Contact your local insurance agent for more information or visit the National Flood Insurance Program at www.fema.gov/national-flood-insurance-program



During normal conditions, vegetation helps absorb rainwater.



But after an intense wildfire, burned vegetation and charred soil form a water repellent layer, blocking water absorption.



During the next rainfall, water bounces off the soil.



And as a result, properties located below or downstream of the burn areas are at an increased risk for flooding.



Heavy Rains

Excessive amounts of rainfall can happen throughout the year. Properties directly affected by fires and those located below or downstream of burn areas are most at risk for flooding.

Degree of Land Slope

Higher degrees of land slope speed up water flow and increase flood risk.



Flash Floods

Intense rainfall can flood low lying areas in less than six hours. Flash floods roll boulders, tear out trees and destroy buildings and bridges.



Mudflows

Rivers of liquid and flowing mud are caused by a combination of brush loss and subsequent heavy rains. Rapid snowmelt can also trigger mudflows.



Flood Insurance = Protection

- Don't wait to buy!
- www.floodsmart.gov



Preventing Disasters From Becoming Disastrous



**Drop Everything
&
Do This NOW**

Photo: Varrella, 2013

Slide: Varrella, 2015

Drop Everything & Do This NOW



1. MAKE A FRIEND (or friends):

- Know your neighbors & colleagues
 - They want to help
- Mutual Aid Agreements –
 - Get ‘em NOW
 - Allows neighbors to help
 - Aid \$\$\$ flows easier
- Get involved outside your office
 - CASFM, CML, Flood TAP, etc.
 - Friends = resources & support



The Suz

Slide: Varrella, 2015

1. Make A Friend (or Friends)



Collaborate as neighbors (*like Watershed Coalitions*)

- Ecologists + biologists + geomorphologists + engineers
- Private stakeholders + govt. agencies + special districts



Photo: Mouttet, 2013



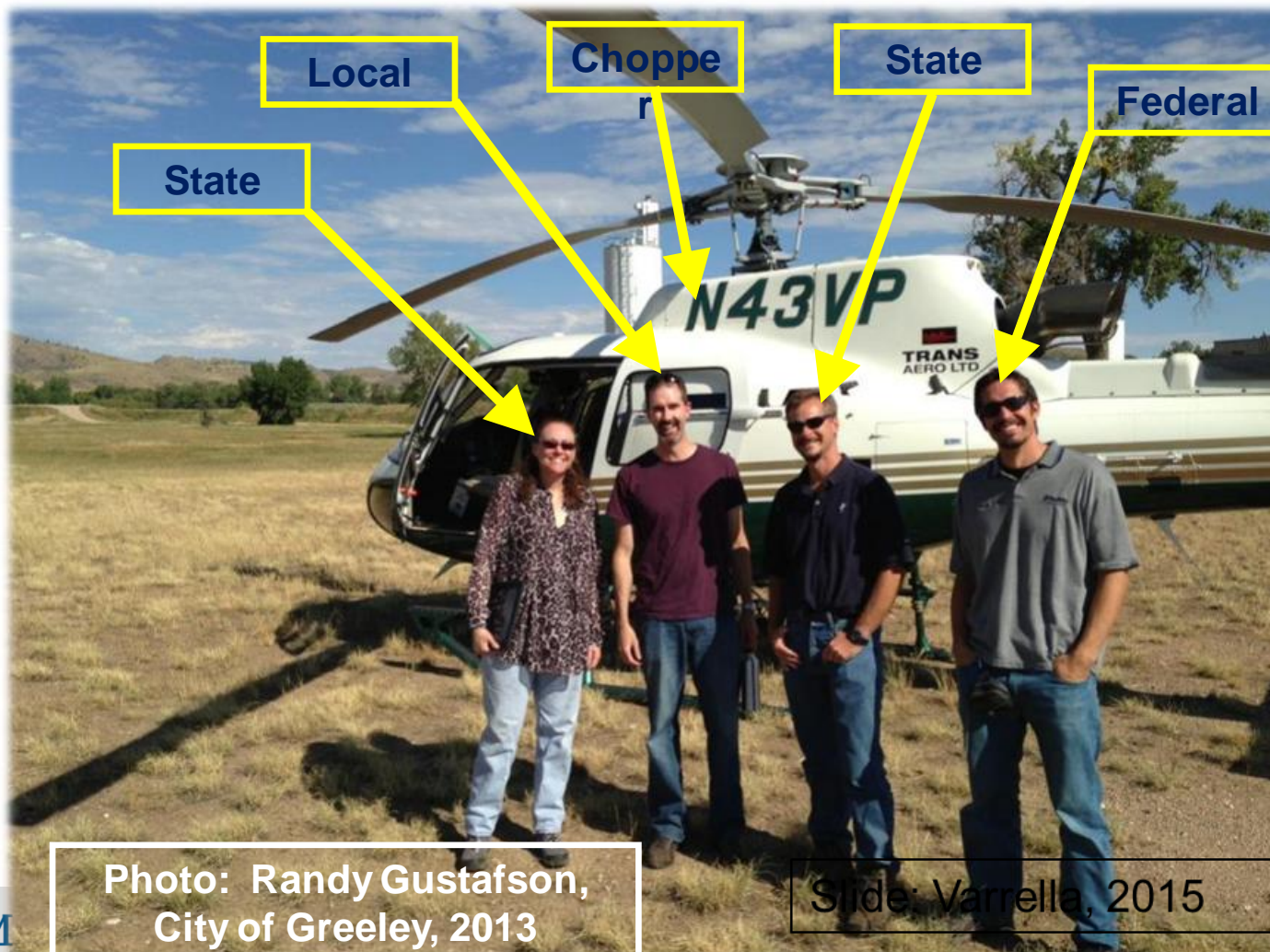
Photo: Varrella, 2013

Slide: Varrella, 2015

1. Make A Friend (or Friends)



Mutual interests & goals = greatest asset



Drop Everything & Do This NOW



2. GET A PLAN:

- Flood warning systems save lives
- Master Plan for all hazards
 - Erosion, fire, flood, acts of terrorism, pandemic
 - Preserve floodplains, use buyouts, use freeboard
- Use the Incident Command System (ICS)
- Know your assets & liabilities
- Set up a digital data platform
 - It's at your fingertips
 - It's at others' fingertips

Slide: Varrella, 2015



Photo: Varrella, 2013

2. Get a Plan

Flood Warning Systems Save Lives:



Photo: Chris Lochra, 2013

Slide: Varrella, 2015

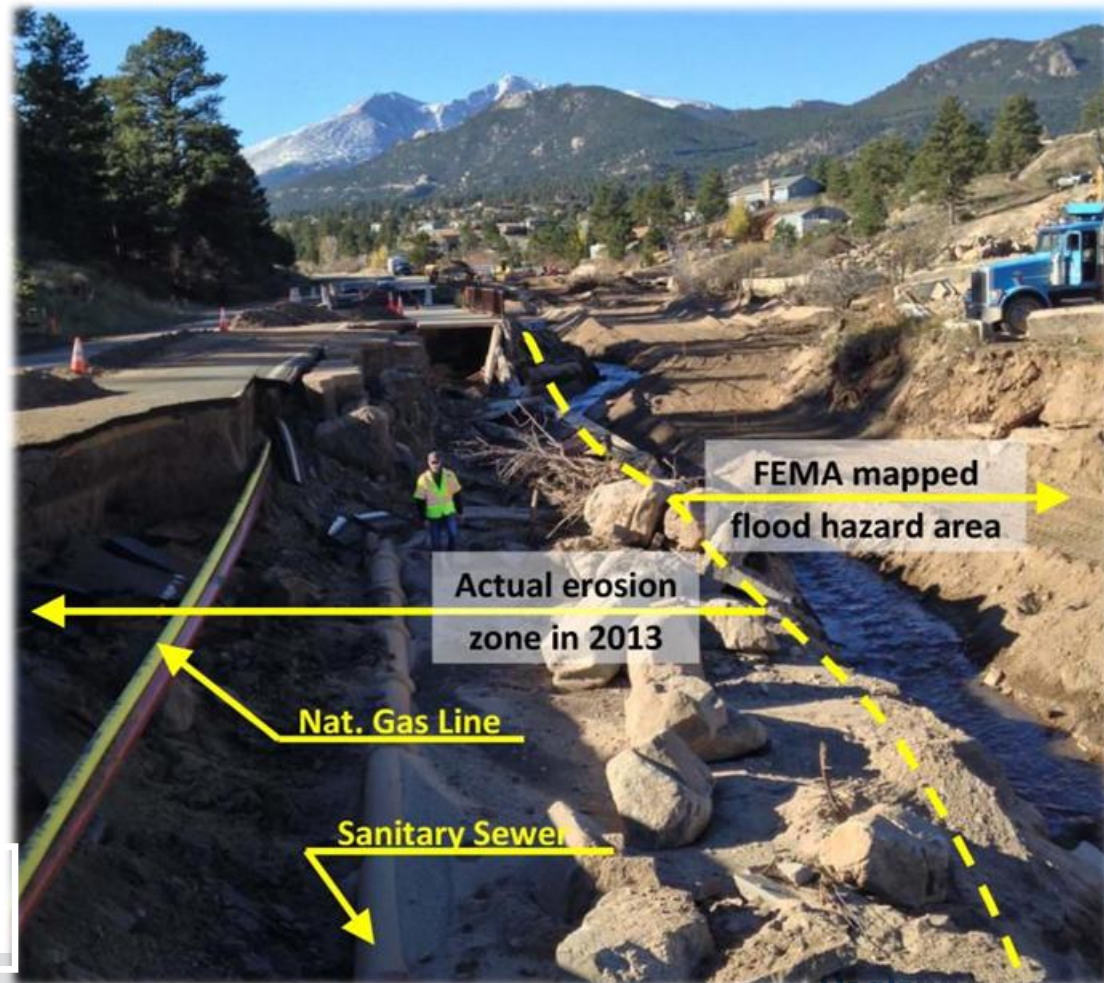
2. Get a Plan

Master Plan for All Hazards

Slide: Varrella, 2015

- FIRMs don't show all flood hazards
- Erosion ignores boundaries
- Dynamic channels are normal
- Setbacks save lives
- Asset inventories must include natural features

Photo: Terry Martin, ICON Engineering, 2013



2. Get a Plan

Master Plan for All Hazards

- Preserve open spaces for rivers
- Freeboard prevents damage

Photos & Statistics:
City of Fort Collins
Stormwater, 2013



Dry building

High water mark

Slide: Varrella, 2015

Parks in 100-year Floodplain (acres)	Natural Areas in 100-year Floodplain (acres)	Total Open Space Preserved (acres)	100-year Floodplain Inside City Limits (acres)	66% of the 100-year floodplain is preserved as Open Space
55	924	979	1,485	

2. Get a Plan

Set Up a Digital Platform

Leverage free technology to save time & resources

- Special websites can be set up now
- Mobile technology captures real-time info
- Public likes to share...
 - Photos & videos
 - Location, dates & times

Slide: Varrella, 2015



Boulder, CO; free Ushahidi crowdmap platform
<https://boulderflood2013b.crowdmap.com/>

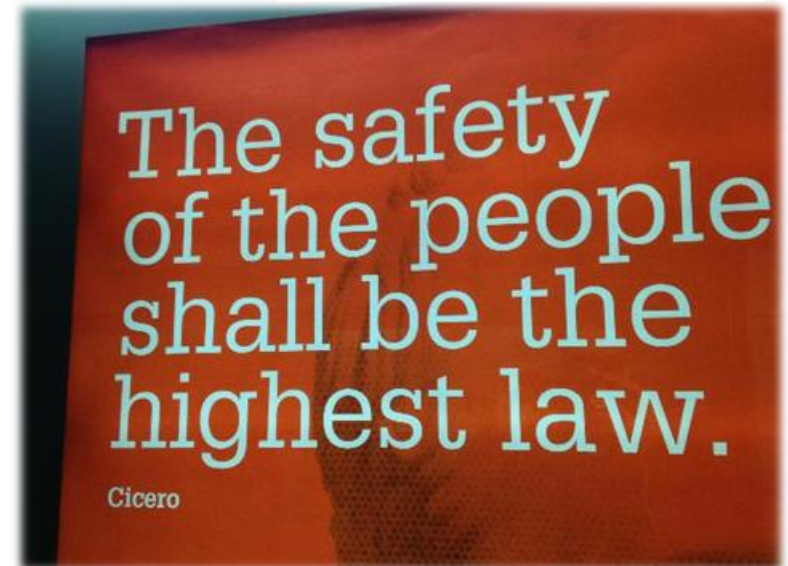
Drop Everything & Do This NOW



3. PRACTICE:

- Drill, drill, *DRILL*
 - Apply the plan before disaster...
 - ... so you know it cold
- Talk it up
 - Use all media available
 - Get an audience today
- Update your plans annually
- MAKE IT A PRIORITY

Photo: Varrella, 2014



Slide: Varrella, 2015

3. Practice

Drill your staff in peacetime

- Fake it before the disaster (*simulation*)
- Learn how to apply your plan



Slide: Varrella, 2015

3. Practice

Talk it up now!!

Photos:
Varrella, 2013



3. Practice

Find your audience when all is quiet

- If they don't look for you, they won't hear you
- Use social media. Seriously... use it!!

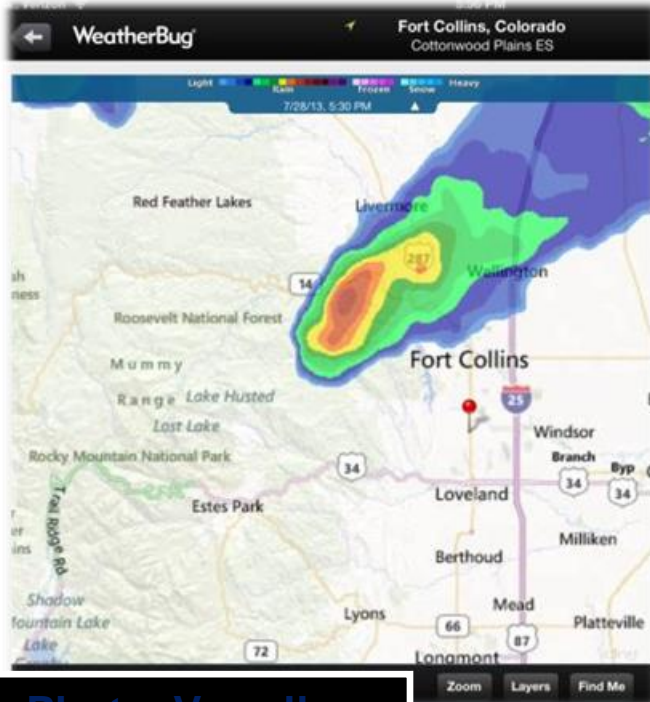


Photo: Varrella,
2013



Slide: Varrella, 2015

Facebook Post from the
Larimer Co. Sherriff,
2013

Drop Everything & Do This NOW



4. TAKE COMMAND of YOUR DISASTER:

- Locals = this is your mess to clean up
 - Feds & State will support...
 - But, the work of recovering is yours
- Stick to the plan during the disaster
- Record all decisions
 - Keep your records simple
 - Critical during FEMA staff changes

Expectations

Reality



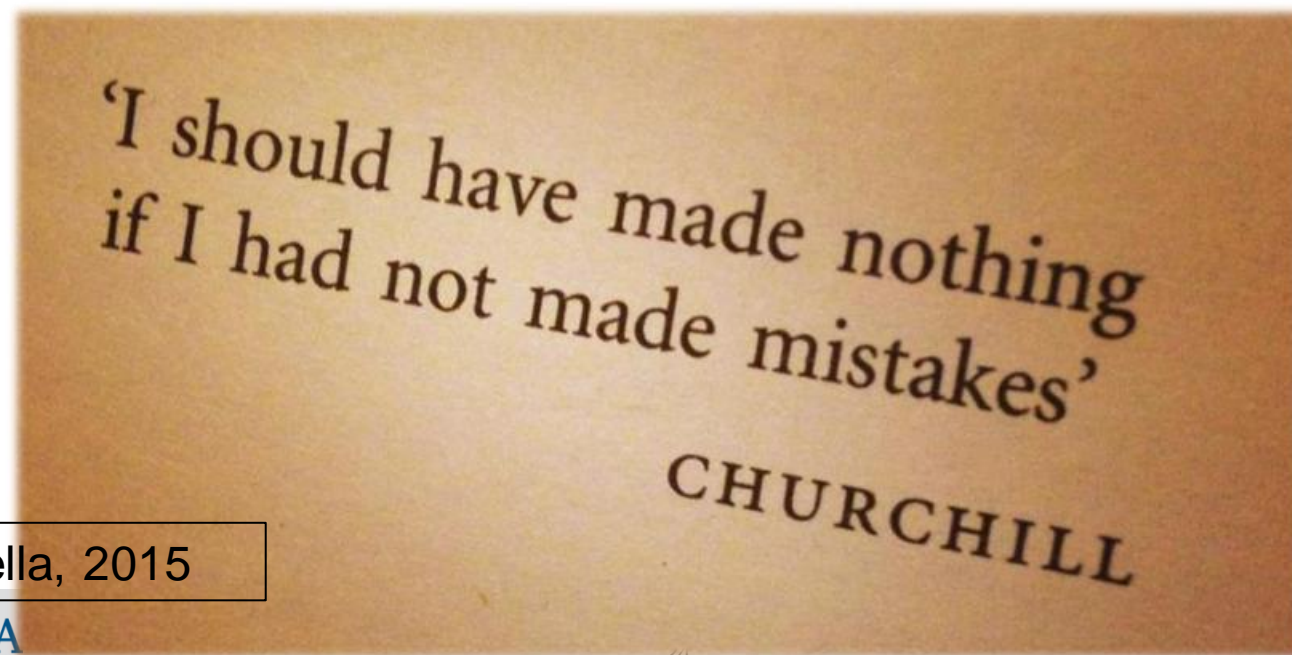
Doodle by Jessica Hagy,
@JessicaHagy, 2014

Drop Everything & Do This NOW



5. COLLECT DATA & UPDATE PLANS:

- Collect high water marks for historic records
 - Have your team of experts ready before disasters
- Prepare a after-action reports (*and be honest*)
- Update Master Plans with knowledge gained



Slide: Varrella, 2015

5. Collect Data; Update Plans



High Water Marks, Debris & Erosion Zones

- Can be used for interim decision-making
- Will be used later to update all-hazard maps



Photos: Varrella, 2013

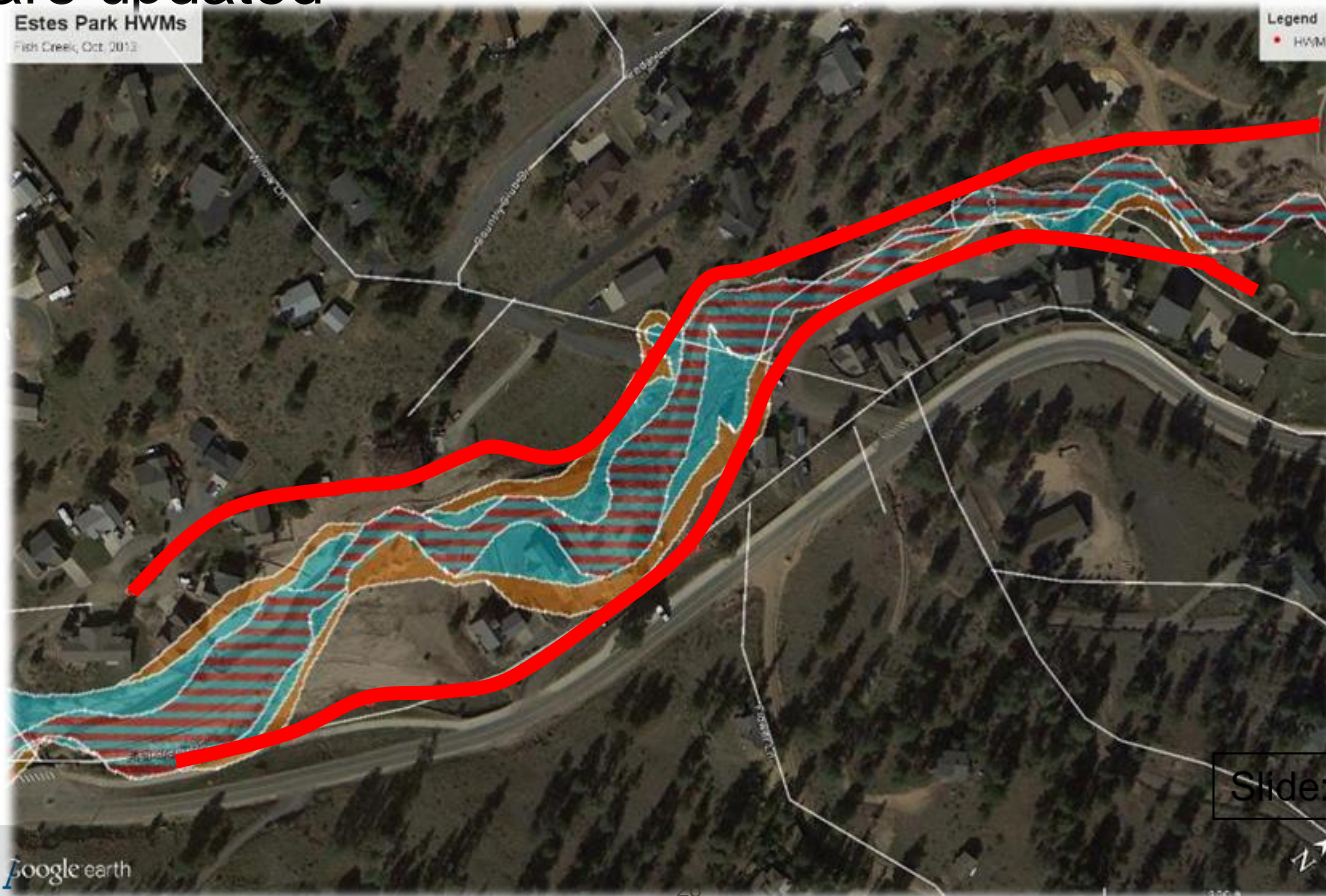
Slide: Varrella, 2015

5. Collect Data; Update Plans



Interim Decision-Making

- Moratorium on permits; *wait, think, then move*
- Field info = best available data until Master Plans are updated

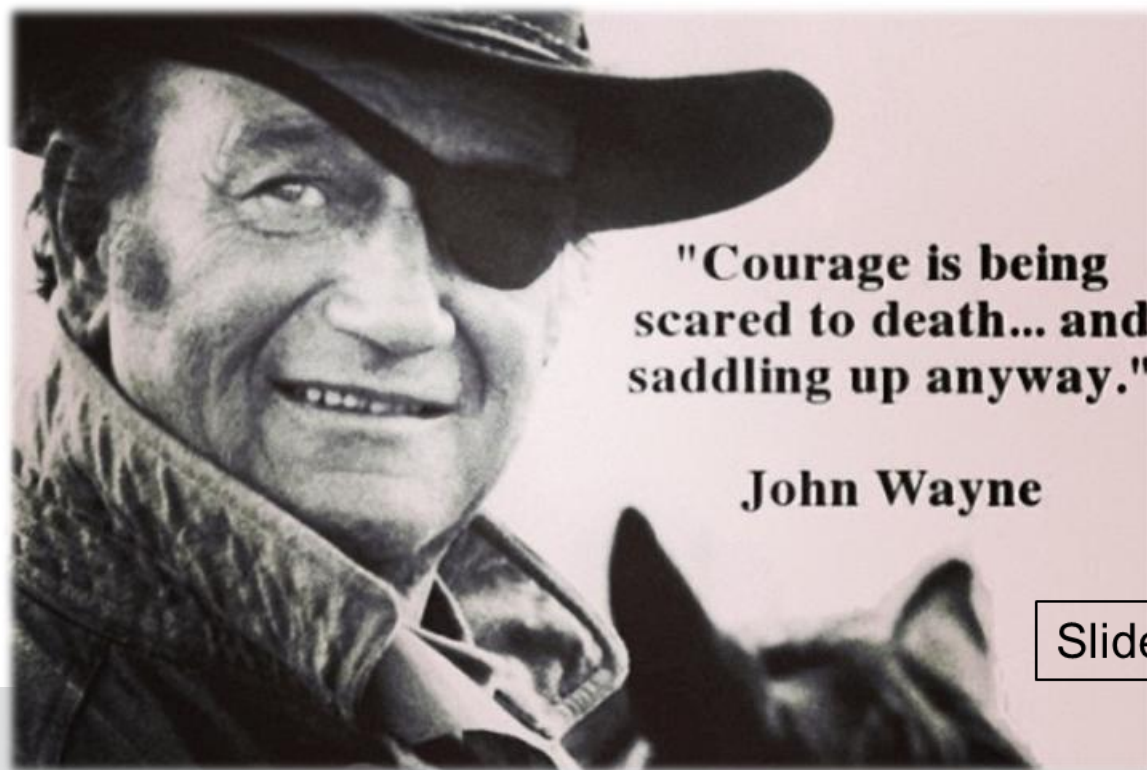


Drop Everything & Do This NOW



6. DON'T GIVE UP:

- Do the right thing, and don't look back
 - Public health, safety & welfare are in your hands
 - We rely on rivers for our survival... this is the real deal



Slide: Varrella, 2015

