

**Forest Service Handbook
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**Forest Service Handbook 5109.18 – Wildfire Prevention Handbook
Chapter 40 - Wildfire Prevention Engineering**

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Approved by: Jaelith Hall-Rivera, Associate Deputy Chief, S&PF

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Responsible Staff:

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Superseded Document(s): Entire Handbook; 5109.18_Contents, Amendment 5109.18-99-1, June 10, 1999; 1509.18,0 Code Contents, Amendment 5109.18-99-1, June 10, 1999; 1509.18_0 Code, Amendment 5109.18-99-1, June 10, 1999; 5109.18,10 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_10, Amendment 5109.18-99-1, June 10, 1999; 5109.18,20 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_20, Amendment 5109.18-99-1, June 10, 1999; 5109.18,30 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_30, Amendment 5109.18-99-1, June 10, 1999; 5109.18,40 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_40, Amendment 5109.18-99-1, June 10, 1999; 5109.18,50 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_50, Amendment 5109.18-99-1, June 10, 1999; 5109.18,60 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_60, Amendment 5109.18-99-1, June 10, 1999; 5109.18,70 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_70, Amendment 5109.18-99-1, June 10, 1999; 5109.18,80 Contents, Amendment 5109.18-99-1, June 10, 1999; 5109.18_80, Amendment 5109.18-99-1, June 10, 1999

Digest: Following is an explanation of the changes throughout the directive by section.

5109.18: Revises entire handbooks to better align with the recently revised FSM 5100 Zero Code, and the Forest Service mission. Provides a description developing, two levels of wildfire prevention and mitigation activities. The first level is ongoing wildfire prevention and mitigation activities; the second level is special wildfire prevention and mitigation activities to target specific problems. Expands the direction on wildfire prevention responsibilities to include positions from the Director of Fire and Aviation Management to the District Rangers.

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10: Changes the chapter title from “Wildland Fire Prevention Planning” to “Wildfire Prevention Planning” and revises direction throughout the chapter on planning with emphasis on use of the wildfire and mitigation assessment and planning process.

20: Revises direction in this chapter on the Smokey Bear Program to reflect current Cooperative Forest Fire Prevention (CFFP) Program direction, and changes in the licensing and Smokey Bear Awards programs. Removes all Area references because the Area has been incorporated into Region 9.

20.1: Revises Smokey Bear Act, Public Law amendment number.

22.1: Changes caption from “Television and Radio” to “Broadcast & Vendor Fulfillment”. Adds direction for broadcasting and vendors to this section. Recodes caption and direction for “Television and Radio” to section 22.2.

22.2: Changes caption from “Newspapers and Magazines” to “Television and Radio, and recodes direction on Television and radio to this section. Recodes direction for “Newspapers and Magazines” to section 22.3

22.3: Changes caption from “Newspapers and Magazines” to “Print Media” and recodes and updates direction for “Print Media” to this section. Recodes caption and direction for “Outdoor Advertising” to section 22.4.

22.4: Changes caption from “Field Production of Public Service Advertisements” to “Outdoor Advertising” and recodes and updates direction for “Outdoor Advertising” to this section. Recodes caption and direction for “Field Production of Public Service Advertisements” to section 22.5.

22.5: Changes caption from “Smokey Bear Internet/World Wide Website” to “Field Production of Public Service Advertisements” and recodes and updates direction for “Field Production of Public Service Advertisements” to this section. Recodes and updates direction for “Smokey Bear Internet/World Wide Website” to section 22.6.

22.6: Establishes code and caption “Social Media Sites” and sets forth direction on Social Media sites to this section. Recodes to this section direction for “Smokey Bear Internet/World Wide Website” previously located in section 22.5.

23.32: Establishes code, caption, and adds direction for “The National Symbols Program Cache”.

25.4: Establishes code, caption, and direction for “Security and Disposal of Smokey Bear Costume”.

30: Changes the chapter title from “Wildland Fire Prevention and Wildland Fire Education” to “Wildfire Prevention and Wildfire Education” and expands direction in this chapter to describe how different communications programs are developed and conducted.

40: Changes the chapter title from “Wildland Fire Prevention Engineering” to “Wildfire Prevention Engineering” and revises direction to emphasize identification of prevention engineering needs and to list sources of assistance for technology development and applications.

50: Changes the chapter title from “Wildland Fire Prevention Enforcement and Fire Investigation” to “Wildfire Prevention Enforcement and Fire Investigation” and revises direction to include expanded descriptions of investigations, restrictions, and closure procedures.

60: Changes the chapter title from “Coordinated Wildland Fire Prevention” to “Coordinated Wildfire Prevention” and revises direction to expand upon the interagency relationship of the National Wildfire Coordinating Group (NWCG), partnerships, and wildland fire prevention cooperatives in delivering effective programs.

70: Changes the chapter title from “Wildland Fire Prevention and Fire Education Teams” to “Fire Prevention Education Teams” and revises chapter in its entirety to align with the recently revised FSM 5100 Zero Code and the Forest Service mission. Revises the chapter to introduce the concept of Fire Prevention Education Teams (FPETs). Adds new sections on team mobilization and organization. Describes the relationship between severity and the use of FPETs.

71.1: Changes caption from “Mobilization” to “Fire Prevention Education Team (FPET) Training” and adds direction for FPET training. Removes direction on “Mobilization” and revises and recodes direction to section 72.2.

72.2: Removes obsolete direction on mobilization and adds to this section direction previously set out in section 71.1.

80: Changes the chapter title from “Wildland Fire Prevention and Communications Training” to “Wildfire Prevention, Mitigation, and Communications Training” and updates direction to list essential prevention courses and related skills needed in the delivery of wildfire prevention programs and projects. Removes all Area references because the Area has been incorporated into Region 9.

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40.2 - Objective

To reduce wildfire risks, hazards, ignitions, and losses through the development, use, and communication of wildfire prevention standards, procedures, mechanical devices, and technology.

40.3 - Policy

Forest Service wildfire prevention and mitigation activities may use wildfire prevention engineering as an effective approach toward reducing numbers of unwanted human-caused wildfires and mitigating risks.

40.31 - Identification of Wildfire Prevention Engineering Needs

Through an assessment process that carefully focuses on risks and uses supporting historical fire occurrence data (ch.10 of this handbook), determine solutions to wildfire problems that include education solutions, engineering solutions, law enforcement solutions, or any combination of these approaches.

Consider the following:

1. The problem (risk, historical fire occurrence, cause).
2. Surrounding environment or landscape (hazards, values).
3. Past efforts at solving these problems.
4. Cost effectiveness.
5. Public relations and social factors.

Precedent should not necessarily be a determining factor in utilizing any particular solution.

40.32 - Law Enforcement

(See FSM 5300, FSH 5309.11). Enforcement of wildfire prevention standards and laws is one of the tools to address wildfire problems, but it should be used in conjunction with education and engineering wherever appropriate. The goal of voluntary compliance is often achieved through education and administrative measures. Law enforcement techniques should be used when other efforts fail or in cases of repeated, willful, or negligent violations. Coordinate criminal or civil actions as needed with law enforcement and investigations personnel.

40.5 - Definitions

Wildfire Prevention Engineering. The process of reducing risks, hazards, ignitions, and losses by shielding the fuel from the heat sources or removing ignition sources from fuels.

“Engineering” also incorporates social engineering, which includes efforts to affect values and behaviors towards stewardship.

41 - Technology Sources

Many wildfire prevention solutions are engineered on-site. Technological wildfire prevention solutions and support are available from:

1. Agency wildfire prevention personnel.
2. Other cooperating Federal and State agencies.
3. USDA Forest Service, San Dimas Technology and Development Center, San Dimas, CA.
4. USDA Forest Service, Intermountain Fire Sciences Laboratory, Missoula MT.
5. USDA Forest Service, Forest Fire Laboratory, Riverside, CA.
6. USDA Forest Service, Missoula Technology and Development Center, Missoula, MT.
7. National Fire Protection Association (NFPA), Quincy, MA.

42 - Application of Development Technology

Construct or retrofit Forest Service facilities and equipment to meet all current engineering standards and State and local laws and regulations for prevention of and protection from wildfires.

Ensure that Forest Service personnel with assigned duties in wildfire prevention have the necessary knowledge, training, tools, and experience about available technology involving wildfire prevention and mitigation engineering.

42.1 - Inspections

Conduct inspections according to the frequency set forth in the unit's wildfire prevention action plans (ch.10 of this handbook). Inspections should include:

1. Structure and improvement hazard reduction.
2. Chimney screens and other spark sources of residential and special use structures.
3. Mechanical equipment used in wildland areas, including both Forest Service equipment and equipment operating under contract.

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4. Powerline clearances and hazard trees.
5. Railroad locomotives and/or rights-of-way.
6. Industrial and construction project sites.
7. Forest Service structures within the wildland urban interface.

42.2 - Spark Arrestors

Forest Service personnel should be knowledgeable of approved spark arrestors for mechanical equipment, including off-highway-vehicles and construction/forestry equipment. Be familiar with the approval process used by the San Dimas Technology and Development Center to ensure proper types, condition, and usage of spark arrestors for mechanical equipment.

42.3 - Fire Precautions

Forest Service wildfire prevention and mitigation personnel should be knowledgeable about:

1. Defensible space clearing distances for structures.
2. Vegetation waste disposal options.
3. Chimney spark arrestors.
4. Landscape and construction specifications for more survivable structures.
5. Location of suppression water sources and delivery options.

42.4 - Hazard Management

The goal of hazard management is to reduce the potential intensity and severity of a wildfire in an area based on fuels, topography, and weather (ch. 10, sec 10.6 of this handbook). Hazardous fuel reduction and maintaining healthy vegetation mitigate risk; see guidance in (FSM 5140).

Hazardous fuels reduction can be used as a tool to mitigate risk to improvements such as structures, campgrounds, and infrastructure.

1. Reduce horizontal and vertical continuity of fuels.
2. Promote live and high moisture content fuels surrounding values at risk, taking care to favor native plant species.