

# MAINTAINING DEFENSIBLE SPACE

## PRE AND POST FIRE ANALYSIS



**NICK WALLINGFORD**

FIRE CAPTAIN-PRE-FIRE ENGINEER

CAL FIRE SHASTA-TRINITY UNIT

# INTRODUCTION

## BACKGROUND

- B.S. FORESTRY AND NATURAL RESOURCES, CAL POLY-SAN LUIS OBISPO, CA
  - MINOR FIRE-FUEL MANAGEMENT AND GIS
- JUST COMPLETED 17<sup>TH</sup> FIRE SEASON WITH CAL FIRE

## RELEVANT DUTIES

- PRE-FIRE/DEFENSIBLE SPACE INSPECTIONS – SHASTA-TRINITY UNIT
  - OVERSEE PROGRAM FOR UNIT
  - SUPERVISE STAFF OF FOUR INSPECTORS
- POST FIRE/DAMAGE INSPECTION- STATEWIDE
  - SERVED AS DAMAGE INSPECTION MANAGER FOR 2018 CARR AND CAMP INCIDENTS, MANY OTHER INCIDENTS SINCE 2015.
  - DIRECTLY INVOLVED WITH POST FIRE INSPECTION OF OVER 20,000 STRUCTURES



# OVERVIEW OF PRESENTATION

- 1. PRIORITIES
- 2. VARIABILITY OF FIRE
- 3. PRE-FIRE DEFENSIBLE SPACE – WHAT IT IS
- 4. LIMITATIONS OF DEFENSIBLE SPACE CODE
- 5. PHOTOS POST-FIRE OBSERVATIONS – EXPERIENCES FROM CARR AND CAMP FIRES
- 6. SUMMARY: ACTIONS TO PREVENT STRUCTURE IGNITION

# PRIORITIES

- 1. LIFE SAFETY
- 2. PROTECT PROPERTY
- 3. PROTECT THE ENVIRONMENT



# VARIABILITY OF FIRE

- FIRES DO NOT BURN CONSISTENTLY
- FUELS, WEATHER ARE NOT CONSISTENT
- SUPPRESSION EFFORTS AFFECT OUTCOMES
- STRUCTURE TO STRUCTURE IGNITIONS ARE DIFFICULT TO STOP
- HIGH INTENSITY FIRES MAY STILL DESTROY WELL BUILT, WELL CLEARED STRUCTURES





# SHASTA DEFENSIBLE SPACE INSPECTION PROGRAM

- FOUR FULL-TIME DEFENSIBLE SPACE INSPECTORS (DSI's) FOR SIX MONTHS A YEAR
  - STARTING APRIL 1<sup>ST</sup>, 2019
- STATION/ENGINE CREWS ALSO COMPLETE INSPECTIONS
- IN 2018 SHASTA UNIT DSI's AND STATION/ENGINE CREWS COMPLETED OVER 9,000 INSPECTIONS.
- #1 GOAL IS EDUCATION





# DEFENSIBLE SPACE – THE CODE

- PUBLIC RESOURCE CODE (PRC) 4291 STATES:  
(1) MAINTAIN DEFENSIBLE SPACE OF 100 FEET FROM EACH SIDE AND FROM THE FRONT AND REAR OF THE STRUCTURE\*, BUT NOT BEYOND THE PROPERTY LINE.



\*STRUCTURE: ANY PERMANENTLY CONSTRUCTED BUILDING WITH A ROOF AND WALLS, GREATER THAN 120 SQUARE FEET.



# DEFENSIBLE SPACE-4291 CODE

- BREAK HORIZONTAL CONTINUITY OF FUEL (SIDE TO SIDE)
- BREAK VERTICAL CONTINUITY FUEL (TOP TO BOTTOM)
- CUT GRASS TO 4 INCHES OR LESS
- REMOVE DEAD AND DYING TREES, BRUSH, BRANCHES AND LOGS
- REMOVE LEAF LITTER WITHIN 30 FEET OF STRUCTURE





# RESULTS OF INSUFFICIENT DEFENSIBLE SPACE

- WITHOUT DEFENSIBLE SPACE THERE IS A VERY HIGH PROBABILITY OF STRUCTURE IGNITING
- APPROXIMATELY 15% OF CARR FIRE AREA SRA (NOT CITY) WAS INSPECTED IN 2018 PRIOR TO FIRE
  - 100% OF HOMES WITHIN CARR FIRE THAT DID NOT PASS THEIR INSPECTION, WERE DESTROYED.



- EVEN PASSING A DEFENSIBLE SPACE INSPECTION IS NO GUARANTEE THAT STRUCTURE WILL SURVIVE A FIRE...



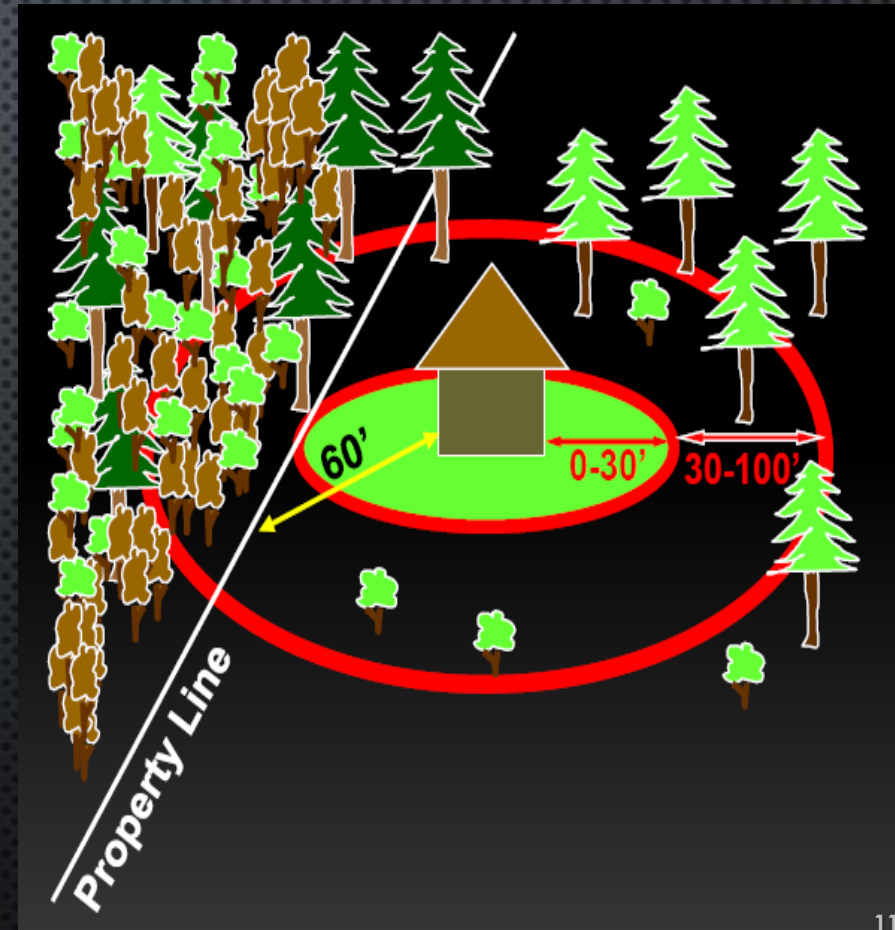
# PRC 4291 IS A MINIMUM STANDARD

- PRC 4291: FUELS SHALL BE MAINTAINED IN A CONDITION SO THAT A WILDFIRE BURNING UNDER AVERAGE WEATHER CONDITIONS WOULD BE UNLIKELY TO IGNITE THE STRUCTURE.
- MOST LARGE AND DESTRUCTIVE FIRES BURN IN WELL ABOVE AVERAGE WEATHER CONDITIONS
  - EX: CARR FIRE, JULY 26<sup>TH</sup> WAS HOTTEST DAY OF 2018 IN REDDING.
- LIMITED LANGUAGE ABOUT WOOD MULCH USE AND ORNAMENTAL VEGETATION, STORAGE OF ITEMS



# PRC 4291 LIMITATIONS

- PRC 4291 ONLY APPLIES TO PROPERTY LINE
- NEW CONSTRUCTION IN SRA/UNINCORPORATED AREAS SINCE ~1991 BUILDINGS MAY BE 30 FEET FROM LOT LINE. PRIOR TO 1991 THEY WERE ALLOWED EVEN CLOSER.
- NO ABILITY FOR CAL FIRE TO REQUIRE CLEARANCE BEYOND 30 FEET OR LESS
- NO ABILITY FOR RESIDENTS TO PROVIDE CLEARANCE BEYOND 30 FEET OR LESS



# PHOTOS

## POST FIRE OBSERVATIONS

- STRUCTURES ARE FROM 2018 CARR AND CAMP FIRES
- ALL STRUCTURES HAD SOME LEVEL OF FIRE SUPPRESSION
- WITHOUT INTERVENTION, MOST OF THESE STRUCTURES WOULD HAVE BEEN COMPLETELY DESTROYED
- 2015-2018 DAMAGE INSPECTION DATA, 93%+ OF HOMES THAT CATCH ON FIRE, ARE COMPLETELY DESTROYED.



# EMBERS

- Direct and indirect impact on structure ignition



<sup>13</sup>  
1/4" Mesh vent, common in nearly all 2008  
and earlier homes in Shasta County



# COMBUSTIBLE MATERIAL IN 0-5 FOOT ZONE

## WOOD SIDING



Carr Fire: Bark mulch



# COMBUSTIBLE MATERIAL IN 0-5 FOOT ZONE WOOD SIDING



Carr Fire: Mulch and ornamental plants; three separate areas of ignition



# COMBUSTIBLE MATERIAL IN 0-5 FOOT ZONE STUCCO SIDING



Carr Fire: Wood mulch NOTE: Home was also exposed to radiant heat



# COMBUSTIBLE MATERIAL IN 0-5 FOOT ZONE STUCCO SIDING



Carr Fire: Wood mulch and ornamental plants  
Note: Home was built to WUI CBC Ch. 7A Building Standard



# ORNAMENTAL VEGETATION



Carr Fire



# ORNAMENTAL VEGETATION



Camp Fire: Ornamental vegetation



# OUTBUILDINGS/ RV'S/BOATS/ ETC.

- PRC 4291 requires 10 feet of bare soil around outbuildings\* within 100 feet of structure
- No standard for RV's, boats, etc.



Carr Fire: Exposure to home from trailer igniting, trailer was exposed to vegetation

\*Outbuilding: structure less than 120 square feet



# WOOD DECK



Carr Fire



# WOOD DECK



Camp Fire



Camp Fire



# WOOD FENCE



Carr Fire: Wood fence connected to structure.  
Note: Siding is non-combustible fiber cement (ex. Hardieplank)



# SUMMARY: BEYOND 4291

## ACTIONS TO PREVENT STRUCTURE IGNITION

- EMBER INTRUSION
  - INSTALL EMBER RESISTANT SCREENS
- COMBUSTIBLE MATERIAL AROUND BASE OF STRUCTURE 0-5 FEET
  - RECOMMEND ONLY BARE DIRT, GRAVEL, CONCRETE, ASPHALT OR GREEN GRASS AROUND BASE OF STRUCTURE
- ORNAMENTAL VEGETATION (PROFESSOR WAITE)
  - REFER TO GUIDES FOR ANY ORNAMENTAL VEGETATION PLANTED AROUND STRUCTURE
- OUTBUILDINGS, RV'S, BOATS WITHIN 30 FEET OF MAIN STRUCTURE
  - KEEP ALL OUTBUILDINGS, RV'S, BOATS, ETC. MORE THAN 30 FEET FROM STRUCTURE
- COMBUSTIBLE DECKS, FENCES, OTHER STRUCTURES ATTACHED TO STRUCTURE
  - REPLACE WOOD FENCE FROM 0-5 FEET AROUND STRUCTURE WITH NON-COMBUSTIBLE MATERIAL
  - REPLACE WOOD DECKS WITH COMPOSITE NON-COMBUSTIBLE MATERIAL (EX. TREX)
  - REMOVE/REPLACE ANY WOODEN ACCESSORY STRUCTURE ATTACHED TO MAIN STRUCTURE



# RESOURCES

CAL FIRE Shasta-Trinity Unit

- 875 Cypress Ave. Redding, CA
- 530-225-2418

- CAL FIRE
- [www.ReadyforWildfire.org](http://www.ReadyforWildfire.org)
- Insurance Institute for Business and Home Safety
- <https://disastersafety.org/wildfire>

