

# California Wildfires

## Chapter 7A and IWUIC

*What's best for your community?*

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# So what's the problem?

- Disaster paradigm has shifted from earthquakes to wildland fires.
  - Wildland fires are dominating disaster response in California.
  - Climate change is real.
  - California cannot afford the cost of continued fire devastation.
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# The Disaster Paradigm (then)

- Earthquakes used to be the biggest area of catastrophic concern in California.
- Codes have continuously improved seismic safety in both new and existing construction since the 1971 San Fernando Earthquake.
- Earthquakes were perceived as “regional” events that affected far more than just a single, isolated building.
- Large earthquakes were thought to have the most significant potential impact on an entire community.

# The Disaster Paradigm (now)

- Wildland fires are now the top focus of many elected officials in CA.
- Climate change is accelerating the frequency and intensity of wildland fires.
- The “fire season” in CA is now considered to be the entire year.
- The cost of battling wildland fires and assisting in community recovery is exhausting funds that could otherwise benefit CA.

# Videos

- Earthquake history
  - [Animated Maps: 120 Years of Earthquakes \(4K\) - YouTube](#)
- Wildland fire history
  - [Animated Maps: California Wildfires from 1910-2019 - YouTube](#)
  - [Animated Maps: Ten Most Destructive California Wildfires – YouTube](#)
- Canadian video
  - [Canadian Forest Fire Video Clip](#)

# Earthquakes vs. Wildland Fires

What are the 10 “most significant” earthquakes in California?

1. San Francisco (1906) [7.9M] 700-3000+ deaths
2. Long Beach (1933) [6.4M] 115-120 deaths
3. Loma Prieta (1989) [6.9M] 63 deaths
4. San Fernando (1971) [6.6M] 58-65 deaths
5. Northridge (1994) [6.7M] 57 deaths
6. San Juan Capistrano (1812) [6.9M] 40 deaths
7. Hayward (1868) [6.3M] 30 deaths
8. Lone Pine (1872) [7.4M] 27 deaths
9. Santa Barbara (1925) [6.8M] 13 deaths
10. Kern County (1952) [7.3M] 12 deaths

What are the 10 “most significant” WUI fires California?

1. Camp Fire (2018) [153k AC | 18,804 bldg] 85 deaths
2. Tubbs (2017) [36,807 AC | 5,636 bldg] 22 deaths
3. Tunnel (1991) [1,600 AC | 2,900 bldg] 25 deaths
4. Cedar (2003) [273,246 AC | 2,820 bldg] 15 deaths
5. North Complex (2020) [318,935 AC | 2,352 bldg] 15 deaths
6. Thomas (2017) [281,893 AC | 1,063 bldg] 2 deaths
7. Witch (2007) [197,990 AC | 1,650 bldg] 2 deaths
8. Woolsey (2018) [96,949 AC | 1,643 bldg] 3 deaths
9. Carr (2018) [229,651 AC | 1,614 bldg] 8 deaths
10. LNU Complex (2020) [363,220 AC | 1,491 bldg] 6 deaths
- \* August Complex (2020) [1,032,648 AC | 935 bldg] 1 death

... and we're  
still building  
homes in  
the WUI

- What are we doing about it?
  - CBC CH7A
  - IWUIC
  - Legislative actions



# CBC Chapter 7A

- History of CBC CH7A
  - How CH7A works
    - Modes of structural ignition
    - Focus on ignition-resistant-construction
    - Reliance on Bates Bill for vegetation management
  - Targets new construction
    - July 1, 2008 exemption
    - Existing construction (pre-2008) is not based on modern construction codes & standards.
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# CBC CH7A

Where did CBC CH7A come from?

How does the IWUIC differ from CBC CH7A, and can it help protect my community?

- CBC CH7A is the first set of building standards that were specifically developed with the intent of reducing the likelihood of structural ignition that might otherwise occur due to exposure of fire hazards that are unique to the wildland-urban interface.
- Effective: July 1, 2008
- **Applicability: New construction**



# Original aspects of CBC CH7A

## Original focus of CBC CH7A

1. Ignition resistant construction
2. Ember intrusion
3. Ember entrapment
4. Defensible space

- Introduced concept of Ignition Resistant Material (IRM)
  - Addressed the hazards associated with ember exposure
  - Established standards to reduce the risks related to ember intrusion through building vents, windows and doors
  - Established construction requirements to reduce the potential for ember accumulation under porches, decks and other building projections.
  - Integrated fuel modification/vegetation management requirements from the Bates Bill (Tunnel Fire 1991)
  
  - Objective: Increase the likelihood that a structure could inherently survive a rapidly passing wildland fire without the intervention of external fire suppression crews.
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# Original aspects of CBC Ch7A

## Original CBC Ch7A (2008)

701A Scope, Purpose and Application

702A Definitions

703A Standards of Quality

704A Ignition-Resistant Construction

705A Roofing

706A Vents

707A Exterior Covering

708A Exterior Windows and Doors

709A Decking

710A Accessory Structures

- Enforcement distinction between SRA & LRA
- New construction only
- No consensus standards on vents, decking and other construction materials
- OSFM listed acceptable materials on state website
- ¼" galvanized mesh was deemed acceptable for vents
- Redwood and cedar decking was deemed acceptable
- Accessory structures were barely addressed
- Local jurisdictions were expected to determine how to enforce the standards (ie., Building Department, Fire Department, or both)

... in an abundance of caution, many jurisdictions were overly prohibitive and/or exceeded their enforcement authority.

# Revisions to CBC Ch7A

## Major revisions to CBC Ch7A (2016)

701A Scope, Purpose and Application

702A Definitions

703A Standards of Quality

704A Ignition-Resistant Construction

705A Roofing

706A Vents

707A Exterior Covering

708A Exterior Windows, Skylights and Doors

709A Decking

710A Accessory Structures

- Clarification of ASTM E84 and UL723 to establish ignition resistant material (IRM)
  - Test extended by 20-minutes (from 10 min to 30 min)
- Utilization of ASTM E2886 as acceptance criteria for attic vents and reduction in wire mesh from 1/4" to 1/8".
  - Previously had to be listed on OSFM website as suitable for preventing intrusion of flames or burning embers
- Addition of ASTM E2707 for acceptance of exterior wall assemblies.
  - ASTM E2707 provided a path (extremely stringent) for special exterior wall construction assemblies.
- Addition of ASTM E2957 for acceptance of exterior porch ceilings.

# Revisions to CBC Ch7A

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709A Decking

710A Accessory Structures

- Addition of ASTM E2957 for acceptance of the underside of floor projections (ie., cantilevered portions of buildings).
- Emphasis on the underside of all building appendages.
  - If it sticks out, assume embers will accumulate under it during a wildland fire event.
  - ASTM E2957 is your best friend.
- Addition of skylights to CBC 708A
  - 1<sup>st</sup> most common error (along with garage doors windows).
- Addition of weather stripping at garage doors.
- Addition of ASTM E2632 and ASTM E2726 for acceptance of decking material.
  - SFM Standard 12-7A-4 still allows redwood and cedar
- Refined standards for accessory structures
  - Critical distances: 3-feet; 30-feet; 50-feet

# CBC 704A.3 (3<sup>rd</sup> most common error)

## 704A.3 Conditions of Acceptance for Ignition-Resistant Material Tested in Accordance With ASTM E84 or UL 723

A material shall comply with the conditions of acceptance in Items 1 and 2 below *when the test is continued for an additional 20-minute period, meaning for a total test period of an "extended" 30-minute test period.* The material shall exhibit a flame spread index not exceeding 25 and shall show no evidence of progressive combustion following the extended 30-minute test period.

1. The material shall exhibit a flame front that does not progress more than  $10\frac{1}{2}$  feet (3200 mm) beyond the centerline of the burner at any time during the extended 30-minute test period.

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# CBC 705A.3 (2<sup>nd</sup> most common error)

## 705A.3 Roof Valleys

Where valley flashing is installed, the flashing shall be not less than 0.019-inch (0.48 mm) No. 26 gage galvanized sheet corrosion-resistant metal *installed over not less than one layer of minimum 72 pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909, at least 36-inch-wide (914 mm) running the full length of the valley.*

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# CBC 707A.3.1

## **707A.3.1 Conditions of Acceptance When Tested in Accordance With ASTM E2707**

The ASTM E2707 test shall be conducted **on a minimum of three test specimens** and the conditions of acceptance in Items 1 and 2 below shall be met. **If any one of the three tests does not meet the conditions of acceptance, three additional tests shall be run. *All of the additional tests*** shall meet the conditions of acceptance. Absence of flame penetration through the wall assembly at any time.

1. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70- min test.

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# CBC 708A.2 (1<sup>st</sup> most common error)

## 708A.2 Exterior Glazing

The following exterior glazing materials and/or assemblies shall comply with this section:

Exterior windows

1. Exterior glazed doors
  2. Glazed openings within exterior doors
  3. Glazed openings within exterior garage doors
  4. Exterior structural glass veneer
  5. Skylights
  6. Vents
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When was the last time you saw a skylight or window lites in a garage door that were dual-glazed with at least one tempered glass pane?





# CBC 708A.4

## **708A.4 Weather Stripping**

Exterior garage doors shall be provided with weather stripping to resist the intrusion of embers from entering through gaps between doors and door openings when visible gaps exceed  $\frac{1}{8}$  inch (3.2 mm). Weather stripping or seals shall be installed on the bottom, sides, and tops of doors to reduce gaps between doors and door openings to  $\frac{1}{8}$  inch (3.2 mm) or less.

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# 2021 IWUIC

- History of IWUIC
  - How IWUIC works
    - Comprehensive approach to wildfire protection that goes beyond construction standards and vegetation management.
    - Consolidates fire department access, water supply, and risk management.
    - Includes 9 appendices that may be beneficial for some jurisdictions to consider.
  - Targets new & existing construction (additions & alterations)
  - Key differences from CBC CH7A
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# International Wildland-Urban Interface Code

## IWUIC (2021)

CH1	Scope and Administration	Appendix A	General Requirements
CH2	Definitions	Appendix B	Vegetation Management Plan
CH3	Wildland-Urban Interface Areas	Appendix C	Fire Hazard Severity Form
CH4	Wildland-Urban Interface Area Requirements	Appendix D	Fire Danger Rating System
CH5	Special Building Construction Regulations	Appendix E	Findings of Fact
CH6	Fire Protection Requirements	Appendix F	Characteristics of Fire-Resistive Vegetation
CH7	Referenced Standards	Appendix G	Self-Defense Mechanism
		Appendix H	IWUIC Flowchart
		Appendix I	Board of Appeals

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# CBC CH7A vs. IWUIC

## CBC CH7A

701A Scope, Purpose and Application  
702A Definitions  
703A Standards of Quality  
704A Ignition-Resistant Construction  
705A Roofing  
706A Vents  
707A Exterior Covering  
708A Exterior Windows, Skylights and Doors  
709A Decking  
~~710A Accessory Structures~~

## IWUIC

CH1 Scope and Administration  
CH2 Definitions  
CH3 Wildland-Urban Interface Areas  
CH4 Wildland-Urban Interface Area  
Requirements  
CH5 Special Building Construction  
Regulations  
CH6 Fire Protection Requirements  
CH7 Referenced Standards  
~~Appendices A through I~~

# IWUIC Chapter 1

## Scope and Administration

- Similar to Chapter 1 in other I-Codes.
  - Applicability
  - Authority of Code Official
  - Permits
  - Construction Documents
  - Fees
  - Inspection and Enforcement
  - Certificate of Completion
  - Stop Work Order
  - Etc.

# IWUIC Chapter 2

## Definitions

- Similar to Chapter 2 in other I-Codes.
  - *Accessory Structure*
  - *Certificate of Completion*
  - *Fuel (Heavy; Medium; Light)*
  - *Fuel Modification*
  - *Fuel Mosaic*
  - *Ignition-Resistant Construction (Class 1, 2 & 3)*
  - *Slope*
  - *Etc.*



# IWUIC Chapter 3

## Wildland-Urban Interface Areas

- Provides a methodology to establish and record wildland-urban interface areas based on findings of fact.
  - 302.1 Declaration
  - 302.2 Mapping
  - 303.3 Review of WUI areas
- CA → Local Ordinance/FRAP

# IWUIC

## Chapter 4

Wildland-Urban  
Interface Area  
Requirements

- 401 General
- 402 Applicability
- 403 Access
- 404 Water Supply
- 405 Fire Protection Plan

# IWUIC

## Chapter 5

### Special Building Construction Regulations

- 501 General
- 502 Fire Hazard Severity
- 503 Ignition-resistant  
Construction and Material
- 504 Class 1 Ignition-resistant  
Construction
- 505 Class 2 Ignition-resistant  
Construction
- 506 Class 3 Ignition-resistant  
Construction
- 507 Replacement or Repair of  
Roof Coverings

# IWUIC

## Chapter 6

### Fire Protection Requirements

- 601 General
- 602 Automatic Sprinkler Systems
- 603 Defensible Space
- 604 Maintenance of Defensible Space
- 605 Spark Arresters
- 606 Liquefied Petroleum Gas Installations
- 607 Storage of Firewood and Combustible Materials

# IWUIC Chapter 7

## Referenced Standards

- Similar to referenced standards chapters in other I-Codes.

# IWUIC Appendix A

## General Requirements

- A101 General
- A102 Vegetation Control
- A103 Access Restrictions
- A104 Ignition Source Control
- A105 Control of Storage
- A106 Dumping
- A107 Protection of Pumps and  
Water Storage Facilities
- A108 Land Use Limitations
- A109 Referenced Standards

# IWUIC Appendix B

## Vegetation Management Plan

- B101.1 Scope
- B101.2 Plan content
  - Site plan
  - Methods and timetables for modifying fuels on property
  - A plan for maintaining the fuel-reduction measures
- B101.3 Fuel modification
  - To be considered fuel modification, continuous maintenance of the clearance is required.

IWUIC  
Appendix C

Fire Hazard  
Severity Form

- Provides an alternative to Table 502.1 for analyzing the fire hazard severity of building sites.



**SECTION C101  
FIRE HAZARD SEVERITY FORM**

**C101.1 Fire hazard severity form.** Where adopted, Table C101.1 is permitted to be used as an alternative to Table 502.1 for analyzing the fire hazard severity of building sites.

**TABLE C101.1  
FIRE HAZARD SEVERITY FORM**

<b>A. Subdivision Design Points</b>	
1. Ingress/Egress	
Two or more primary roads	1__
One road	3__
One-way road in, one-way road out	5__
2. Width of Primary Road	
20 feet (6096 mm) or more	1__
Less than 20 feet (6096 mm)	3__
3. Accessibility	
Road grade 5% or less	1__
Road grade more than 5%	3__
4. Secondary Road Terminus	
Loop roads, cul-de-sacs with an outside turning radius of 45 feet (13 716 mm) or greater	1__
Cul-de-sac turnaround	2__
Dead-end roads 200 feet (60 960 mm) or less in length	3__
Dead-end roads greater than 200 feet (60 960 mm) in length	5__
5. Street Signs	
Present	1__
Not present	3__
<b>B. Vegetation (IWUIC Definitions)</b>	
1. Fuel Types	
Light	1__
Medium	5__
Heavy	10__

*(continued)*

**TABLE C101.1—continued  
FIRE HAZARD SEVERITY FORM**

2. Defensible Space	
70% or more of site	1__
30% or more, but less than 70% of site	10__
Less than 30% of site	20__
<b>C. Topography</b>	
8% or less	1__
More than 8%, but less than 20%	4__
20% or more, but less than 30%	7__
30% or more	10__
<b>D. Roofing Material</b>	
Class A Fire Rated	1__
Class B Fire Rated	5__
Class C Fire Rated	10__
Nonrated	20__
<b>E. Fire Protection—Water Source</b>	
500 GPM (1892.5 L/min) hydrant within 1,000 feet (304.8 m)	1__
Hydrant farther than 1,000 feet (304.8 m) or draft site	2__
Water source 20 min. or less, round trip	5__
Water source farther than 20 min., and 45 min. or less, round trip	7__
Water source farther than 45 min., round trip	10__
<b>F. Existing Building Construction Materials</b>	
Noncombustible siding/deck	1__
Noncombustible siding/combustible deck	5__
Combustible siding and deck	10__
<b>G. Utilities (gas and/or electric)</b>	
All underground utilities	1__
One underground, one above ground	3__
All above ground	5__
<b>Total for Subdivision</b>	
Moderate Hazard	40–59
High Hazard	60–74
Extreme Hazard	75+

# IWUIC Appendix D

## Fire Danger Rating System

- Provides a method of rating the relative fire danger for a particular building site based on fuel models.
  - Provides a “Fuel Model Key” which is a table with six (6) different general categories of land vegetation growth.
  - Describes 21 different “Fuel Models” that are used in the Fuel Model Key.

# IWUIC Appendix E

## Findings of Fact

- E101 General
- E102 Definitions
- E103 Climatic Considerations
- E104 Topographic Considerations
- E105 Geographic Considerations
- E106 Reporting the Findings

*(Note that E105 does not address geologic considerations.)*

# IWUIC Appendix F

## Characteristics of Fire-Resistive Vegetation

1. Growth with little or no accumulation of dead vegetation.
2. Nonresinous plants.
3. Low volume of total vegetation.
4. High live fuel moisture.
5. Drought-tolerant plants.
6. No ladder fuels between ground and canopy.
7. Requires little maintenance.
8. Woody stems/branches that require prolonged heating to ignite.

# IWUIC Appendix G

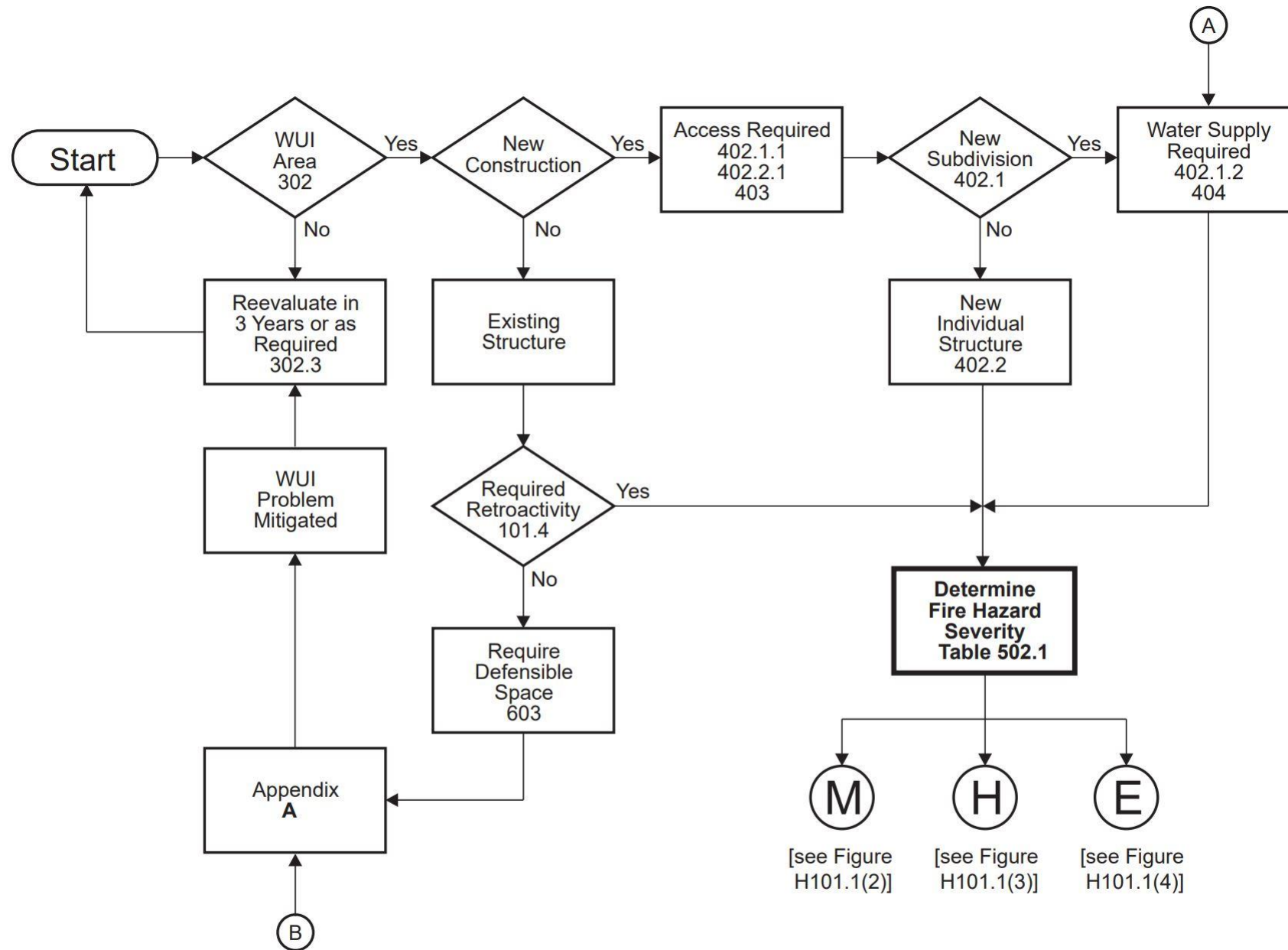
## Self-Defense Mechanisms

- G101.1 Identification of the problem
- G101.2 Structural survivability
- G101.3 Alternative concepts
  - G101.3.1 Exterior sprinkler systems
  - G101.3.2 Alternate water supply for exposure protection
  - G101.3.3 Class A foam systems
  - G101.3.4 Enhanced exterior fire protection
  - G101.3.5 Shelter in place
  - G101.3.6 Building location

# IWUIC Appendix H

## IWUIC Flowchart

- Provides a basic flowchart that describes an effective methodology for determining whether WUI-specific fire protection measures would be required.
- If fire protection measures are required, recommends a level of protection.



**FIGURE H101.1(1)  
DETERMINATION OF REQUIREMENTS**

# IWUIC Appendix I

## Board of Appeals

- Provides basic provisions for the establishment of an appeals board to hear and act upon applications for modification of the requirements of the IWUIC.
  - Procedures
  - Limitation of authority
  - Qualification of board members
  - Legal counsel
  - Board decisions





# Legislative Actions

- What happens when elected officials think WUI codes and standards aren't sufficient?
- What happens when elected officials get involved?
- Legislative regulation vs. Codes & Standards regulation.
  - Pros & cons

*... are your local regulations at risk?*

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## Recent Legislative Actions

- SB 12 (Pending)
- SB 55 (Pending)
- SB 901 (9/21/18)
- AB 9 (Pending)
- AB 38 (10/2/19)
- AB 642 (Pending)
- AB 3074 (9/29/20)
- AB 1295 (Pending)

# SB 12 (Pending)

- Local government: planning and zoning: wildfires.
  - Introduced: McGuire & Stern
  - Amended in Assembly 7/1/2021
- Jurisdictions shall update safety element to include a comprehensive retrofit strategy to reduce the risk of property loss and damage due to wildfires.
- OSFM shall update VHFHSZ maps by 1/1/2024.

# SB 55 (Pending)

- Very high fire hazard severity zone: state responsibility area: development prohibition
  - Introduced: Stern & Allen
  - Amended in Senate 4/5/2021
- Prohibit the creation or approval of a new development, as defined, in a VHFHSZ or SRA unless the local agency has adopted a comprehensive community hardening strategy.

SB 901  
(9/21/2018)

- **Wildfires**
  - Introduced: Dodd
- Primarily focused on industrial logging activities.
- Requires state forestry board to adopt regulations implementing minimum fire safety standards to apply to LRA similar to SRA.
- VMP, Fuel breaks, Greenbelts.

# AB 9 (Pending)

- Fire safety and prevention: wildfires: fire adapted communities
  - Introduced: Wood
  - Amended in Senate 7/14/2021
- OSFM shall establish the Community Wildfire Mitigation Assistance Program to coordinate efforts to improve wildfire preparedness.
  - Establish a statewide clearinghouse to provide a centralized source of data, BMPs, ordinances, etc. related to wildfire preparedness & risk reduction.

AB 38  
(10/2/2019)

- Fire safety: low-cost retrofits
  - Introduced: Wood
- OSFM shall by 1/1/20 develop a list of low-cost retrofits that provide for comprehensive site and structure fire risk reduction from adjacent structures or vegetation.
- On or after 1/1/21 require seller of real property in HFHSZ to disclose information related to fire hardening improvements and any known wildfire vulnerabilities.

# AB 642 (Pending)

- **Wildfires**
  - Introduced: Friedman
  - Amended in Senate 6/30/2021
- OSFM and HCD to consider expanding the application of WUI standards to HFHSZ.
- Expands OSFM involvement in statewide training and education (pub-ed related to fire prevention and public safety).



AB 3074  
(9/29/20)

- Fire prevention: wildfire risk: defensible space
  - Introduced: Friedman
- On or before 1/1/23 Board of Forestry to update guidance document regarding an “ember-resistant zone” within 5-feet of a structure.
  - Consider increasing fuel reduction between 5’ to 30’.

# AB 1295 (Pending)

- Residential development agreements: very high fire risk areas
  - Introduced: Maratsuchi
- On or after 1/1/22 would prohibit the legislative body of a city or county from entering into a residential development agreement for property located in a VHFHSZ.



# Can IWUIC work in CA?

(... or in your community?)

- California Adoption (replace CH7A)
  - Local Adoption (supplemental to CH7A)
    - San Mateo Consolidated Fire (Robert Marshall)
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# Will California adopt the IWUIC?

*... what will it take?*

- Pros & Cons to state-wide adoption.
- Which portions of IWUIC should CA adopt?
- Integration of current legislated standards into IWUIC.
- Who will do the heavy lifting?

# Can my Local Jurisdiction Adopt the IWUIC?

*... what will it take?*

- Local adoption would supplement current CBC CH7A standards.
- Decide which portion(s) of IWUIC would be beneficial to your community.
- Collaborate with neighboring jurisdictions to encourage uniformity in local adoptions.
- Contact jurisdictions that have already adopted IWUIC to get a head start.
  - San Mateo Consolidated Fire Department – Robert Marshall, FM

Thank You !!

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