Planning to Live with Fire
Planning Tools and Best Practices

Carol L. Rice
Wildland Resource Management, Inc.
December 4, 2013
Introduction

- Carol Rice, Wildland Resource Management, Inc.
- Overview of planning tools
- Examples of best practices
- Based on Managing Fire in the Urban Wildland Interface
  - Thanks to Cheryl Miller, Ken Blonski and Solano Press
The Role of the Community/Fire Planner

YOU can Prevent Wildfire Damage!

- Hazard Assessment
- Land Use Planning
- Community Design
- Conditions of Approval
  - Fire Protection Plans
  - Fuel Management
  - Biotic Protection
Types of Community Planning and Fire Plans

- General Plans
- Specific Plans
- Fire Protection Plans
- Regional fire plans
- CAL FIRE Unit Plans
- Local Hazard Mitigation Plans
- CWPPs Community Wildfire Protection Plan

Yellow = Local Plans (future), Red = Operational, Green = Existing Communities

All most effective with new construction - Except CWPP
## Practical Solutions and Management Approaches - Best Practices

### Ignition Prevention & Community Awareness Programs

<table>
<thead>
<tr>
<th>Environment</th>
<th>Education</th>
<th>Enforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

### Development of Policy and Land Use Plans

<table>
<thead>
<tr>
<th>Land Use Designation and Zoning Ordinances</th>
<th>Project Planning and Review Processes</th>
<th>Guidelines, Standards, Codes and Local Ordinances</th>
<th>General Plan and Safety Element Specific Plan</th>
<th>Subdivision Ordinance</th>
<th>Development Agreements</th>
<th>Land Use Plans and Master Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Community Design Practices

<table>
<thead>
<tr>
<th>New Residential Layout</th>
<th>Existing Residential Development</th>
<th>Utility Locations &amp; Capacity</th>
<th>Road Networks for Access &amp; Evacuation</th>
<th>Structure Design &amp; Materials</th>
<th>Domestic Landscape Fuels</th>
<th>Wildland Fuels</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>◼</td>
<td>✓</td>
<td>◼</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Emergency Services & Residents Response to Fire

<table>
<thead>
<tr>
<th>Emergency Response</th>
<th>Residents Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Tools for Carrying out Best Practice**

**Tools Used for Preplanning for New Development or Land Management**

- General Plan
- Safety Element or Pre-Disaster Mitigation Plan
- Zoning
- Specific Plan
- CEQA
- Design Guidelines
- Development
- Construction

**Tools Used to Mitigate Existing Conditions**

- Master Plan or Management Plan
- Emergency Response Plan
- Community Awareness Campaign
- Code Enforcement
- Changes to the Existing Physical Environment

---

**Tools for Planners**

There are fewer solutions for existing developments

Taken from: Managing Fire in the Urban-Wildland Interface
Elements of Fire to Address Through Planning

- Topography
- Fire Weather
- Fuel
  - Structure
  - Vegetation
- Utilities
- Fire Response & Recovery
# Scale and Element of Tools

## Elements that Contribute to Potential Damage from Fire

<table>
<thead>
<tr>
<th>Elements of Threat</th>
<th>Individual</th>
<th>Neighborhood Groups</th>
<th>Local Govt</th>
<th>Regional</th>
<th>State</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topography</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Severe fire weather/fire history</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Fuel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure-related elements</td>
<td>CD</td>
<td>CD</td>
<td>CD, Po</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure density</td>
<td>NTA</td>
<td>NTA</td>
<td>CD, Po</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure construction, design, and materials</td>
<td>CD</td>
<td>CD</td>
<td>CD, Po</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure setback</td>
<td>NTA</td>
<td>NTA</td>
<td>NTA</td>
<td>CD, Ps, Pc</td>
<td></td>
<td>Ps</td>
</tr>
<tr>
<td>Landscape/wildland vegetation-related items</td>
<td>CD</td>
<td>CD</td>
<td>CD, Po</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic landscapes / defensible space</td>
<td>CD</td>
<td>CD</td>
<td>CD, Po</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildland vegetation</td>
<td>CD</td>
<td>CD</td>
<td>CD, Po</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Key to Tool Symbols

- **A**: Awareness Through Ignition Prevention Programs (chapter 10)
- **CD**: Mitigation Action through Community Design (chapters 12-18)
- **Pc**: Code
- **Po**: Ordinance
- **Ps**: Standard
- **NTA**: No tool available

## From: You Too Can Prevent Wildfires - Smokey Turned 65! Environmental Monitor, Fall 2010. by Miller, Blonksi and Rice, at www.califaep.org
## Scale and Element of Tools (2)

### Elements That Contribute to Potential Damage from Fire

<table>
<thead>
<tr>
<th>Toolbox</th>
<th>Individual</th>
<th>Neighborhood Groups</th>
<th>Local Govt.</th>
<th>Regional</th>
<th>State</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities and infrastructure</td>
<td>Augment</td>
<td>Augment</td>
<td>Po</td>
<td>Local utility company</td>
<td>Ps, Pc</td>
<td>Ps</td>
</tr>
<tr>
<td>Water supply for suppression services</td>
<td>NTA</td>
<td>Local utility company</td>
<td>Po</td>
<td>Pc, Po</td>
<td>Ps, Pc</td>
<td>Ps</td>
</tr>
<tr>
<td>Utility locations (gas/electric/propane)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community fire protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency access (fire suppression and evacuation)</td>
<td>R</td>
<td>R</td>
<td>Po, R</td>
<td>Pc, Po, R</td>
<td>Ps, Pc, R</td>
<td>Ps, R</td>
</tr>
<tr>
<td>Level of suppression service</td>
<td>Augment</td>
<td>Augment</td>
<td>Po</td>
<td>NTA</td>
<td>NTA</td>
<td>NTA</td>
</tr>
<tr>
<td>Community involvement and education</td>
<td>A</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Key to Tool Symbols

- **A** = Awareness Through Ignition Prevention Programs (chapter 10)
- **CD** = Mitigation Action through Community Design (chapters 12–18)
- **NTA** = No tool available
- **Ps** = Standard
- **Pc** = Code
- **Po** = Ordinance
- **R** = Responses to Fire (chapter 19)

*From AEP article Miller et al*
# Scale and Element of Tools

<table>
<thead>
<tr>
<th>ELEMENTS THAT CONTRIBUTE TO POTENTIAL DAMAGE FROM FIRE</th>
<th>TOOLS AVAILABLE TO THE VARIOUS PLAYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
</tr>
<tr>
<td>Topography</td>
<td>A</td>
</tr>
<tr>
<td>Severe fire weather/fire history</td>
<td>A</td>
</tr>
<tr>
<td>Fuel</td>
<td></td>
</tr>
<tr>
<td>Structure-related elements</td>
<td></td>
</tr>
<tr>
<td>Structure density</td>
<td>NTA</td>
</tr>
<tr>
<td>Structure construction, design, and materials</td>
<td>CD</td>
</tr>
<tr>
<td>Structure setback</td>
<td>NTA</td>
</tr>
<tr>
<td>Landscape/wildland vegetation-related items</td>
<td></td>
</tr>
<tr>
<td>Domestic landscapes/defensible space</td>
<td>CD</td>
</tr>
<tr>
<td>Wildland vegetation</td>
<td>CD</td>
</tr>
</tbody>
</table>

**Key to Tool Symbols**

- **A** = Awareness Through Ignition Prevention Programs (chapter 10)
- **CD** = Mitigation Action through Community Design (chapters 12–18)
- **NTA** = No tool available
- **Po** = Ordinance
- **Pc** = Code
- **Ps** = Standard
- **R** = Responses to Fire (chapter 19)

From AEP article Miller et al
## Scale and Element of Tools

### Elements That Contribute to Potential Damage from Fire

<table>
<thead>
<tr>
<th>ELEMENTS OF THREAT</th>
<th>TOOLS AVAILABLE TO THE VARIOUS PLAYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
</tr>
<tr>
<td>Topography</td>
<td>A</td>
</tr>
<tr>
<td>Severe fire weather/fire history</td>
<td>A</td>
</tr>
<tr>
<td>Fuel</td>
<td></td>
</tr>
<tr>
<td>Structure-related elements</td>
<td></td>
</tr>
<tr>
<td>Structure density</td>
<td>NTA</td>
</tr>
<tr>
<td>Structure construction, design, and materials</td>
<td>CD</td>
</tr>
<tr>
<td>Structure setback</td>
<td>NTA</td>
</tr>
<tr>
<td>Landscape/wildland vegetation-related items</td>
<td>CD</td>
</tr>
<tr>
<td>Domestic landscapes / defensible space</td>
<td>CD</td>
</tr>
<tr>
<td>Wildland vegetation</td>
<td>CD</td>
</tr>
</tbody>
</table>

### Key to Tool Symbols

- **A** = Awareness Through Ignition Prevention Programs (chapter 10)
- **CD** = Mitigation Action through Community Design (chapters 12–18)
- **NTA** = No tool available
- **Ps** = Standard
- **Pc** = Code
- **Po** = Ordinance
- **R** = Responses to Fire (chapter 19)

From AEP article Miller et al
## Scale and Element of Tools (2)

### Elements that Contribute to Potential Damage from Fire

<table>
<thead>
<tr>
<th>ELEMENTS THAT CONTRIBUTE TO POTENTIAL DAMAGE FROM FIRE</th>
<th>TOOLS AVAILABLE TO THE VARIOUS PLAYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
</tr>
<tr>
<td>Utilities and infrastructure</td>
<td></td>
</tr>
<tr>
<td>Water supply for suppression services</td>
<td>Augment</td>
</tr>
<tr>
<td>Utility locations (gas/electric/propane)</td>
<td>NTA</td>
</tr>
<tr>
<td>Community fire protection</td>
<td></td>
</tr>
<tr>
<td>Emergency access (fire suppression and evacuation)</td>
<td>R</td>
</tr>
<tr>
<td>Level of suppression service</td>
<td>Augment</td>
</tr>
<tr>
<td>Community involvement and education</td>
<td>A</td>
</tr>
</tbody>
</table>

### Key to Tool Symbols

- **A** = Awareness Through Ignition
- **CD** = Mitigation Action through Community Design (chapters 12–18)
- **NTA** = No tool available
- **Ps** = Standard
- **Pc** = Code
- **Po** = Ordinance
- **R** = Responses to Fire (chapter 19)

---

From AEP article Miller et al

**Reduced Role of Planners in Helping Suppress Fires**
Planning Processes & Practices

- Gather facts
- Create a vision
- Gather agreement
Consistency is Required

Assessment → Policy → Projects
Examples of Goals

Vision /Desired Outcome

- Minimize the Number of Ignitions
- Install/maintain Defensible Space (Reduce Fire Intensity Next to Structures)
- Safe Access and Egress
- Limit Fire Size
- Promote Ecosystem Health
- Work Cooperatively on Projects
- Develop/update Wildfire Plan
<table>
<thead>
<tr>
<th>Policy</th>
<th>Action at Project level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce chance of ignition</td>
<td>make human behavior fire-safe</td>
</tr>
<tr>
<td></td>
<td>fuel reduction</td>
</tr>
<tr>
<td>Minimize potential damage to live and property</td>
<td>keep fire from crossing boundaries</td>
</tr>
<tr>
<td></td>
<td>Calm fire behavior through fuel reduction</td>
</tr>
<tr>
<td></td>
<td>Increase firefighting efficiency</td>
</tr>
<tr>
<td></td>
<td>minimize damage to developed areas</td>
</tr>
<tr>
<td></td>
<td>Calm fire behavior through fuel reduction</td>
</tr>
<tr>
<td></td>
<td>Increase firefighting efficiency</td>
</tr>
<tr>
<td></td>
<td>minimize damage to natural resources on park</td>
</tr>
<tr>
<td></td>
<td>Calm fire behavior through fuel reduction</td>
</tr>
<tr>
<td></td>
<td>Increase firefighting efficiency</td>
</tr>
<tr>
<td>Comply with local regulations</td>
<td>100 ft clearance around structures</td>
</tr>
<tr>
<td></td>
<td>10-ft clearance along roads, 14.5 ft high</td>
</tr>
</tbody>
</table>
Hazard and Risk Assessment

- Regional and Local Hazard Assessments
  - 2010 fire plan update
  - Very High Fire Hazard Severity Zones

- Community Risk Assessment
  - Parcel-based
  - Regional (NIST, USGS)
Best Practices

- General Plan
- Lot Layout
- Access
- Infrastructure
- Existing Developments

Many taken from: Managing Fire in the Urban-Wildland Interface
Best Practices: General Plan

- Have a good hazard assessment
- Use Safety Element to promote fire safety
- AND use Housing Element, Safety Element, Open Space Element, Circulation Element, Conservation Element to promote fire safety
- Identify issue of concern, policy and implementation measure
- Don’t allow waivers!
Best Practices: Lot Layout

- Avoid ridgetops
- Place structures away from slope edge
- Avoid structures at top of steep ravine
- Cluster lots (not too close)
- Have a break every 1000 ft between lots for access to open space

Fig 12-1
Best Practices: Roads

- Design roads for simultaneous access and evacuation
  - Radii
  - Width
  - Grade
  - Surface
- Use roads as firebreaks (between homes & OS)
- Two access points – far apart
- Gates
- Signs
- EVAs

Support Your Local Firefighter
Best Practices: Infrastructure

- **Water**
  - Power or gravity
  - Shutoffs
  - Connections

- **LG Tanks**

- **Electricity**
  - Backup
  - Backup
Best Practices: Existing Development

- Reduce fuels in yards and in open space
- Improve access (parking, turnouts, veg)
- Designate shelter in place
- Enhance water supply
- Change structure exteriors
  - Roofs
  - Vents
  - Decks
  - Siding

Develop a Community Wildfire Protection Plan!
Community Wildfire Protection Plans

- Addresses existing communities
- Consider 4 phases of wildfire:
  - Prevention, Preparedness, Response & Recovery
- Many guides available (Society of American Foresters et al, ForEverGreen Forestry), California Fire Alliance
- Highlights:
  - Gathers affected residents
  - Establishes plan of work
  - Sets priorities
  - Requires monitoring
Project-Level Planning: Creating a Fire Protection Plan

- Justification for action – existing conditions
- Context (physical and regulatory)
- Mitigations of unacceptable conditions
- Mechanisms for Implementation
- Process for update

For new construction or open spaces
Project Design and Review Process (Fire Focused)

- Planners and fire department meet early in process
- Include management actions in Project Description
- Incorporate fire protection issues into infrastructure and lot layout
- Consider fire ecology and maintenance to improve
  - Lot layout
  - Landscaping
  - Access (within open space)
- Meet with Project Proponent and their biologists
  - Consider cost & feasibility of maintenance of vegetation
  - Address native habitat & weeds in yards & common areas
  - Landscaping
What you do matters!

- As effective as fire response in determining damage
- Lasting impact
- Affects more than structures and nearby environment
Useful Links:

- Sierra Nevada Community Conservation and Wildfire Protection Plan Guidebook =
  http://www.forevergreenforestry.com/SierraConservationCWPP.html
- Diablo FireSafe Council Best Management Practices Guidebook for Hazardous Fuels Treatments =
  http://www.diablofiresafe.org/publications.html#BMP
- CWPP Guidebook =
- California Fire Alliance CWPP guidance =
  http://www.cafirealliance.org/cwpp/
- Living with Fire Program =
  http://www.unce.unr.edu/blogs/livingwithfire/about/
- Solano Press =
Thank You!

Questions?