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NWCG Wildland Urban Interface Mitigation Field Guide

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The effects of wildland fire on communities have become more frequent and far-reaching. A comprehensive approach to preparedness and mitigation is an important part of effectively reducing community wildfire risk. The *NWCG Wildland Urban Interface Mitigation Field Guide* provides mitigation practitioners at all experience levels with recommendations on the most effective and efficient ways to accomplish mitigation work in communities at risk to wildfire damage or destruction.

The content in this guide was written in coordination with the *NWCG Standards for Mitigation in the Wildland Urban Interface*, PMS 052, and is intended to act as an in-depth supplement to that publication.

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Mitigation 101

What is Mitigation?

Mitigation refers to actions that reduce potential loss or damage (e.g., to life, property, health) from an adverse event. The goal of wildfire mitigation is to reduce the negative effects from a wildfire event.

Wildfire mitigation encompasses a range of activities, including education, risk assessments, pre-fire planning (Community Wildfire Protection Plans, evacuation plans, etc.), vegetation management, increasing structure ignition resistance, codes, and ordinances.

Although such actions are primarily taken prior to an event, they can also be taken during (evacuation) and post-event (rebuilding, recovery, and rehabilitation).

Mitigation opportunities exist at all levels and across all scales – public, private, and Tribal lands, from the individual parcel to the landscape-scale.

Why is Mitigation Important?

Undertaking wildfire mitigation can reduce or eliminate the potential damage from wildfire to the human environment (homes, neighborhoods, communities) and to the natural environment (wildlife, watersheds, ecosystems). These actions offer multiple benefits, including:

- Contributing to firefighter and public safety by reducing fuels and lessening the risk of structures igniting.
- Creating communities that are more resilient to disturbances (wildfire, flooding, insect outbreak, etc.).
- Allowing individuals and communities to minimize post disaster disruptions and recover more rapidly.
- Lessening the financial and health impacts on individuals and communities.
- In many cases, mitigation work also enhances other important values such as ecological benefits and aesthetics.

The Mitigation Leader

Competent and confident leadership is crucial to effective wildfire mitigation. Leaders may be those with formal authority and/or members of the community. Refer to Figure 1 for the roles of the Mitigation Leader.

Figure 1: Roles of a Mitigation Leader

Community Engagement and Partnerships

Connecting with people is essential for effective community risk reduction actions. There are many ways to communicate and connect; some are active, others are passive. The key is knowing when to use each communication approach.

Active Communication

Active communication is face-to-face engagement and two-way communication based on questions and answers. Both parties involved in a conversation should be actively involved and both should come away from the interaction with a better understanding of the issues discussed. Decades of research have shown that active communication is more likely to lead to action and behavior change. Use the best practices for active communication (Table 1) when trying to motivate individuals to specific actions.

Best Practices for Active Communication

Table 1: Active Communication tips

	**Personal connections allow us to talk about the value of mitigation, explain why homes burn, and detail how property owners can help themselves.**
	**Listen to the resident's concerns, goals, and objectives.** Strive to understand the social context of the risk. Seek to understand their personal values and motives.
	**Leverage local resources. Empower local individuals who already have a relationship with residents. Community service organizations, fire personnel, forestry professionals, friends, neighbors, and relatives can all help engage community members in mitigation work. When asking volunteers to help with face-to-face engagement activities, train them to ensure they provide the correct mitigation guidance.**
	**Provide open, honest, accurate, and reliable information.** Discuss personal and community responsibilities. Discuss risks and benefits of an action frankly and honestly.
	**Know how much fuel reduction costs in your area. Be familiar with cost-share programs and other assistance programs.**
	**Meet on site whenever practical. Get outside for a walk around a home during a neighborhood or community meeting.**
	**Seek to find workable solutions and compromises to achieve risk reduction objectives.**

Making First Contact

Making contact is the first step to engaging residents and communities. Follow these guidelines to get more people involved in your mitigation work.

1. Know the community where you are working and adjust your communication approaches accordingly.
    a. What do community members already know about fire and fire management?
    b. What aspect of the fire risk is of most concern to them? (Smoke? House loss? Habitat loss?)
    c. Are there certain values community members are concerned about that mitigation actions might adversely affect?
    d. What other concerns besides fire are they having to consider?

2. Know the social and political environment to understand the best way to approach different groups.
3. Attend and present at a range of community meetings (homeowner associations, realtors, non-profit, etc.) and, when possible, collect contact information.
    a. Follow-up with a phone call, email, or site visit soon after making first contact. Take advantage of the resident's interest and act swiftly to engage.
4. Create demonstration projects in neighborhoods where people can see what mitigation looks like.
    a. Always have someone on hand to speak with individuals as they observe.
5. Avoid using jargon or acronyms.
6. Always have business cards available and collect names and contact information from those interested.
7. Share your organization's resources, services, and tools with partners. These partners can increase awareness of your mitigation services and reach members of the community with whom you are not connected.

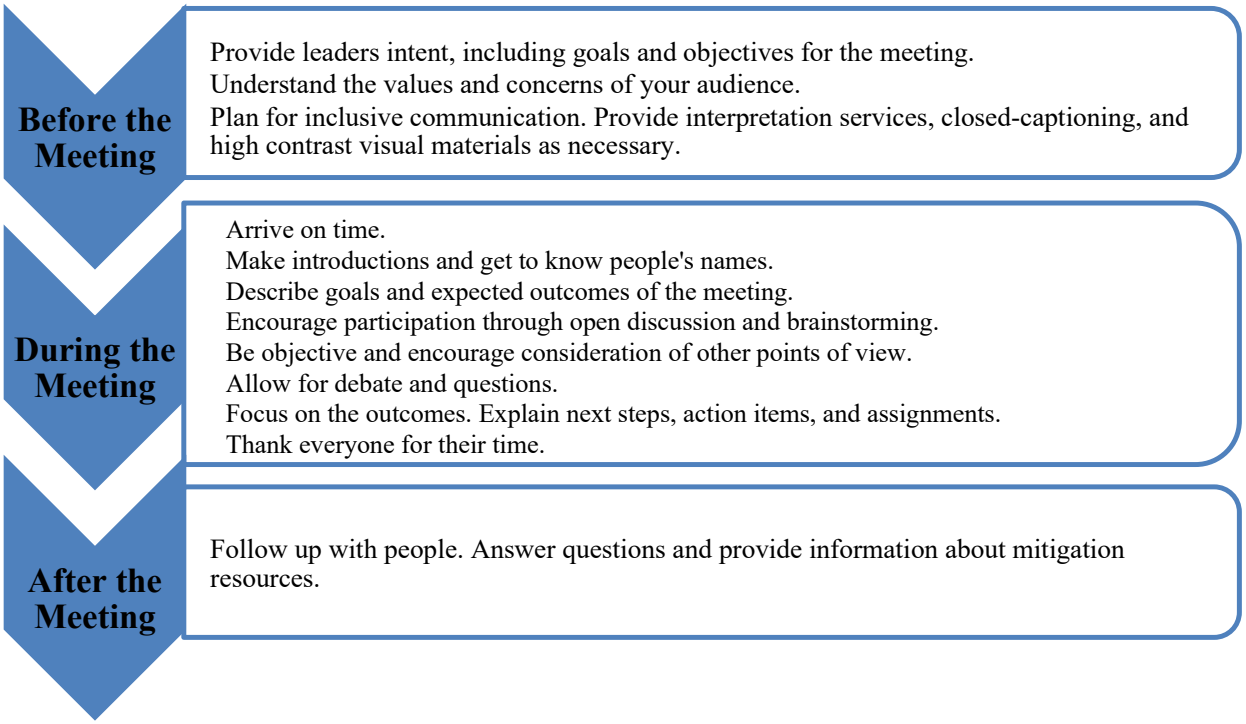
Participating in Community Meetings

- **Be selective.** You will likely be unable to attend every meeting to which you are invited. Your time is valuable. Invest in activities more likely to lead to concrete action.
- Before agreeing to attend a meeting, ask yourself:
  - Is the meeting likely to result in meaningful first contact opportunities?
  - If you have been asked to speak or present at a meeting, will the time allotted allow you to sufficiently discuss the problem and present solutions?
  - Are you the right person to attend this meeting? Or do you have a partner that may be better positioned to reach this community?

Facilitating Meetings

For a successful mitigation initiative or program, collaboration, and effective meeting facilitation are key. As a mitigation leader, it is important to bring together diverse individuals and organizations with varied backgrounds, motivations, and skills. To ensure productive meetings, consider the following guidelines:

Figure 2 Guidelines for productive meetings



Meeting Ground Rules

Having a set of ground rules can establish expectations of conduct to keep your meetings productive. Ground rules can include things like showing up on time and being prepared, respecting diverse opinions, listening with an open mind, putting away cell phones, staying on topic, avoiding side conversations, and ending meetings on time. Ground rules can be customized to fit the specific needs and goals of your meetings. Consider some of the following ground rules when hosting a meeting.

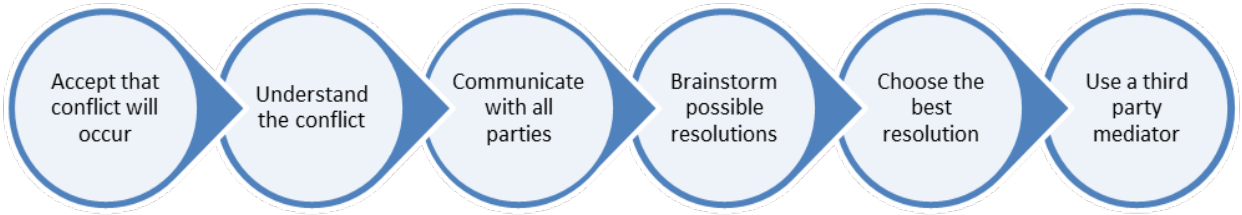
Figure 3: Ground Rules for meetings

Agendas	Have an agenda for the meeting to keep the discussion on track and maximize the use of time.
Flexibility	Be open to changes in the agenda or discussion, and stay focused on the overall goals of the meeting.
Confidentiality	Establish expectations for maintaining discussion privacy with any information shared.
Inclusiveness	Ensure that everyone has an opportunity to participate and that their contributions are valued.
Active Participation	Encourage all attendees to actively participate in the discussion, ask questions, and share their perspectives.
Positive Language	Encourage participants to use positive and constructive language, avoiding personal attacks and criticism.
Decision Making	Establish a clear process for making decisions, such as taking votes or reaching consensus.
Problem Solving	Provide a structured approach to solving problems and resolving conflicts that may arise during the meeting.
Follow-Up	Assign tasks and establish deadlines for follow-up actions and next steps after the meeting.

Resolving Conflict

Conflict is a normal part of working with others and it's important to handle it effectively. Confronting conflict in a positive and constructive manner can help resolve disagreements, improve relationships, and lead to better outcomes. When confronting conflict, consider the following:

Figure 4: Conflict flow chart



Accept That Conflict Will Occur.

- Do not avoid conflict. Conflict will arise and when pushed off it will only grow, creating animosity, resentment, and alienation.

Understand the Conflict.

- Know the parties involved and their concerns.
- Ensure you understand the conflict by asking clarifying questions and rephrasing what has been said. "Let me make sure I understand what you are saying. You are frustrated/upset about _____because of_____."
- Ask yourself:
  - What do I want to be the outcome?
  - What do I need to achieve this outcome?
- Ask about the other parties involved:
  - What are the motives, and the interests of the parties involved?
  - What is important to them?
  - What do they need?
  - Think empathetically. How would you feel in their situation?

Communicate With All Parties.

- Listen to all parties involved in the conflict. Do not interrupt.
- Do not react to emotional outbursts. Apologize if necessary.
- Speak honestly about yourself, not the other parties. If you are hurt, let people know. This shows vulnerability and works to build trust.
- Do not assign blame. Discuss the problem, not the person.
- Do not let anyone monopolize the conversation. Everyone must have fair and equitable time to state their concerns and beliefs.
- Make decisions easier by being clear about your beliefs but open to other's views.
- Try to find common ground and build on that.

Brainstorm Possible Resolutions.

- Focus on the points of agreement and the positives of the discussion or conflict. What do the parties agree upon?
- Build trust by asking for ideas to come to a resolution.
  - All ideas and solutions are fair and must be considered. Allow numerous approaches from all parties.
  - Do not criticize the ideas that are raised.
  - Seek win-win solutions.

Choose the Best Resolution.

- Assess the ideas and present the solutions that are win-win.
- Allow parties to support the solution.
- Be democratic but ensure the solution leads to the desired outcome.
- Work to make the solution theirs, not yours.

Use a Mediator If Needed.

When a conflict cannot be resolved consider inviting a third-party mediator to support a resolution.

When an individual is:

- Dominating the discussion.
  - Call attention to the agenda and timeframes.
  - Politely stop the person, summarize comments, and ask others for their input.
  - Give individuals who are not engaged in the conversation an alternative way to share input.
- Inserting personal agendas.
  - Politely ask the individual to relate what they are describing or discussing to the current topic.
  - Acknowledge the comment and move on, e.g., "I appreciate that idea but that is not directly relevant to the topic we are here to discuss."
  - Set time limits before starting meetings to ensure that all have the opportunity to talk.
- Talking off the subject.
  - Politely ask that the person to relate what they are discussing to the agenda.
- Write the topic down on a white board or paper. Note that if there is time it may be discussed or that there may be a need to discuss it at another time.
- Having side conversations.
  - Politely ask them to stop and keep to the task at hand.
  - Ask them to join the group discussion.
  - Move closer to the people having the side conversation to show you are aware.
- Being constantly negative or presenting a hostile demeanor.
  - Acknowledge their point of view.
  - Keep in mind that this person may become your biggest advocate because of their passion.
  - Point out that being outcome-focused requires a solutions-oriented approach.
  - Explain that the work is challenging, but they are invited to help with the challenge.
  - Ask what they do think is positive about the program, project, or subject being discussed.
- Attacking, criticizing, or picking arguments.
  - Stop all arguments immediately.

- Ask participants how they would like the group to resolve the conflict.
- Describe what the person is doing and refocus the conversation on the goals and objectives.
- If this activity continues, ask the participant(s) involved to have a follow-up conversation in private to better understand their concerns.

- Not showing up.
  - Contact the person outside of the meeting either in person or with a phone call.
  - Let the person know you have noticed they have been less present lately, and you wanted to check in.
  - Listen to what they have to say. Work to find a way for them to participate in alternate ways. Perhaps they are still interested but the meeting time is not working for them or their family.
  - Seek solutions that keep them engaged in the process.
  - Note that you need their help to make progress to work toward the group's goals and that you appreciate their work.

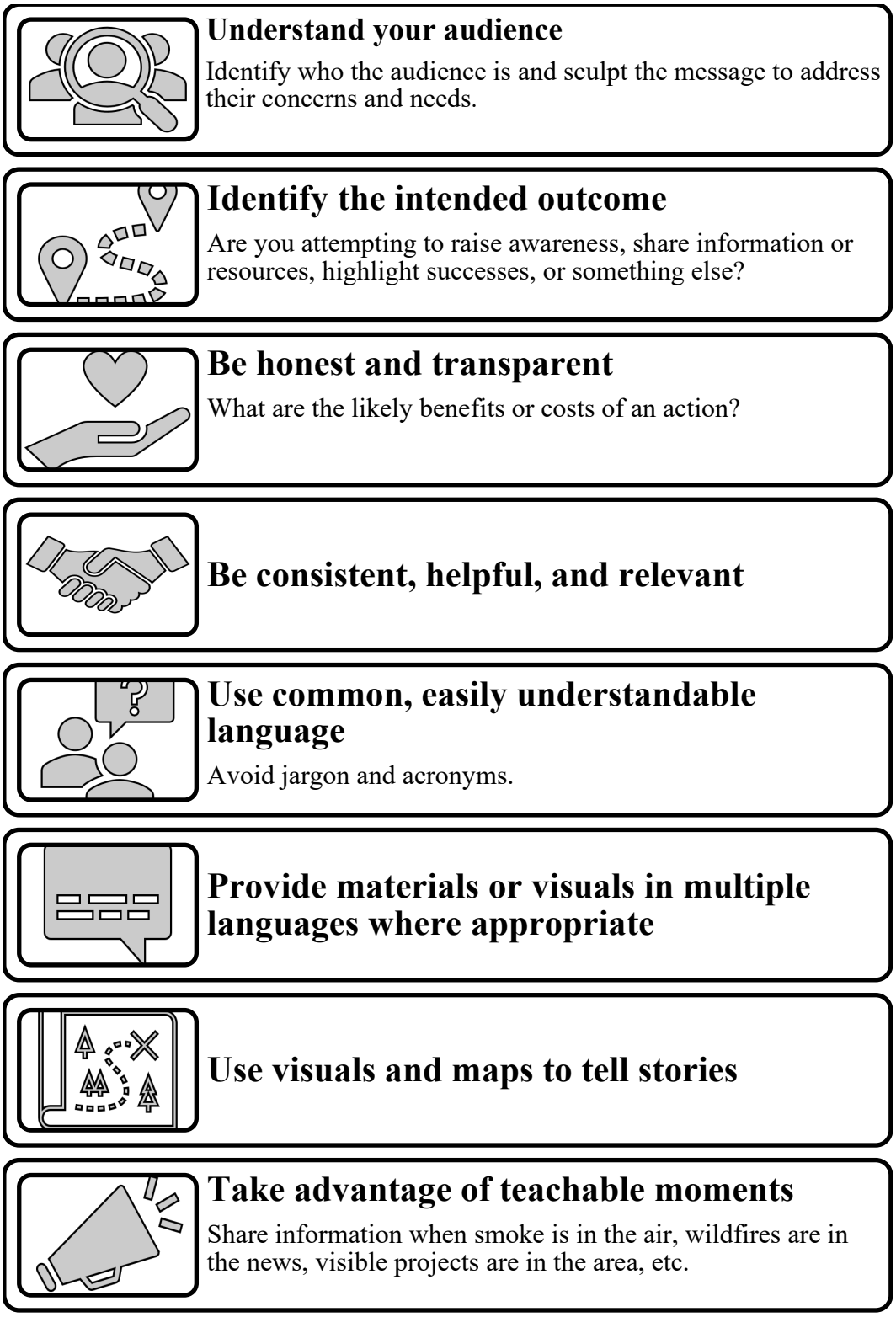
Passive Communication

Passive communication includes the use of tools such as brochures, videos, news releases, social media, articles, signs, or websites. Passive communication is not as effective at motivating people to act but can help when trying to raise awareness of a particular issue amongst a larger audience. Supplementing active communication with passive communication adds to the information stream intended to capture people's attention and move them towards action. Passive techniques can also point people to resources such as meeting details, how to apply for funding or whom to contact for help.

General Communication Content Guidelines

Consider the following guidelines for effective general communication content.

Figure 5: Communication guidelines



Media Interviews

Utilizing media is a tactic best aimed at raising awareness of a particular topic. Conducting media interviews can be an important part of the work of a mitigation specialist but also can be intimidating. Consider the following best practices (Table 2) when conducting interviews:

Figure 6: Media Interview Best Practices

	**Preparation: Research the media outlet and the interviewer and prepare answers to common questions related to your area of expertise. If possible, find out what questions will be asked ahead of time.**
	**Communication style: Be clear, concise, and confident in your answers. Use plain language that is easy for the audience to understand.**
	**Message control: Have a clear message that you want to communicate and stick to it. Avoid speaking off-topic or getting sidetracked. Prepare a list of talking points or key messages.**
	**Body language: Maintain good posture and eye contact and use gestures to reinforce your message.**
	**Responding to difficult questions: Be prepared for tough questions and have strategies for dealing with them in a professional and confident manner.**
	**Remain calm: Take deep breaths and remain calm, even if you are feeling nervous or under pressure.**
	**Rehearsal: Practice the interview with a colleague or friend so that you feel more confident and prepared when participating in media interviews.**

The *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, provides additional useful guidance on things to keep in mind before participating in a media interview or posting on social media.

Social Media Considerations

Many organizations and agencies use social media to reach different audiences and take part in the conversation. Strategies for social media posting should adapt to each platform that is used. Remember

that **social media should not be used as a replacement for active engagement.** The following best practices for social media (Table 3) can be applied across several platforms.

Figure 7: Social Media Best Practices

	**Audience: Customize your content to reach the audience you want to target. Consider age, location, and preferred language. Use the right platform to reach your audience.**
	**Access: If possible, have an individual, or team that is dedicated to posting and creating content for social media.**
	**Automate posting: Plan posts to optimize engagement and use a calendar to be organized in your efforts.**
	**Words matter: Avoid jargon, acronyms, and slang terms that may be confusing or offensive to some audiences.**
	**Use existing and partner channels to share information: Determine where your audience gets their information and utilize those channels to share your messaging. Creating new channels and building an audience can be time consuming.**
	**Diversify content: Highlight people, places, and projects in the stories you share. Be authentic by choosing "real life" images over ones that are idealized or overly polished. Use a variety of formats such as pre-recorded videos, live videos, images, audio, and user-generated content.**
	**Message: Provide timely responses and respond directly. Monitor mentions or other posts about your organization or messaging. Reply to comments and engage the public, but don't feed the trolls.**

Mitigation Acceptance and Behavior Change

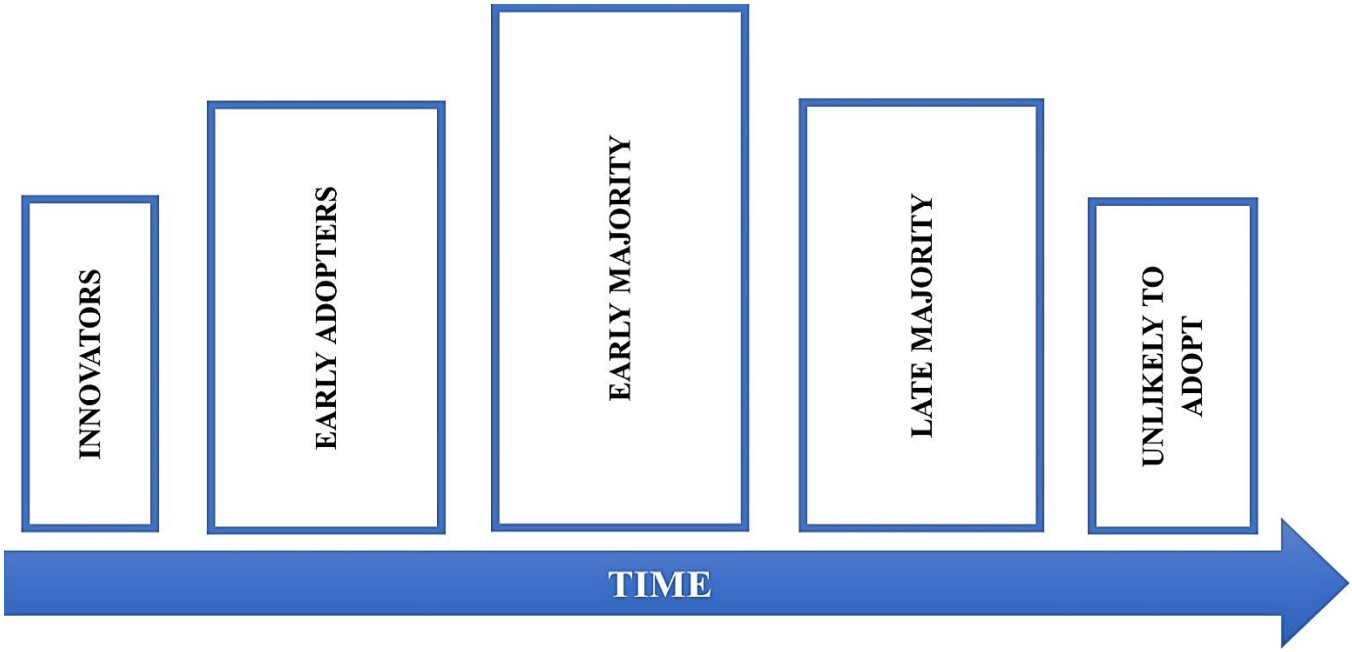
Remember, not everyone will mitigate right away. People vary greatly in their abilities and their readiness to try something new or their tolerance of risk. People have many things in their daily lives, besides wildfire risk, that they worry about. Actions that are easily adopted and complimentary to an individual's life are more likely to be adopted.

Understanding What Motivates Actions

When seeking behavior change in a community, it is best to understand how new ideas are passed and adopted. Adoption of a new idea or behavior will not happen simultaneously but is a process. According

to the Diffusion of Innovation Theory (https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/behavioralchangetheories4.html), as individuals receive new information, guidance, and/or recommendations, they fall into five distinct categories. Understanding the categories and associated strategies to appeal to each can be used to help guide where and how you direct your attention.

Figure:8: Flow chart showing the timeline for behavior change categories.



INNOVATORS: Individuals who want to be the first to do something. They jump on-board early, follow guidance, or even go it alone to reduce risk. Engage these individuals early as they may be able to motivate others.

EARLY ADOPTERS: These individuals need the facts, resources, and tools to make careful decisions. They are often opinion leaders within your community and can influence others. Empower these individuals to share the importance of mitigation and its benefits with those in their sphere of influence.

EARLY MAJORITY: Rarely the leaders within a community, they want to see how the mitigation project looks, and how it impacts their values and perceptions. Often, these individuals adopt the practice before others. Work with these individuals to highlight the widespread adoption of mitigation practices. This will help reach the late majority.

LATE MAJORITY: The Dubious and Doubtful group. They only adopt a practice after most individuals have tested it or completed the work. Highlighting success stories, providing opportunities to examine previously mitigated properties, and focusing on the effectiveness of specific mitigation actions may help engage this group. Emphasize that most people in the neighborhood or community are working to reduce risk.

UNLIKELY TO ADOPT: This group of individuals are the last to participate and potentially never will. If a community's culture shifts to a mitigation-focused community, these individuals may adopt the practice after it has been proven or becomes a cultural norm/tradition. Be careful not to assume all those who have not mitigated fall into this category. This category is composed of those who have the information, as well as the resources, necessary to act, and are choosing not to do so. This category does not include those whose engagement activities have not effectively reached or who do not have sufficient resources to act.

Mitigation Nudging

The concept of a nudge is simple. A nudge is an approach that steers people in a direction, but also allows them to make their own decision. The following information has been adapted from Nudging: A Very Short Guide by Cass R. Sunstein, (https://dash.harvard.edu/handle/1/16205305).

1. **Identify ways to reduce "friction."** Identify factors that can inhibit a resident from taking action, such as making it easy to schedule home assessments, providing a curbside chipper program, or nearby slash disposal site to facilitate vegetation removal, etc.
2. **Use the concept of social norms.** Emphasize that most people in the neighborhood or community are working to reduce risk. Note when a resident's neighbor has done the work.
3. **Disclose the full range of pros and cons** around proposed actions (e.g., talk through both the necessary ecological role of fire as well as any potential negative environmental impacts).

4. **Seek a commitment.** When people make a commitment to action, they are more likely to follow through on the desired behavior. Seek to elicit implementation intentions. Ask them about their plan and timeline.
5. **Recognize that fire needs to fit into people's everyday lives.** There are many other things on peoples' plates other than fire risk. Acknowledge that fire mitigation can be completed incrementally, in harmony with their other activities, goals, and desires.

Mitigation Talking Points

When talking about mitigating wildfire risk, have talking points that address some of the common concerns and questions that people may have. Develop localized talking points that summarize research and practical experience to help highlight the importance of engaging in mitigation work. Ensure the talking points that are developed fit your community's demographics, forest conditions, and available resources.

<u>Base Your Talking Points on These Concepts:</u>

- The Importance of Individual Action
  - There are no guarantees, but proper mitigation can greatly reduce the odds that your property will have significant damage.
  - Small actions can have large results. Explain the science behind the structure ignition zone.
- Fire as Part of the Landscape (Ecology, Aesthetics)
  - In many ecosystems fire is an essential ecological process that helps to keep diseases, insects, and overcrowding in check. Wildfire suppression has left many of our landscapes (e.g., grasslands, riparian areas, chapparal communities, forests) out of balance.
  - Different ecosystems evolved with different types of fire (fire regime); some ecosystems rely on frequent low-intensity fires while others depend on infrequent larger, high-intensity fires, such as lodgepole pine.
  - Well planned mitigation projects can restore the landscape to a more resilient condition, which is good for the ecology, wildlife, water sources, visitors, and residents of the area.
  - Landscape management activities can be aligned with the aesthetic needs of an owner.
  - Highlight local demonstration areas that you can show property owners.
- Mitigation is Hard, But Important Work
  - Plan the work in advance to maximize your time and effort. Working when it is cooler or earlier in the season can help if heat is a factor in your community.
  - Make it fun. Host work parties to help get work done.
  - Working together can create a greater sense of community. Much like the barn raisings of old, numerous people must come together to work towards the common goal of more resilient and safer communities.
  - When the work is completed, have a potluck event to celebrate the accomplishments.
  - Contact and coordinate with local volunteer organizations or student groups who may be interested in providing work parties for those without resources.
  - Seek service groups looking for projects; church organizations, scout groups, and nonprofits often provide volunteer assistance.

- Mitigation Expense Considerations
  - There are simple, inexpensive steps that most people can take to make their home more ignition resistant.
  - Start small and expand over time and can be done incrementally. Start with the "low hanging fruit," such as clearing debris from the roof and gutters and trimming overhanging branches.
  - Numerous funding opportunities are available to reduce the financial burden. Have a list of potential funding resources available.
  - Highlight other benefits, besides fire mitigation, of a specific action. A metal roof can also be good for snow; keeping gutters clear protects against water damage, and removing trees close to the home is a part of everyday maintenance.
- Many Hands Make Light Work
  - To get more people to lend a hand, focus on the positives.
  - Even incremental actions can lead to positive outcomes over time.
  - You can help your community by working with your neighbors to mitigate together.
  - Parcels treated together are more effective at changing fire effects, fire behavior, and outcomes.
  - If public land is nearby, explain what is being done to address wildfire risk on that property. Consider meeting with the public land management agency to discuss risk reduction projects. Post a sign or banner if allowed.

Partnerships

The problems presented by wildfire are generally too large for any one person or organization to manage alone. Partnerships can increase capacity.

The number of partners can vary based on the goal, and partnerships can be formal or informal. It is important to consider what type of partnership is most appropriate for a given situation. For instance, a simple informal partnership between two individuals or organizations might be all that is needed while a more formalized collaborative group with many organizations represented might be required.

Formalizing Partnerships

Although the five steps listed here are most critical for large, formalized partnership efforts, the information may be useful for small-scale or less formalized partnerships. Identify potential partners and groups that should be included.

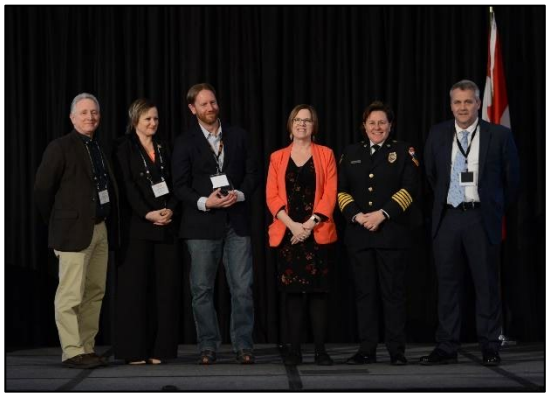
Figure 9: Potential partners and groups

AGENCIES/ORGANIZATIONS	COMMUNITY & BUSINESS LEADERS	INTERESTED PARTIES
Natural resource agencies (local, county, state, federal, and non-governmental)	Elected officials	Recreation organizations
Land trusts	Educators (K-12 and college/university)	Conservation organizations
Emergency management	Homeowner associations	"Friends of" groups
Fire departments/districts	Business owners	Researchers/subject matter experts
County hazard mitigation planners	Ranchers	Residents (renters, homeowners)
Local health districts	Community organizations	Retired natural resource professionals
Transportation - roads, railroads	Volunteer service groups	Hospitals, daycare centers, campgrounds, senior centers, or any places that may have vulnerable populations
Utility and water providers	Contractors	
	Forest products industry	
	Developers/home builders	
	Insurance companies	

1. Convene partners for initial meetings to develop the partnership's vision, mission, goals, structure, and function.
   a. **Vision:** Statement that summarizes the partnership's goals for the future.
   b. **Mission**: Identifies what the partnership does, how it functions, and why.
2. Consider including the following during these development meetings:
   a. Describe how the partnership can help accomplish the vision.
   b. Describe the resources and relationships each brings to the table.
   c. Identify the barriers and how the partnership can overcome them.
3. Determine how the partnership functions.
   a. Coordination
   b. Cooperation
   c. Collaboration
4. Determine the appropriate governing structure for the partnership.
   a. Identify the ground rules.
   b. How will work be distributed according to each partner's strength and resources?

Maintaining Partnerships

1. **Design a maintenance plan.** Conduct frequent review of the accomplishments, participation, challenges, barriers, and short, and long-term plans.
2. Determine how the group will ensure the following six R's for maintaining engagement of all participants will occur.



   a. **Recognition.** People want to be recognized for their contributions.
   b. **Respect.** People want their values, culture, ideas, and time to be respected and considered in the organization's activities.
   c. **Role.** People want a clearly defined role in the coalition that makes them feel valuable and to which they can contribute.
   d. **Relationships.** People want the opportunity to establish and build networks both professionally and personally for greater influence and support.
   e. **Reward.** People expect the rewards of participating in a partnership to outweigh the costs and to benefit from the relationships established.
   f. **Results.** People respond to visible results that are clearly linked to outcomes that are important to them and that they can clearly link to their participation in the coalition.

Partnership Best Practices

1. Make sure interested and engaged people are at the table.
2. Make it official. Select a chair, take minutes, establish methods to communicate between meetings, set a regular meeting schedule and set clear expectations.
3. Set specific, mutually developed short, and long-term goals, and objectives.
4. Be consistent:
   a. Select a spokesperson.
   b. Develop talking points and frequently asked questions.
   c. Agree upon common language.
5. Respect differing opinions.
6. Do not let a lack of participation slow the process of building collaborations.
7. Mutually agree that mitigation is the desired outcome.
8. Follow through on commitments. Be reliable and persistent.
9. Focus on outcomes.
10. Don’t just talk about mitigation or plan it. DO IT!
11. Plan mitigation actions together, looking for good cross-boundary projects and opportunities to share personnel, equipment, and funding when possible.

Building Mitigation Capacity

Capacity is the "infrastructure" that is critical to supporting mitigation work. When seeking to increase mitigation capacity, it is important to understand what assets your community may already have in place.

These assets can include:

- **Individuals** – skills, talents, abilities, and community connections.
- **Associations** – homeowner associations, volunteer organizations, labor unions, community organizing groups.
- **Institutions** – formal organizations with employees and buildings.

When considering community assets, think about:

- What mitigation services are currently available?
- Who is providing these services?
- Where are the gaps?

Capacity Building Best Practices

- Encourage community members to actively participate. Providing free, no-labor mitigation services does little to grow mitigation capacity.
- Provide opportunities for participation in all phases of the work. Remember that volunteers can support more than just the heavy lifting. Volunteers can collect and manage data, help with outreach, and support administration amongst other activities.
- Set a positive example. Help adjust attitudes and perceptions by doing work on your property.

- If there are public lands nearby, describe mitigation actions that are taking place there.
- Focus on the positives to encourage more people to lend a hand.
  - "We can change the trajectory."
  - "Over time, even your incremental actions can lead to positive outcomes. You can help your community by working together with your neighbors to mitigate."
  - "Parcels of land that are treated together are more effective at altering fire effects, fire behavior, and outcomes."

Tracking Progress and Communicating Success

Tracking Progress

Tracking progress of projects, partnerships, and plans can facilitate the understanding of successes, gaps, barriers, or challenges as wildfire mitigation activities occur over time. The identification of goals, desired outcomes, specific strategies, and a timeline for when an evaluation should occur (often part of a larger plan of action) can make tracking progress easier. Tracking progress can be as simple as reviewing the strategies in the plan, identifying accomplishments, challenges, and next steps. The Strategic Planning Cycle (Figure 2) outlines a process for a more formal evaluation.

Figure 10 Strategic Planning Cycle

How to Track Progress

Measurement methods can be both quantitative and qualitative. Quantitative data can often be easier to gather; however, qualitative information may be harder to obtain and share, but is beneficial to program evaluation. Both measurement methods have value. The following table (Table 4) shows an example of various mitigation outcomes and metrics that could be tracked as well as tracking methods. What mitigation outcomes a community or partner group decides to track will be determined by their goals and planned mitigation activities.

Table 2: Example Mitigation Outcomes and Metrics

Mitigation Outcomes	Tracking Considerations	Tracking Methods
Partnerships and Collaboration	• Meeting dates, times, and locations. • Partner types, attendance, and contributions.	• Use sign-in sheets for meetings. • Create work reporting forms for partners.
Risk Assessment	• Number of communities, homes, and values at risk. • Location of high-risk areas. • Location of project areas targeted for treatment.	• Use Community Wildfire Protection Plans, rapid-risk assessments, spatial information data, etc. to map or develop a database of wildfire risk. • Use fire modeling to establish a baseline to measure progress.
Ignition-Resistant Landscapes	• Participation in chipping/slash programs; estimate of the volume of slash reduced. • Participation at transfer sites – number of people who have dropped off brush, leaves, or other vegetative debris. • Estimate of the volume of wood removed by truckload or user; calculate acres treated. • Participation in grazing or prescribed fire projects. • Fuels treatment design (location, size, timing, technique). • Effectiveness of fuels treatment.	• Create tally sheets for tracking participation. • Create formulas to track volume of fuel reduced. For example, the structure ignition zone (usually 100 feet around a building, depending on terrain) is approximately ½ acre. Use standard measures of the cubic feet say of a dumpster, pickup truck, or dump truck. • Create maps to track where community mitigation activities (e.g., thinning, mechanical treatments, chipping, prescribed fire, etc.) are taking place. • Develop case studies of wildfires that burned in fuel treatment areas.
Ignition-Resistant Structures	• Homes and other buildings that have had a structure ignition zone assessment. • Number of property owners who completed recommended work or requested a return visit.	• Enter assessment results into a database to determine community risk commonalities and for future use if properties are re-visited. • Take before and after photos of work completed.
Improved Wildfire Risk Awareness	• Number of attendees at an education event, workshop, or meeting. • Number and timing of events, direct mail pieces, social media posts. • Test the effectiveness of messaging.	• Create forms (can be online) to track attendance. • Create an annual calendar of risk awareness programs, posts, and projects. • Conduct a survey or focus group to gauge changes in community member knowledge, engagement, or effectiveness of an activity.
Investments	• In-kind contributions (volunteer work hours, donated equipment use). • Grant funding spent. • Community contributions of matching funds.	• Create in-kind tracking forms for workday activities (paper or electronic). • Create an annual investment summary of grant funding, community dollar contributions, and equivalency of volunteer work hours.

Mitigation Outcomes	Tracking Considerations	Tracking Methods
Increased Community Capacity	• Involvement of the local community. • New community resources (e.g., shared chippers, slash sites, etc.)	• Number of participants in programs, number of new participants, number of residents that represent Specific demographic groups or areas.
Other Information	• Gather success stories and quotes. • Take pictures of people, projects, and events. • Have a debrief at the end of a workday.	• Interview people to capture their story. • Take photos before, during, and after a project – from the same vantage point when possible. • Conduct After-Action Reviews when possible.

Celebrating Success

Celebrating success helps keep community members and partners engaged and active in mitigation efforts. Communicating accomplishments using a variety of outreach tools can help ensure you reach a broad audience. Take advantage of existing newsletters, email distribution lists, web pages, social media accounts, and annual homeowner association meetings to share information about recent accomplishments. Success can come in many forms, such as:

- Increased community member knowledge of wildfire season and causes.
- Relationships between community members being developed or improved.
- New partners have shown interest or have contributed to mitigation activities.
- Emergency vehicle access and evacuation preparedness has been improved.
- Financial contributions or grant funds have been received.
- A team of volunteers showed up to a community workday.
- Fuels reduction efforts, like prescribed burning, may also be beneficial for the natural environment. Improved habitat may attract wildlife, invigorate native plant species, set back invasive species, or benefit threatened or endangered species.

Communication and Showing Gratitude

Regular communication with partners is essential for the success of mitigation programs. Communication may be formal or informal, such as in person meetings or visits versus phone calls and emails. Showing continued support of community efforts is necessary to sustain interest and engagement in these activities.

- Show up at partner workday events or community meetings, even if you weren't expected to work or attend that day.
- Stop by to say hello to a Firewise USA® resident leader or community sparkplug when you're in the neighborhood. These kinds of personal contacts go a long way towards building trusting relationships.
- Having local fire control staff stop by, wearing their Personal Protective Equipment (PPE) and driving their brush truck can create buzz in a community and reinforce the reason the community is engaged in mitigation practices.
- Share timely messages with community partners – times of elevated fire risk, recent wildfire activity in the area, anniversaries of past local wildfires. Share photos and information they can use to post on social media.

There are many ways to show your gratitude and support for volunteers and community leaders, and different volunteers may appreciate being recognized in a variety of ways. Showing appreciation of people's efforts may include:

- Thanking volunteers after a day of hard work. Making a call or sending a card to those going the extra mile.
- Providing refreshments or a meal after a community workday.
- Presenting a certificate or plaque to deserving individuals or work crews.
- If funds are available, giving volunteers thank you items like hats, shirts, or gloves with a mitigation image or message can make volunteers feel part of something bigger.

Ignition-Resistant Structures

The materials, design, and construction assembly of a structure play a particularly large role in the likelihood of that structure wildfire. A structure may be a home, business, commercial property, farm building, or other free-standing building. There are many ways a structure can be modified to make it more resistant to ignition from direct flame contact or radiant and convective heat, as well as from embers that may fall on or near it. The goal is to create neighborhoods and structures that are less vulnerable to ignition without fire department intervention. This concept is sometimes also referred to as structure hardening or creating a structure that is fire-resistant.

Ignition-Resistant Structure Actions and Costs

Actions that create ignition-resistant structures or modify the structure ignition zone can require a financial investment. Some actions, like replacing a roof, siding, or deck materials, can be a significant expense. Other changes, like raking debris from under decks and cleaning debris out of rain gutters, have little, or no associated cost. When meeting with a property owner during a site visit, the mitigation specialist should be prepared to discuss the effectiveness and cost of a variety of actions.

Cost may become a limitation to completing work. It can be helpful to share the impact of proposed actions but also acknowledge that making some changes is better than doing nothing. In some cases, trade-offs can be made. For example, replacing flammable siding may not be an option or undesired. It can be stressed that keeping vegetation away from a structure and having a five-foot “fuel free” zone will be even more important.

The maintenance of building features and landscaping should be ongoing tasks. Being prepared for a wildfire event has no endpoint and should be described as a journey rather than a destination. The following considerations and actions identified in Table # will help to reduce the risk of structures igniting.

FREE	No cost
$	Low cost
$$	Moderate cost
$$$	High cost

Our communities must grow in working together to protect every potential part of structures and parcels that could become a point of entry for embers or flames. We must address interdependent factors that can influence fire spread including the landscape around homes, as well as home construction and design (e.g., roofs, windows,

attachments such as decks and fences, outbuildings). An ember ignition of one home can start a catastrophic chain of events – a single home catching fire can result in neighborhood destruction.

Table 3: Roof Design and Materials

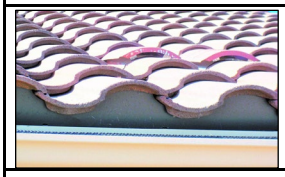
IMAGE	SUBJECT	DETAILS	COST
	**Covering**	Class A-rated materials are the most fire-resistant.	**$$$**
	**Skylights**	Flat-type skylights with tempered glass perform better than dome-type skylights with plastic or acrylic glass. Metal flashing should be installed where the skylight meets the roof.	**$-$$**
	**Chimney**	The chimney should have a spark arrestor screen that has heat and corrosion resistance equivalent to 12-gage wire, 19-gage galvanized steel or 24-gage stainless steel with openings not larger than ½ inch.	**$**
	**Edges**	Fill or plug gaps that occur between the roof covering and roof decking (e.g., with clay tiles or metal roof gaps) or use fire-resistant flashing.	**$**
	**Gutters**	Metal gutters, downspouts, and connectors are preferred over plastic or vinyl. A non-combustible covering can minimize the accumulation of debris.	**$-$$**
	**Eaves**	Boxed in, enclosed, or soffited eaves with non-combustible materials are preferred over open eaves and/or the use of combustible materials.	**$$**
	**Design**	Complex roof assemblies are susceptible to debris accumulation where the roof meets a wall (e.g., dormer) or where roof sections create a valley. Remove debris in these areas.	**FREE**
	**Vegetative debris**	Removal of vegetative debris from the roof, gutters, edges, and skylights should be done on a regular basis. Non-combustible flashing can be used in locations where debris (and ember) collection is likely.	**FREE-$**

Table 4:Vents

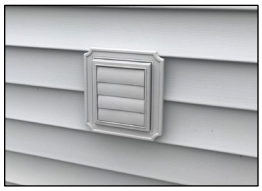
IMAGE	SUBJECT	DETAILS	COST
	**Screening**	All vents (e.g., attic, soffit, ridge, etc.) should have 1/8″ or finer metal screening. Or use tested and approved wildfire ember-resistant vents.	**$**
	**Low-profile metal vents**	Vents in particularly vulnerable areas can be replaced with low-profile metal vents.	**$**
	**Strip vents**	In soffited eaves, strip vents should be used and located near the edge of the overhang.	**$**
	**Dryer vents**	Should be the type that remains closed when the dryer is not running.	**$**

Table 5: Exterior Walls

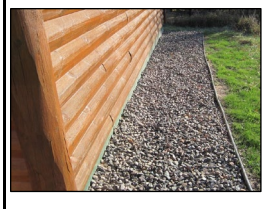
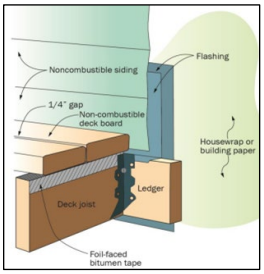
IMAGE	SUBJECT	DETAILS	COST
	**Materials**	Utilize non-combustible or ignition-resistant materials such as fiber-cement board, stucco, masonry/brick, stone, or heavy timber construction. Exterior walls need to be assembled and sealed in such a manner that there can be no exposure (heat or embers) to combustible sheathing or other materials that may be behind the walls.	**$$$**
	**Foundation Clearance**	There should be a minimum of 6” of non-combustible material (e.g., concrete or rock) between the bottom of the siding and the ground. If this clearance does not exist, it’s even more important to make sure there is nothing flammable in the 5-foot area around the structure.	**FREE – $**
	**Windows**	Replace single-pane windows with dual or multi-paned windows. Tempered glass is preferred. Window frames should be composed of non-combustible material or, if not possible, incorporate a metal sub-frame to help the window frame retain its shape when exposed to increased heat. Screens should be a non-combustible mesh.	**$$**
	**Openings**	Keep garage doors free of holes or gaps between the door and the floor. Ensure weather stripping is in good condition and replaced as needed.	**$**
	**Combustibles**	Remove all human-made and vegetative combustibles, including mulch, from 5-feet around siding and 7-feet from inside corners.	**FREE**

Table 6: Decks

IMAGE	SUBJECT	DETAILS	COST
	**Materials**	Decks should be constructed of heavy timber, non-combustible materials, fire-retardant-treated wood, or ignition-resistant materials.	**$$$**
	**Combustibles**	Combustibles should not be stored on or under decks. Debris should be **routinely** removed from deck surfaces and gaps between boards. Decks could be enclosed to keep material from collecting underneath.	**FREE**
	**Deck to siding**	Install step flashing that extends a minimum of 6" from the deck to the siding. – *Graphic and information for deck to siding provided by the Federal Emergency Management Agency's Mitigation Assessment Team.*	**$**

The key points listed above are not all-inclusive of all structure hardening options. For greater detail, please review:

- *NWCG Standards for Mitigation in the Wildland Urban Interface,* PMS 052, https://www.nwcg.gov/publications/pms052.
- NFPA 1140: Standard for Wildland Fire Protection, as part of the Emergency Response and Responder Safety Document Consolidation Plan as approved and amended by the NFPA Standards Council, NFPA 1140 is a combination of Standards NFPA 1051, NFPA 1141, 1143, and NFPA 1144. https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1140&tab=nextedition
- Insurance Institute for Business & Home Safety Suburban Wildfire Adaptation Roadmaps https://ibhs.org/wildfire/suburban-wildfire-adaptation-roadmaps/
- International Code Council https://www.iccsafe.org/products-and-services/codes-standards/

Structure Ignition Zone

The Zone Approach

The structure ignition zone describes an area 100 feet around a structure and its attachments where combustibles have been removed or altered to reduce or eliminate ignition hazards. The distance may be increased to 200 feet if the structure is in an area with steep terrain or heavy fuels. Structures can include homes, businesses, accessory structures, etc. There are several terms historically used to describe this area, including home ignition zone and defensible space. To be inclusive of the wide range of structures that are built in the wildland urban interface environment, the *NWCG Standards for Mitigation in the Wildland Urban Interface,* PMS 052*,* uses the term structure ignition zone.

"Embers are the primary cause of home ignitions. Structures are fuel. If structures don't ignite, homes don't burn, and if homes don't burn, problem solved. This suggests the opportunity for preventing wildland urban interface (WUI) fire disasters by reducing home ignition potential. [It is] a home ignition approach instead of a fire control approach." Jack Cohen

While zone definitions may be different in your area, the zone explanations and recommendations shown here reference the Insurance Institute for Business and Home Safety (IBHS) and National Fire Protection Association (NFPA) criteria.

Figure 11: Zone 1: 0-5 feet from the structure and under steps, decks, and other attachments (non-combustible zone).

Zone 1: 0-5 feet from the structure and under steps, decks and other attachments (noncombustible zone).

- Keep this area free of combustible materials, such as plants, firewood stacks, patio furniture, vehicles, gasoline cans, piled construction materials, and other man-made objects.
- Remove anything stored underneath decks or porches.
- Replace combustible mulch with a hardscape material like rock, gravel, pavers, or concrete; bare ground is also acceptable.
- While it's best to not have any vegetation here, having mowed grass or a few scattered, fire-resistant plants can be acceptable if they are maintained.
- Leaf litter, pine needles, and other windblown debris should be routinely removed.

This zone should be extended to 7 feet at inside corners.
Boats and vehicles should not be stored in Zone 1.

Figure 12: Zone 2: 5-30 feet from the structure (immediate landscaped area).

Zone 2: 5-30 feet from the structure (immediate landscaped area).

- This area should be maintained by keeping the grass mowed and vegetative debris raked away.
- Vegetation should be watered/irrigated as needed during times of drought.
- All dead vegetation should be removed.
- Plantings should be limited to carefully spaced, low-growing, low-combustibility species, grasses, and lawns.
- Trees and shrubs should be well-spaced and not highly combustible (e.g., evergreens).
- If highly combustible trees or shrubs are in this zone, they should be limited in number and well-spaced from one another, have their lower limbs pruned up and away from the ground, and should not be aligned with the corner line of structures.
- Boats, recreational vehicles, and other vehicles should not be stored in this zone.
- If another structure is in this area, it should also have its own managed structure ignition zone.
- Propane tanks should not be in this zone. If they are, a 10-foot managed area should be maintained around them.

Figure 13: Zone 3: 30-100 feet from the structure.

Zone 3: 30-100 feet from the structure.

- Low flammability vegetation should be chosen for this area with adequate vertical and horizontal spacing between the vegetation to limit the potential of fire spread.
- Trees should be spaced from one another, so the canopies don't touch to minimize the transfer of crown fire.
- Tree groupings should be well-spaced from one another.
- Other structures in this zone should also have a managed structure ignition zone.
- Dead and downed fuels should be removed as much as possible.

Your Local Structure Ignition Zone Regulations, Guidelines, and Recommendations

Structure Assessment Visits

Structure assessment visits are in person interactive opportunities for a mitigation specialist and a property owner to discuss wildfire and wildfire hazard mitigation. They are critical to engage property owners or residents in risk reduction activities on private property. Structure assessment visits are often the first active step in moving property owners to take mitigation action.

On site discussions with property owners are the preferred method for establishing trust. These conversations provide a unique opportunity to relay site-specific recommendations about wildfire risk, including structure ignition potential and particularly hazardous vegetation near structures as well as considering other structures on the parcel including sheds, chicken coops etc., and placement of wood piles, flammable attachments, vehicles etc. You will also gain valuable insights about the property owner's lifestyle, values, concerns, and understanding of wildfire risk.

One-on-one comprehensive parcel assessment visits are important because they:

- Identify specific vulnerabilities.
- Identify residents' reduction concerns and barriers to action.
- Tailor solutions to the resident.
- Help create relationships built on trust.

Best Practices Before the Site Visit

- Be strategic about home visits, especially if time is limited. Determine a minimum number of site visits to schedule in a locale to make good use of your time.
- Be mindful of community values, such as privacy, or wildlife viewing, and learn about any existing covenants, conditions, or restrictions (CCR) that may conflict with structure or vegetation modifications.
- Work collaboratively with partners to conduct site visits and share resulting information. A resident may not be comfortable with you, particularly if you are uniformed personnel, but they may be comfortable with one of your partners. Consider who will be the best messenger.
- Develop site visit training to ensure that all partners that are conducting site visits are providing recommendations in a consistent manner.
- Plan to dress in a professional manner. If appropriate, wear your organization's uniform or logo.

Best Practices During the Site Visit

- Remember to listen first.
- Effective engagement requires building rapport while empowering self-confidence so that residents are willing to begin addressing risks independently.
- Focus on the "front door to outdoor" concept. Discuss structure characteristics first, then the structure ignition zone, surrounding landscapes/vegetation, and the larger community.
- To influence behaviors, present information in a relatable and understandable way.

- Example: If you notice that the property has numerous bird feeders and birdhouses, discuss potential negative impacts wildfires can have on the avian population or how a healthy ecosystem can improve wildlife habitat.
- Consider residents' preferences for privacy and aesthetics, but do not compromise to the point that the treatment is ineffective.
- Example: A homeowner is sentimental about a tree near their home and doesn't want to cut it. The alternative is to trim the tree, remove ladder fuels under the tree, and routinely remove any fallen debris created by the tree.
- Give credit where credit is due by acknowledging positive property attributes or actions that residents have already taken to reduce risk.
- Discuss the various ways wildfire could impact a building (embers, flames, radiant heat). Point out specific vulnerabilities and how they could be mitigated.
- Discuss the challenges with fighting fires, limited resources, and the fact that firefighting resources may not be available to provide protection to structures during a wildfire.
- Explain the trade-offs of action and inaction.
- Prioritize actions, addressing the highest risks first.
- Create specific recommendations based on site conditions such as erosion concerns, adjacent properties, or overlapping ignition zones, community egress, fuel breaks, and safe areas.
- Be clear about what residents need to do and provide the rationale for those actions. Be specific about how an individual action reduces risk.
    - Be prepared with resources such as contractor lists and cost-share program opportunities.
    - Identify specific fuels for removal on a map or by marking them with flagging or paint.
    - Identify structure retrofit actions.
    - Point out specific opportunities where mitigation can most easily be done.

    - Leave the property owner with a written action plan.
- At the end of the one-on-one visit, ask for a commitment to action. Seal a commitment with a handshake. While non-binding, the concept "my word is my bond" resonates with many residents in regions with high wildfire risk.
- Suggest how and when the promised action can occur and how you can help make it a reality.

Best Practices After the Site Visit

- Determine what will be done with the structure assessment visit report once completed. Simply conducting the site visit and filing the information away is unlikely to lead to meaningful mitigation.
- Plan to follow-up with the property owner or resident to check on progress and answer any additional questions they may have.
- Follow-up may include providing additional information and resources, such as:
    - Contractor lists.
    - Brush/slash disposal options.
    - Funding opportunities.
- Have a plan to help property owners or residents get mitigation done.
- Set up a centralized tracking tool (this could be as simple as a spreadsheet). This will help to:
    - Track location of visits.
    - Track needed re-engagement times.
    - Track property owner risk reduction progress.

Basics for Structure Assessment Forms

Structure assessment forms are a great way of gathering information for the resident on the structure's susceptibility to wildfire impacts and areas on and/or around the structure that need some work. There are many types of assessment forms such as paper forms to electronic/fillable forms that capture spatial data. Some states may have established forms that you may want to utilize. When assessing a structure, ensure your form or application captures information and recommendations related to:

- Resident/Property Owner Name and Contact Information
- Assessor Name
- Overview of Surroundings (including fences, outbuildings, sheds)
- Chimney to Eaves
- Top of Exterior Walls to Foundation
- Foundation to Immediate Landscaped Area
- Immediate Landscaped Area to Zone 3

Adapted from the National Fire Protection Association's Home Ignition Zone Structure Assessment Guide, https://www.nfpa.org/education-and-research/wildfire.

Emergency Vehicle Access

The topic of emergency vehicle access should be addressed when meeting with property owners or residents. While no guarantees should be made that adequate access equates to structure survival, it should be emphasized that a lack of access can mean that no firefighter assistance is a possibility.

While emergency vehicle access has many components, including things like roadways, grades, dead ends, signage, and bridges, the main thing that a property owner has control over is their driveway access.

Driveway Access Key Points

Is the Home Easy to Find?

- Address and fire number signs should be clearly seen from the road from both directions of travel and be constructed of nonflammable material with reflective letters at least 3 inches in height. The area around the sign should be well maintained (tree limbs trimmed, weeds cut) so the view is not obscured.
- If there are multiple address signs at the road, a secondary sign should lead firefighters to each home.
- Homes that cannot be seen from the road limit a firefighter's ability to determine if it is safe to enter.

Is the Home Easy to Access?

- Driveways need to have width clearance of at least 12 feet and vertical clearance of at least 13.5 feet. Greater width clearance may be needed if the driveway has curves or if local ordinances exist.
- A driveway surface should be paved or firmly packed and able to support the weight of emergency vehicles, even in the spring when the ground may be soft.
- Driveways should be free of gates, posts, and any other obstructions that could limit access.
- Longer driveways should have adequate space for an emergency vehicle to turn around once it reaches the home, so firefighters can quickly exit.

Structure Triage and Wildfire Mitigation

Being able to discuss a structure's risk in association with suppression is helpful when speaking with a resident. This information is used by firefighters as they make decisions regarding if they will or will not protect a home or structure. Below are the structure triage descriptions as provided within the *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461.

Defensible – Prep and Hold

- Determining Factor: Safety zone present.
- Size up: Structure has some tactical challenges.
- Tactics: Firefighters needed on site to implement structure protection tactics during fire front contact.

Defensible – Standalone

- Determining Factor: Safety zone present.
- Size up: Structure has very few tactical challenges.
- Tactics: Firefighters may not need to be directly assigned to protect structure as it is not likely to ignite during initial fire front contact. However, no structure in the path of a wildfire is completely without need of protection. Patrol following the passage of the fire front will be needed to protect the structure.

Non-Defensible – Prep and Leave

- Determining Factor: NO safety zone present.
- Size up: Structure has some tactical challenges.
- Tactics: Firefighters not able to commit to stay and protect structure. If time allows, rapid mitigation measures may be performed. Set trigger point for safe retreat. *Remember pre- incident preparation is the responsibility of the homeowner*. Patrol following the passage of the fire front will be needed to protect the structure.

Non-Defensible – Rescue Drive-By

- Determining Factor: NO safety zone present.
- Size up: Structure has significant tactical challenges.
- Tactics: Firefighters not able to commit to stay and protect structure. If time allows, check to ensure that people are not present in the threatened structure (especially children, elderly, and invalid). Set trigger point for safe retreat. Patrol following the passage of the fire front will be needed to protect the structure.

Insurance Best Practices

Wildfires have increased in intensity and severity recently and have become an increasing concern for many homeowners. It is important that homeowners have adequate coverage for wildfire loss in their insurance policies and should check with their agent to ensure that they do. Other insurance concerns for residents in areas of high wildfire risk may include dropped coverage, premium increases, and required mitigation actions.

1. Recommend the resident has enough insurance to rebuild their home and replace their belongings and dispose of hazardous materials. This is especially important after any significant remodeling or renovation project, such as adding an addition or making structural alterations. Consider extended replacement cost, building code update, and inflation coverages. Encourage residents to contact their agent prior to "fire season" for a comprehensive review of their coverages, limits, and deductibles.

2. Encourage residents to prepare a home inventory and store it in a secure location or online. This will aid in the claims process in the event of a loss. Many insurance companies have apps and services that can assist with the inventory process. Have residents contact their agent for more information.
3. Residents should ask about the process for replacement of home contents after a wildfire. Some insurance companies have specific forms that will need to be completed, and which require specific information while others use a basic formula. Knowing what an insurance company requires will help residents prepare their home inventory.
4. Encourage residents to get a "home ignition zone" wildfire risk assessment, follow the recommendations, and document their actions. Ask if their insurance company offers a discount for mitigation/structure modifications.
5. Encourage residents to share photos of any community wildfire mitigation work with their insurance agent as well as details of other mitigation efforts such as whether their community has implemented a Community Wildfire Protection Plan or is participating in Firewise USA®, Fire Safe Councils, or Fire Adapted Communities Learning Network.

Fuels Treatment

Landscape Fuels Treatments

Mitigation treatments will vary depending on the vegetation type, property ownership, financial considerations as well as more physical constraints such as access and topography. The first thing the mitigation specialist should define is the purpose of the treatment. Is fuel reduction/fire mitigation the most important outcome? Is species rehabilitation or ecological improvement the goal? Healthy landscape treatments can improve ecosystem vitality, watershed health as well as provide wildfire safety improvements for homes and neighborhoods. Due to the variety of ecosystems that can be impacted by wildfire including grasslands, brushy areas, forests etc., residents, fire departments and land management agencies and others need to work together to reduce the impacts of wildfires to their communities as well as protect the health and resilience of local ecosystems. Due to the variety of ecosystems collaborative efforts to determine the best practice needed to create healthier landscapes is critical. Before starting a project make sure you are following all applicable federal, state, local codes and regulations. Additional considerations for landscape fuels treatments include:

1. Plan projects with partners, especially residents, whose lives will be most directly affected when/if fire occurs.
    a. Encourage adjacent property owners to plan mitigation efforts together to manage overlapping ignition zones.
    b. If treatment has a prescribed fire or pile-burning component, prepare the community for dealing with smoke.
    c. Work with experts to explore other options to create healthier landscapes including grazing, mowing, removing invasive species etc.
    d. Encourage feedback.

2. Engage property owners and residents. Keep them informed before, during, and after the project.
    a. Include them in the planning process to give them more "ownership" over the effort.
    b. Including them early will minimize questions, confusion, and concerns.

3. To maximize the effect, look for opportunities to "cluster" projects across boundaries.

4. Try to avoid the postage-stamp approach. Small, scattered projects are not as effective at changing fire behavior as larger projects but may be a critical first step when working on private property.
5. Use planned fuels projects to influence neighboring landowners and residents to mitigate by demonstrating what effective treatment looks like and how it can be completed.
6. Use the project as a demonstration site to educate the public about risk reduction and the value it provides to promote healthy landscapes, watersheds, and wildlife habitat.
7. Design projects with mutually beneficial outcomes, including:
    a. Protecting homes and infrastructure.
    b. Improving watershed conditions.
    c. Contributing to healthy vegetative or ecological conditions which result in landscapes that are more resilient during wildfire events and more resistant to insect and diseases.
8. Have a clear plan (and back-up plans) for the removal of woody and vegetative debris (e.g., brush, grass, leaf litter).
9. Plan to maintain the project over time.

Grassland Restoration

Restoration of degraded grasslands, can mitigate the threats of wildfire and drought, restore watersheds, and improve the health of rangelands.

1. Managing through Prescribed Fire: This method can reduce non-native species such as Cheat grass, Guinea grass reducing wildfire severity and restoring native flora needed by quail and other species.
2. Managing through Grazing: Using cattle goats or other grazers like buffalo can manage the amount of fuel reducing flame length during a wildfire making it safer for communities and prevent the encroachment of trees and brush on grassland, improving habitat for the species that live in this ecosystem.

3. Managing with Herbicides: In order to break the annual grass fire-cycle in the sagebrush steppe, land managers use pre-emergent herbicides to reduce annual grass populations and seeding to

increase fire-tolerant perennials. These tools must be applied to the same soils in ways that are not counterproductive, and their application must therefore be staggered in time, which we refer to as layering.

Shrub Management

Shrub is an extremely valuable habitat and one on which many species depend for their survival. However, if left unmanaged it can take over grassland or other ecosystems and pose a threat to local communities in the event of a wildfire. Various techniques or combinations of techniques can be used to control shrub, some of them more sensitive than others, and include:

1. Control invasive species such as rhododendron, which have very little value for wildlife and can contribute to fire intensity.
2. Cutting with brush cutters, chainsaws, and hand tools.
3. Cutting by mowing or flailing.
4. Coppicing (cutting shrubs at the base regularly) and thinning.
5. Stump removal and grubbing out.

6. Grazing and browsing with varying stocking levels and different types of livestock.

<u>Saw-Palmetto Shrub Wildfire Management</u>

1. Both roller chopping and web plowing provide substantial canopy control. The time of mechanical treatment that appears to be best is in late summer when the plants have their lowest levels of stored carbohydrates, and when the soil is often saturated. Web plowing is recommended above roller chopping because saw-palmetto cover is reduced for much longer.
2. Repeated use of prescribed fire at frequent intervals can reduce the amount of regrowth.

Forest Thinning

Thinning is a timber stand improvement technique to remove trees from stands to reduce stocking and concentrate growth on the more desirable trees. Three thinning considerations for wildfire hazard mitigation include:

1. **Thinning by description**, sometimes referred to as PXD or simple mitigation. The goal here is to remove excess fuel from the stand. It can be done by clearing to a specification. *Example:* the desired outcome is an even crown spacing of 20 feet, regardless of species.

2. **Thinning by prescription,** sometimes as referred to as PXP. The goal is to either harvest a given size/age class of timber, or attempt to restore the forest to a healthier, more sustainable condition. Prescriptions can be simple. *Example*: remove all lodgepole pine < 6" DBH. They can also be very specific and complex with multiple stand treatments per unit.
3. **Thinning by marking**. Foresters will paint dots or slashes on every tree to be removed, eliminating any requirement of discretion on the part of the contractors or volunteers who are doing the actual harvest.

Harvesting/Logging can be broken into three main approaches. Each approach has limitations and advantages depending on the practitioner's primary goals.

1. Hand Thinning: Generally, time consuming, labor intensive, and costly. It is often the only option when working on steep slopes or areas that lack access for mechanized equipment. It's a good option for removing ladder fuels and small diameter trees.
2. Mechanical Harvest: This is generally performed by teams with mechanized harvesters, forwarders, and skidders. Often trees are felled by one operator and forwarded to a landing where all slash is processed, and timber decked for removal (whole tree removal). This reduces impact on the ground by concentrating the disturbance to a single (or a few) site(s). Conversely, trees may be harvested and stripped of tops and limbs, where they fall and are ground into the same area as where the tree once stood (selective harvest).
3. Mastication/Hydro-axing: This method of logging requires large machines to grind the timber into chips on site. It is quick and generally the least expensive treatment option. It has high disturbance impacts which require avoidance in damaging the forest floor which could hamper regeneration. Strict rules of operation and limits on acceptable chip depth are required. Consult with your state forestry agency for applicable best management practices for these values.

Common Prescription Types

Here are some common prescription types that you may encounter in discussions with agencies or other professionals.

Ecological Restoration: The primary goal is to benefit the ecosystem and all its parts. Therefore, a solid understanding of the local ecology is necessary. Trees should be removed to improve the desired species configurations and densities. Careful attention needs to be paid to configurations that reduce pathologies such as insects, diseases, and invasive species. The creation of meadows and openings can be beneficial

for wildlife and should also be carefully considered. Retention of some dead trees or snags for habitat enhancement is often practiced.

Fire Mitigation: The primary goal of this treatment type is to slow or eliminate extreme and active fire behavior during a wildfire event. The actions required to achieve this are strongly dependent on tree species, slope, and general health of the stand pre-treatment.

Patch Cutting/Clear Cutting: There are several reasons clear/patch cutting is an ideal mitigation method including, disease or insect outbreak, and keeping disease from spreading to other trees. Patch cutting may be used to clear an area of storm-damaged trees, or monocultural species, such as some pines that lack wind-fastness or removed altogether. The patches are localized clear cuts that should be designed to mimic the mosaic pattern of a fire scar.

Lop and Scatter: This method is most often applied on remote sites and/or steep slopes. It is also generally a hand-crew technique. All trees are dropped and limbed where they stand. The boles are cut into 8’ to 4’ chunks and left in contact with the ground. Limbs are cut into pieces and spread loosely, with no slash standing taller than 12” to 18” above the ground. No continuous contact between branch segments or trunk slices is allowed. The material is then left to decay naturally. This is sometimes referred to as “fuel rearrangement,” as the aerial fuels are reduced, but overall fuel load of the site is not.

Hybrid Approaches: Any or all these techniques can be mixed or matched to reach the various (and potentially, many) goals of your treatment. It is common to want to create or improve meadows and openings, while also wanting to clear road accesses and promote microclimates within a given landscape.

Wildfires can be devastating, but not all fire is bad. Fire plays a natural and necessary role in many landscapes. Periodic low-intensity fires speed up the process of forest decomposition, create open patches for new plants to grow, improve habitat and food for animals, and deliver nutrients to the plants that survive. Fuels management builds wildfire resilience by reducing small trees, brush, dead branches, and limbs (called ladder fuels) which makes it less likely that future wildfires will torch an entire landscape.

Vegetation Treatment Resources

Resources are available to assist the mitigation practitioner with constructing fuels treatments, from planning and establishment to maintenance and monitoring. The first step is looking for regionally specific resources that might be obtained through state forestry agencies, University Extension offices, fire consortium, etc. to find recommendations and guidelines specific to fuels management in the local area. There are also numerous information sources for fuels treatment guidance. Examples include:

U.S. Forest Service Treesearch publications database contains thousands of General Technical Reports (GTRs), maps, notes, papers, bulletins, updates, and scientific journal articles: https://research.fs.usda.gov/treesearch

Natural Resources Conservation Service (NRCS) technical guides and standards: https://www.nrcs.usda.gov/

United States Geological Survey: https://www.usgs.gov/

U.S. Forest Service Fire Research: https://research.fs.usda.gov/fire

Joint Fire Science Program: https://www.firescience.gov/ords/prd/jf_jfsp/jf_jfsp/r/jfspublic/home

Fuel Treatment Effects and Effectiveness: https://www.firescience.gov/ords/prd/jf_jfsp/jf_jfsp/r/jfspublic/jfsp-fuels-treatment?session=4082693600839

Oak Woodlands and Forests Fire Consortium: https://oakfirescience.com/

International Journal of Wildland Fire: https://www.publish.csiro.au/wf

U.S. Department of the Interior Fuels Management program: https://www.doi.gov/wildlandfire/fuels

Mitigation Event Planning and Logistics

Mitigation activities are those actions implemented before, during or after a wildfire to reduce or eliminate risks to persons, property, infrastructure, or natural resources.

The mitigation professional is responsible for planning and implementing mitigation events, projects, and activities. Success of these events is dependent upon proper planning, clear goals and objectives, safe operations, and the effective, and efficient use of people, resources, and tools.

Mitigation Events

Mitigation events include chipper days, woody/vegetation debris removal, community cutting/thinning projects, general landscape clean-up days, creation of defensible space around a public structure or in a park, and many other activities. **Mitigation events are a great way to motivate people to get involved and act.** They create results on the ground but also provide opportunities for "first contact" between mitigation specialists and residents who may not already be engaged.

Debris removal is commonly considered a barrier to mitigation. There are numerous ways to overcome this barrier, including:

1. Encourage residents to pick up the debris and haul it to a central location (e.g., local brush collection site) for contractors or community members to chip or burn when it is safe to do so.
2. If residents do not have a means to haul vegetative debris, recruit truck and trailer owners to lend a hand.
3. Ask residents to coordinate a chipper or "green dumpster" day. If residents are uncomfortable renting a chipper, they can haul vegetative debris to the end of their driveway for a contractor to pick up or mulch on site.

Always plan events with safety in mind and include the following:

- Develop plans that include event objectives and goals, safety, and emergency procedures as well as communications plans. Communicate these plans and procedures with everyone.
- Adhere to safety guidelines and safe work practices.
- Develop contingency plans.
- Plan for alternative activities if the weather is questionable.
- Ensure that there is enough work for everyone. Develop primary and secondary activities that are meaningful and geared towards the group you are working with.

Before the Event

Site Inspections

Prior to any mitigation project or event, inspect the work site for hazards. Make note of any safety concerns on the site such as hazard trees, dangerous terrain, or other natural hazards such as bees, snakes, poison ivy etc., the location of septic systems, abandoned wells, underground power, gas, and water lines. Utilize "call before you dig" offers provided by local utility companies. Mitigate the hazards, if possible, to reduce associated risk. Make attempts to keep people and equipment away from them during the event.

Insurance and Liability

- Ensure there is adequate insurance to cover staff and volunteers.
- The work should align with the participants in mind. Develop projects that fit the physical fitness of the participants and set a minimum age and experience requirement if necessary.

Developing the Plan

Develop the plan to include the five W's and H.

- **Where?** Provide an address, directions, and map to the work site. Make sure attendees are aware if restrooms or hand washing stations are not available.
- **When?** Provide the date, time, and duration of the event. Include an alternative date in case of bad weather.
- **Who?** Provide the host's name and contact information. Include additional details about any particular organizations, groups, or individuals that will be involved.
    - Consider if volunteers are needed. Include the minimum and maximum number of participants for the event. How many staff members are needed to supervise or lead the work, and will they be required to have any specific qualifications or skills?
- **What and Why?** Describe the work that will be completed and why it is needed. Include the goals and objectives as well as the expectations of the participants. What clothing should they wear? Provide any required PPE, as participants may not have safety equipment such as hard hats or ear protection. Develop an inventory for the needed tools and equipment.
    - Inform participants to bring water, bug spray, sunblock, and any required medicines. If people need to bring their own food, make that known as well.
- **How?** Take the time to develop the work or action plan. How will the work be completed? Who will lead the activities? Will it occur in phases, or will everyone work together at the same time?

During the Event

Parking

Arrival and departure from an event can be one of the most dangerous times for participants. Ensure that there is adequate safe parking for everyone participating in the event. Depending on the expected turnout, have individuals assist with parking. Consider working with the local fire or police department to help with any additional traffic needs. Alternatively, plan to have carpooling or mass transit available to reduce the number of vehicles parked on site.

Release of Liability and Photo Use

A Release of Liability is an agreement between two parties in which one gives up the right to hold the other legally responsible for current or future injuries, losses, and damages. A release of liability should be signed by all volunteers participating in an event. An additional liability release may be required for minors. If appropriate, a release of liability form should be signed by property owners before work is started on a property.

When working with volunteers, it should be required that they provide emergency contact information, any other pertinent information as allowed and a signed release of liability form. In addition to liability releases, volunteers and participants should also sign, or have a guardian sign, a photo release.

As a note, when taking pictures of event activities, it is best not to include license plates, address signs, or any other identifiable information in a picture that you plan to use for a publication.

Workday Orientation & Safety

Upon arrival to the work site:

1. Thank everyone for coming and provide an opportunity for everyone to introduce themselves.
2. Provide organization details (e.g., who is sponsoring the project?).
3. Provide the specific details of the project and the site or location.
    a. Why are we here?
    b. What are the goals and objectives?
    c. Explain the work to be done.
    d. Describe the day's timeline. When are breaks scheduled? When is the day finished?
4. Hold a Safety Talk.
    a. Provide a general safety overview, including local considerations of poisonous plants, snakes, etc. and any hazards noted during the site inspection.
    b. Collect any liability release forms.
    c. Ensure that participants know how to wear and use personal protective equipment and the appropriate tools for the work.

Share the emergency response plan in case of injury, accident, or illness.

Operational Considerations

Engage Participants

- Use this opportunity to get to know the people working or assisting at the event and build trust. Often these events are a great way to build lasting relationships and expand mitigation outcomes.
- Provide direct guidance and be available to answer questions throughout the event.
- Share information as it pertains to the event. Discuss ecosystem health, fire adaptation, and mitigation resources availability.
- Acknowledge hard work and the small successes. When you complete a project and move on to the next, make sure you take the time to high-five and say, "great work." These actions go a long way with volunteers.
- Take frequent breaks and pay attention to the crowd. Remind people to snack, reapply sunscreen, and drink water. During longer breaks, have a speaker discuss the project or share information pertaining to the project or area.
- Stick to a schedule and end on time.

Work Safely

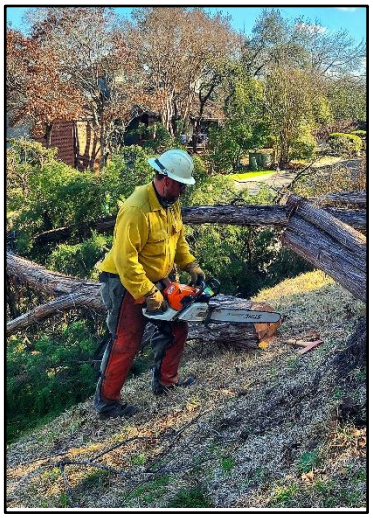
- If something is unsafe, stop that activity. If the unsafe activity continues, stop the event.
- Ensure personal protective equipment is always worn.
- Pay special attention to the health and welfare of volunteers. Volunteers may not be familiar with the location, altitude, weather, hazards, or work.
- Frequently ask how people are doing and monitor for signs of health issues (e.g., breathing heavily, excessive sweating, staggering, etc.).

Equipment Use

- Properly using equipment will reduce the potential for injury and accidents while completing mitigation work.
- Equipment must be inspected and/or tested prior for use in the field or on a project to ensure that it is operating properly and in good condition. Make sure back-up batteries, parts, tools, and fuel are available as needed.
- Depending on the type of work, special safety equipment may be needed as well. Consider any special PPE that is required by the equipment used.
- All-terrain vehicles (ATV), chainsaws, and heavy equipment should be used only by a licensed or qualified individual.
- Never operate equipment without the proper and necessary PPE, regardless of complexity, or duration of project. This includes wearing a helmet when driving an ATV or wearing chaps and eye/ear protection when operating a chainsaw.

Chainsaw Operations

A qualified or licensed individual should be the only one to operate a chainsaw, and this individual should have the proper training necessary. The sawyer should determine their comfort level and not feel pressured if the job is too complex for their skill level.



- Proper PPE should always be worn when handling or working near chainsaws. The operator should wear a hardhat or helmet, eye protection**,** ear protection approved for noise levels of 85 decibel or greater, long sleeve shirt, long pants, 8-inch-high lace-type exterior leather work boots, approved chaps that overlap boots by a minimum of two inches and gloves.
- A first aid kit should be available. When a larger operation has additional personnel, consider having more than one first aid kit on site. Additionally, it is recommended that a tourniquet, back board, basic life support trauma gear and an automated external defibrillator (AED) be available.

To ensure safe felling operations, consider the following:

- Inspect the chainsaw, felling ax, and wedges before working with them.
- Assess the situation and analyze associated risks. Consider environmental factors that increase risks, such as current, and forecasted winds, or steep slopes.
- Plan for quick and safe escape routes.
    - A secure felling area and safety zone should be established and maintained.
    - Examine the work area. Loose soil, rocky ground, or steep terrain may increase complexity of an operation. Check for overhead hazards, like dead or broken limbs or leaning trees. Consider other hazard trees nearby to avoid a domino effect.

    - Minimize the personnel working within the felling area. Establish communications with spotters or lookouts as well as any other personnel working in the area.
    - Evaluate tree characteristics, such as the species, size, and any defects.
    - Frequently look up while cutting and use proper procedures and techniques.
    - Give a warning yell when the tree has been cut and use the established escape route.
- Felling hazard trees or snags presents a significant risk to sawyers. This operation requires a risk assessment and demands the sawyer's full attention.

Refer to the *NWCG Standards for Wildland Fire Chainsaw Operations*, PMS 212, for more comprehensive, and specific information.

For additional resources, rules, and safety guidance please visit the Occupational Safety and Health Administration's Logging Operations Standard, (https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.266).

Heavy Equipment Operations

When working on projects using heavy equipment, consider the following.

- Trained and certified equipment operators should be the only individuals operating or riding on the equipment.
- Always wear appropriate personal protective equipment. The operator should wear a hardhat or helmet, long sleeve shirt, long pants, work boots, and gloves.
- Establish communication methods prior to commencing work.
- Operators have difficulty seeing ground personnel. Consider having a spotter.
- When working around heavy equipment, remain at least 100 feet in front of and 50 feet behind the equipment. In timber, these distances should increase to two- and one-half times the canopy height.
    - Wear a high visibility vest or shirt.
    - Never approach equipment until you have eye contact with the operator and the equipment is idling. All implements attachments should be lowered to the ground.
    - Communicate all hazards, such as powerlines, or fences, to the operator. Flag these and other hazards.
    - Avoid working downhill from equipment. Rolling material could jeopardize your safety.
- Ensure all environmental protection guidelines are followed.

Woodchipper Operations

When working on projects using a woodchipper, consider the following:

- Always wear appropriate personal protective equipment. Clothing should be close fitting and tucked in. The operator should wear a hardhat or helmet, eye protection, ear protection, long sleeve shirt, long pants, boots, and gloves that do not have gauntlets.
- Workers should be trained on the safe operation of woodchippers. Follow the manufacturer's guidelines and safety instructions for operation, inspection, and maintenance.
- Inspect the chipper at the start of each work shift to ensure that all parts and safety devices are functioning properly. Look for broken parts, cracks, worn hinges, and missing parts, or pins.
- When servicing and/or maintaining chipping equipment (e.g., clearing a jam), use a lockout system to ensure that the equipment is de-energized.
- Protect yourself from contacting operating chipper components by guarding the infeed and discharge ports and preventing the opening of the access covers or doors until the drum or disc completely stops.
- Never reach into a chipper while it is operating.
- Maintain a safe distance (e.g., two tree or log lengths) between woodchipper operations and other workers.

Working with Volunteers

Volunteers are a great resource and can increase chipping program outcomes. When integrating volunteers into these events or projects, consider the following:

- Ensure volunteers understand about PPE and how its worn. Anyone working near or with a woodchipper should not wear loose clothing or jewelry, including watches. Loose items can get caught on branches and be pulled off or pull the individual towards the chipper. Everyone should wear closed-toed shoes, such as hiking or sturdy work boots.
- Explain that chippers are loud and know that you may need to use different communication methods, such as hand signals or radios. Explain the hand signals and what they mean with all volunteers.

If volunteers are helping move material to the chipper while it's operating, inform them to:

- When picking up or dragging material to the chipper, be aware of those around you. Sudden movements while moving materials can cause injury to others.
- Pay particular attention to the material in the chipper as you bring up your pile. Debris is unstable and can get caught in the rollers and swing back and forth causing unsafe conditions.
- Chipping can be physically demanding. Use your legs to lift and listen to your body to determine what you can manage safely and efficiently.

Working with Contractors

- Ensure that contractors hired to perform the work are bonded/insured and licensed to work in the area. Check with the Better Business Bureau or a similar review organization to ensure they provide quality work.
- When working with any new operator or contractor, use extra caution as you learn their working practices.

Closeout

- At the end of the event, highlight what was accomplished and thank everyone for their contribution.
- Mention a few of the outcomes.
  - "With your help we chipped #### piles today!"
  - "Today, Annie gets the hardest worker award for her tireless efforts moving the slash to the pile."
- Conduct an After-Action Review to discuss what was planned, what went well, and what could have been enhanced.
- Provide any follow-up information, such as the next event details and or mitigation resources.
- Collect provided personal protective equipment.
- Check your tool inventory and confirm you have everything.
- Before leaving, conduct a final headcount to make sure everyone is accounted for to ensure accountability.
- Help people as they depart, by providing parking attendants in high visibility vests to support a safe departure.

Data Collections and Outcomes Tracking

Things to track at a mitigation event:

- Number of event participants.
- Hours spent (including travel time).
- Project outcomes (e.g., cubic yards, piles, acres, feet, miles, etc.).
- Spatial information (points and polygons).
- Financial investments.

- Technical support hours donated.
- Equipment usage.
- Donations.

Mitigation Events Best Practices

1. Plan mitigation events collaboratively with residents.
2. Require residents to participate in planning and completing the project.
    a. *Example*: Residents haul brush to the curb and the fire department does the chipping or removal.
    b. *Example*: The community or neighborhood leader promotes and coordinates the event, manages the work site and volunteers, and collects project outcome data.
3. Plan for safety.
    a. Provide safety training and personal protective equipment (goggles, chaps, ear protection, etc.).
    b. Ensure equipment operators are qualified.
    c. Understand the legal limitations and ramifications.
        i. Review your insurance coverage and ensure you are adequately protected.
        ii. Require all participants to sign a liability release. Minors must have a release signed by their guardian. Make sure minors are only allowed to do age-appropriate work to align with child labor laws.
4. Have the residents do as much of the work as possible.
    a. The more people are invested in the work, the more likely they are to maintain it after the project is completed. Recognize there are different ways for individuals to contribute to wildfire mitigation.
    b. Require an in-kind or cash match from homeowners receiving mitigation support. In-kind match can include volunteer work hours and donated equipment use.
5. Schedule events to maximize participation.
    a. Encourage communities to schedule and host events regularly and with plenty of notice.
        i. This establishes mitigation as an ongoing activity. Residents are more likely to begin work each summer if they know there will be a chipper available on the second Saturday in July or the first Saturday in August.
    b. Planned events attract partners. For example, contractors may donate services with the potential to expand their client base.

6. Establish a minimum number of residents in an area who must participate before you commit to a mitigation event.
7. Network, take names, participant contact information, and promise to follow-up.
8. Thank participants for their hard work and the progress that was made.

Mitigation Funding

The cost of mitigation work is cited as a common barrier to action. Use the following best practices when seeking funding, using funding resources, and engaging residents.

Seeking Mitigation Funding

1. Understand the cost of doing business.
2. Take the necessary training to understand the type of funding available.
3. Create a detailed budget and timeline for each program and project.
4. Develop financial management safeguards and procedures.
5. Don't chase funding at the expense of your mission or capacity to accomplish effective risk reduction activities.

Using Mitigation Funding in Sustainable, Efficient, and Effective Ways

1. Homeowners must be a part of the equation, but their roles may vary by both community and homeowner. Where feasible, require a project cost match through a cash investment, or in-kind work hours by property owners.
2. Develop sustainably funded programs and projects. Example: Create a chipper program that has a mosaic of funding sources, including municipal, and grant support. Multi-year funding will help sustain the program.
3. Bundle two or more funding sources into one project.
4. Work with others who are doing mitigation work (e.g., a utility company) and use their investment as a match on adjoining private-land mitigation.
5. Share equipment between partners.
6. Ask a fiscal sponsor to lower their indirect cost rate and dedicate the remainder as a cash match.
7. Look for opportunities to reduce costs.
    a. See if landfills will waive tipping fees.
    b. Use locally available materials, like native rocks in hardscaping.
    c. Use the right tools for the job and consider alternatives. Can the landowner safely burn brush piles rather than chipping?
    d. Are there alternatives to hiring an arborist (generally more expensive)?
8. Develop "do not exceed" rates for mitigation projects with residents.
9. Leverage resources and seek donations for things like dumpsters for green waste or tools and equipment from a local box store.

Develop Services to Identify and Support Vulnerable Populations

1. First – Listen! When working with vulnerable populations, added barriers, or cultural differences may exist. Understanding the barriers to inclusion and participation is the first step.
2. Focus investments on high-risk areas adjacent to lower-income developments.
3. Understand the specific limitations and barriers within vulnerable populations and adjust tactics accordingly.
    a. An inability to make investments of time or money.
        i. Provide volunteer support services; reduce or remove cost-share requirements.
    b. Mobility limitations.
        i. Develop evacuation plans.
        ii. Focus ingress and egress treatments in areas that service these populations and developed areas.
    c. Language barriers.
        i. Include translation and interpretation services in your mitigation planning, budget, and activities.
4. Adjust financial assistance programs by reducing and/or eliminating matching requirements.
5. Partner with local social service organizations to integrate wildfire mitigation into their programs.
6. Identify volunteer resources to complete mitigation (i.e., scouts, or community, and faith-based service organizations).
7. Create and inclusive and equitable work environment with under-represented groups in the community. The same wildfire mitigation approach/program is unlikely to work in every community.

Safety

Be aware of the range of safety considerations that mitigation professionals must take into account. Equipment use, interacting with residents, home visits, and driving, among others, should all be considered. Safety is everyone's responsibility, and you should prepare for anything that may happen.

The NWCG 6 Minutes for Safety Subcommittee provides comprehensive safety information available online, https://www.nwcg.gov/committee/6mfs/my-safety.

General Safety

Proper planning and implementation will help reduce any potential injuries or adverse outcomes. Ensure that you adhere to specific protocols, policies, and procedures of local jurisdictions or organizations regarding general safety.

Everyone has a responsibility to ensure a safe work environment for all. Consider the following general safety guidelines when conducting work.

- Ensure that everyone involved understands their responsibilities and acknowledges the associated risks.
- Become familiar with the *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461. Many response-related safety considerations are interchangeable with mitigation work.
- Have an emergency plan in place. Practice your plan and incorporate scenarios into training events. Review and revise the plan frequently.
- Hold brief safety meetings before, during, and/or after work activities to discuss the ongoing work, changes in the plan, equipment, and associated risks, or safety concerns. Document accidents or near misses and learn from them.
- Ensure that appropriate PPE is worn.

Understanding Risk

Risk can be defined in many ways depending on discipline and context. According to the United States Department of Agriculture (USDA) Forest Service's *Operational Risk Management Guide,* risk is the effect of uncertainty on objectives, the probability, and severity of consequence on uncertain future events.

Most risk faced by mitigation practitioners is manageable through thoughtful and deliberate risk management. Risk management, as defined in the *NWCG Glossary of Wildland Fire Terminology*, PMS 205, is a continuous process that provides a systematic method for identifying and managing the risks associated with any operation.

Risk management should occur throughout an organization. Anticipate and manage risk by planning:

- Identify the value and objectives of a planned action.
- Assess hazards and associated risks. How likely is something to happen and what are the consequences if this occurs?
- Understand that you cannot reduce the risk to zero but determine what is acceptable.
- Establish control measures and formulate a plan that allows you to meet the objectives of an action while reducing the risk.
- Determine if the benefit outweighs the cost.
- Implement the plan.
- Evaluate and adjust.

Before You Go

- Review your plan and determine an information workflow. Always inform someone, preferably a supervisor, where you are going and include estimated travel times as well as an estimated time of return. Agree on your check in and check out procedure.
- Determine communication needs and what will be most reliable (e.g., cell phone, radio, satellite phone, etc.). How will you call for help if there is an emergency?
- If you are meeting with a new resident or partner, call ahead to confirm a meeting time and location. Consider taking someone with you.
- Take a CPR/First Aid course. Maintain these certifications.
- Consider environmental hazards.
    - Check the weather for your destination and be sure to dress appropriately. Consider wearing layered clothing so you can adjust to changes in weather or physical activity.
    - Prevent exposure to poisonous plants or other pests that may cause illness or injury.
    - Wear/bring sunscreen and a hat to protect you from the sun.
    - Have plenty of water and take frequent breaks to avoid heat-related illnesses.
- Consider the need for insurance or any approvals or permits that may be needed.

Travel

- Plan ahead. Know the route you will take and estimated travel time.
- Have maps in your vehicle, as navigation systems may not be reliable in some areas.
- Plan driving times and distance to prevent fatigue and take breaks after driving for a few hours.
- Ensure your vehicle is well maintained and equipped with adequate spare parts and tools.
- Have an emergency kit in your vehicle in case of a vehicle breakdown or you are stranded. Include water, food, first aid kit, flashlight, batteries, chargers, reflective clothing, blankets, and money. Ensure you have enough supplies for 72 hours.
- Always maintain situational awareness.

Emergency Medical Care Guidelines

- Consult your local agency, department, or business practice regarding emergency medical care. Be sure to work within the scope of what you are trained and authorized to do. Document the emergency, including a timeline of events, observations, and any treatment provided to the patient.
- Review the Emergency Medical Care Guidelines in the *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, for more comprehensive information.

Medical Response Procedures

Establish control of the incident, whether emergent, urgent, or routine. Follow your emergency plan and notify supervisory personnel. Like incident response, request assistance, or let a more qualified individual take control if you are overwhelmed by the incident.

Conduct a rapid assessment of the individual. Check an individual's airway, breathing, circulation, and any life-threatening injuries received. Use appropriate PPE, such as pocket masks, gloves, goggles, etc., if contact with body fluids is possible.

In the event of an emergent or urgent emergency, call 911 immediately. Provide your name, location of the emergency, type of emergency, and what help is required. Do not say the patient's name or other identifying personal information over the radio. Follow directions and communicate the information in a clear and concise manner.

Use the Patient Assessment in the *NWCG Incident Response Pocket Guide (IRPG)*, PMS 461, to evaluate if the patient is emergent or urgent and requires transport.

Table 7: Patient Assessment

Assessment Areas	Indicators
Initial Patient Assessment	General impression of the patient: Major bleeding control: Airway, breathing, circulation: Wrist or neck pulse:
Patient Information	Chief complaint: Age and weight:
Level of Consciousness	● Alert and oriented ● Verbal (responds to voice) ● Pain (responds to painful stimuli) ● Unresponsive
Breathing	● Normal ● Difficult/labored ● Not breathing – start rescue breathing
Pulse	● Present ● Absent – start CPR
Skin Color	● Normal ● Pale ● Bluish ● Flushed/red
Skin Moisture	● Normal ● Dry ● Moist/clammy ● Profuse sweating
Skin Temperature	● Normal/warm ● Hot ● Cool ● Cold
Pupils	● Equal ● Unequal ● Reactive to light ● Fixed or slow response ● Dilated or constricted
Make A Transport Decision	

Plans, Regulations, and Policy

Communities may use an assortment of plans, regulations, and policy to guide and shape wildfire-related work (e.g., land use plans, codes, ordinances, Community Wildfire Protection Plans, Natural Hazard Mitigation Plans, etc.). A selection of some of the most common are presented here. Familiarize yourself with the regulations and plans which impact wildfire preparedness work in your area.

Community Wildfire Protection Plans

According to the *NWCG Glossary of Wildland Fire Terminology,* PMS 205, a Community Wildfire Protection Plan (CWPP) is defined as a plan developed in the collaborative framework established by the Wildland Fire Leadership Council and agreed to by state, Tribal, and local government, local fire department, other stakeholders, and federal land management agencies managing land in the vicinity of the planning area.

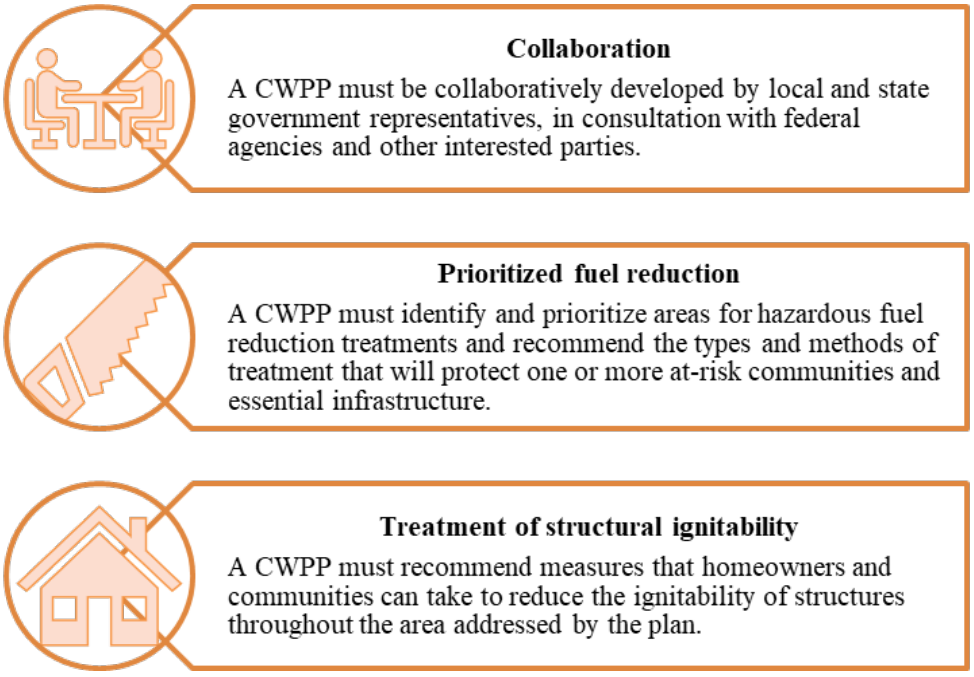
A CWPP identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment on federal and non-federal land that will protect one or more at-risk communities and essential infrastructure and recommends measures to reduce structural ignitability throughout the at-risk community. A CWPP may address issues such as wildfire response, hazard mitigation, community preparedness, or structure protection – or all the above.

The Healthy Forest Restoration Act (HFRA, 2003) set forth general guidance for CWPPs. The language in the HFRA allows for communities to have considerable flexibility while developing their CWPP.

Minimum Requirements of a Community Wildfire Protection Plan

As described in HFRA, there are three requirements for a CWPP.

Figure 14: Requirements for a CWPP



Generally, CWPPs Include the Following Elements:

1. An assessment of wildfire risk.
2. A plan to reduce hazardous fuels.
3. A plan to reduce structure and infrastructure vulnerabilities.
4. A method to share CWPP findings and recommendations.
5. A response component.
6. A maintenance plan for projects and for the plan itself.

Additional elements may be added depending on the needs of a community, including post fire mitigation plans and evacuation planning.

Community Wildfire Protection Plan Best Practices

The following best practices are adapted from *Best Management Practices for Creating a Community Wildfire Protection Plan,* https://www.nrs.fs.usda.gov/pubs/gtr/gtr_nrs89.pdf.

1. Pay attention to community context.
    a. Review previous successful collaborative efforts to identify applicable lessons.
    b. Address previous disagreements or conflicts within the community to prevent them from becoming barriers.
2. Develop CWPPs collaboratively with stakeholders, especially property owners, and identify leaders.
    a. Identify leaders who can motivate others and invite them to participate.
    b. Personally invite key stakeholders, including traditionally excluded, or under-represented groups, community organizations, public health districts, fire departments, federal, and state land managers, community leaders, large-tract property owners, residents who have shown interest in community wildfire risk reduction, environmental/recreation/wildlife groups, the timber industry, elected officials, and policy makers.
    c. Invite people who can connect multiple social groups or networks.
    d. Expand existing networks during the process to bring more resources/support for the CWPP and its implementation.
    e. Make sure you have representation from the three entities required to sign the finished CWPP: the relevant government (city or county), local fire department(s), and state forestry agency.
3. Keep in mind that the planning and development process does not have to be overly complex. Simple and direct documents can be effective as well.
4. When drafting a CWPP, pay close attention to the values assets that are important to communities, such as:
    a. Protecting lives and property.
    b. Infrastructure (cell towers, transportation, water supply systems, etc.).
    c. Ecosystem restoration.

d. Recreation access and protection sites.

e. Aesthetics and viewsheds.

5. Determine the scale of the CWPP.

   a. Think about what you are trying to accomplish and pick a scale where you think you will be able to achieve impact.

   b. Choose the boundary (county(ies), fire district(s), neighborhood(s)) that make sense for what you are trying to achieve.

6. Identify high and medium (moderate) community wildfire risk specifically and clearly on a map that is widely distributed.

7. Include components of mitigation/fire adaptation along with suppression and recovery strategies to help communities cope before, during, and after fires.

8. When developing the list of recommended actions, be able to answer these six questions:

   a. Who will implement the CWPP? Who will implement the proposed mitigation work?

   b. What are the plan's key projects?

   c. When will the proposed mitigation work take place?

   d. Where will the work be done?

   e. How will defensible space, home hardening, landscape-scale fuel treatments, and other recommendations be accomplished?

   f. How will this work be maintained over time?

9. Ensure that the CWPP relates to, strengthens, and enhances other plans within the community (such as all-hazard plans, comprehensive plans, fire management plans, building codes, evacuation plans, and other community development frameworks).

10. Ensure public awareness of the CWPP by engaging residents and communicating accomplishments as projects are completed.

11. Plan for maintenance and evaluation of CWPP. Be able to quickly identify changes and adapt the plan as new conditions arise.

Community Wildfire Risk Assessment

A community wildfire risk assessment is a tool to help a community plan for the specific wildfire risks and challenges in their area. The assessment can be used when creating a CWPP or to assist residents through the Firewise USA® recognition process. An assessment could also be a standalone document for communities interested in a smaller scale effort to help them prioritize action. The assessment will provide a baseline evaluation of a community that can be used to support community outreach and serve as a guide to prioritize work within the neighborhood.

Community Wildfire Risk Assessment Considerations

Begin the risk assessment by choosing the boundary (county, fire district, neighborhood, etc.) that makes sense for what you are trying to assess. Address the following risk factors, indicating the level of risk (e.g., high, medium, low) and display the results on a map.

Table 8: Risk factors and considerations in a wildfire risk assessment

Risk Factor	Consideration
Fuel hazards	Describe the area's vegetation, topography, and land use. Make note of areas of storm damage or tree mortality caused by insects or disease.
Structure Ignitability	Describe homes, housing developments, landscaping, defensible space, and fuel breaks within the community.
Businesses and Infrastructure	Consider local businesses and infrastructure (e.g., water supply, power lines, communication sites, roads, escape routes) and their vulnerability to wildfire and embers.
Wildfire Risk	Describe how a wildfire is likely to start and spread within the community. Consult historical fire cause data and weather patterns.
Values at Risk	Consider wildlife conservation areas, recreation areas, and areas of historic or cultural significance.
Local Preparedness	Describe past and current wildfire preparedness activities in the area, including evacuation readiness, and safety zones. Review the available fire suppression resources and challenges.
Community Strengths and Vulnerabilities	Provide photos and brief descriptions of common strengths and vulnerabilities of the community.

Plan of Action:

An essential part of a CWPP is an action plan that has been created based on the vulnerabilities and beliefs about wildfire risk and spread in the community. An action plan is a list of achievable actions to reduce the risk and make community members more prepared for wildfire. This action plan lists priority projects with associated CWPP member responsibilities, timeline, and funding needs. When creating an action plan, it can be helpful to keep the following mitigation components in mind:

- Assess the risk
- Prioritize the projects
- Create ignition-resistant structures
- Create defensible space around structures
- Treat fuels on the landscape
- Track & evaluate progress
- Celebrate successes

CWPP Updates

It is preferable to update or amend an existing CWPP rather than create a new one. When considering an update to the plan, ask yourself:

1. Why is the update needed?
2. What has been accomplished since the original document was drafted?
3. What has changed?

The answers to these questions can help determine if an update is needed. However, at minimum, a CWPP should be updated at least once every 10 years.

State/Local/Tribal and Territorial Hazard Mitigation Plan

The Federal Emergency Management Agency's (FEMA) Federal Insurance and Mitigation Administration (FIMA) administers the National Hazard Mitigation Planning Program and provides guidance and technical assistance for developing hazard mitigation plans.

State, Tribal, and local governments engage their communities in multi-hazard mitigation planning to identify natural hazards that may affect them, identify strategies and activities to reduce any losses from those hazards, and establish a coordinated approach to implementing the plan. **FEMA requires state, Tribal, and local governments to develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects.**

Many communities at risk for wildfire take an integrated planning approach and incorporate the jurisdiction's CWPP into their multi-hazard mitigation plan.

For more information and resources, visit FEMA's Hazard Mitigation Planning website, https://www.fema.gov//hazard-mitigation-planning-resources.

Codes and Ordinances

- Codes and ordinances can play a significant role in community wildfire risk reduction in communities that enact and enforce them.
- The most effective codes and ordinances are designed by the local community to meet their specific needs.
- Codes and ordinances can be a valuable part of your wildfire mitigation program. They may require a significant investment in time to develop, maintain, and enforce.
- Codes and ordinances for the wildland urban interface (WUI) will not work for everyone. Many communities will not tolerate regulations or do not have the capacity to adopt, implement, and enforce them.

Many communities, when adopting a code, begin with standard codes from the National Fire Protection Agency (NFPA) and/or the International Code Council. The codes listed below are professionally developed and can act as a starting place for locally appropriate WUI standards. Keep in mind:

- Few authorities adopt these codes and standards exactly as written; instead, most authorities having jurisdiction modify them to meet their own local needs.
- Most communities which adopt wildfire-related codes and ordinances do so after significant wildfire events.
- A common issue which arises during enforcement is the lack of maintenance of the landscape surrounding the home.
- Public engagement and programs which support residents to take the actions required by codes and ordinances support the overall success of the codes.

NFPA 1140: Standard for Wildland Fire Protection. The 1140 Standard provides the minimum requirements for protection and emergency services infrastructure in the wildland, rural, and suburban areas; wildland fire management practices and policies; methods of assessing wildland fire ignition hazards; and job performance requirements for wildland fire positions.

https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1140

*ICC 2018: International Wildland Urban Interface Code***.** This comprehensive WUI code establishes minimum regulations for land use and the built environment in designated wildland urban interface areas using prescriptive and performance-related provisions.
https://codes.iccsafe.org/content/IWUIC2018P3/effective-use-of-the-international-wildland-urban-interface-code

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Contacts

Use this table to add details about mitigation services, resources, and contact information.

Table 9: Example form for recording contact information for resources

Mitigation Service or Resource	Contact Information
Chipper Services, (Including Equipment Rental)	
Home Fire Risk Assessments	
Community Wildfire Protection Plan Website	
Forestry Contractors	
Local Brush and Leaf Collections Sites	

Use this table to add other key mitigation/community contacts.

Table 10: Example table for recording contact information for community members

Type of Contact	Contact Information (name, phone, email, mailing address, etc.)

Mitigation Guiding Principles

One size does not fit all. Adjust your strategies and tailor your approach to community demographics, needs, and values.

Table 11: Mitigation strategies

Strategies	Insights
Engagement is a Two-way Process	• It is neither completely top-down (experts providing instruction) nor bottom-up (residents seeking help). • Work to engage the whole community. Provide accessible information in the appropriate languages.
Check your Assumptions	• Barriers to mitigation vary widely. Commonly held perceptions often do not hold up to deeper scrutiny and is why interactive communication and listening is a key part of effective engagement. • Many people are doing something; do not assume they are not. Studies consistently show that residents are taking at least some action. Mitigation professionals can help evaluate the actions being taken and provide support to build on them and increase effectiveness.
Communicate in Person	• Build trust-based relationships using in person, face-to-face engagement. • The most effective way to change behavior is through Active Communication which focuses on listening to understand before seeking to be understood and occurs in person whenever possible. • When meeting with property owners, always listen first. • Seek to understand individual motivations, concerns, and needs in relation to wildfire.
Focus Where Return on Investment is Highest	• When capacity or resources are limited, prioritize where your work can have the most impact in reducing immediate and long-term risk. • While it is important to focus on the level of fire risk it is also important to be strategic and consider potential return on investment. Significant effort to minimally reduce risk in a high-risk area may have less effect than less intensive work to effectively reduce risk in a moderate area. • Incremental efforts can be a good way to acclimate people to the idea of mitigation, create a social norm of mitigation, and provide visual evidence of what effective mitigation looks like—all of which can increase mitigation behaviors.
Build Partnerships	• Partnerships are often integral to completing landscape-level work across boundaries and jurisdictions. • Make sure to consider who is not at the table that has a role in wildfire mitigation.
Make Mitigation Support Accessible to All Populations	• Communities are composed of diverse residents – those who have different languages, socio-economic backgrounds, access, and functional needs, cultural backgrounds, and more. Successful mitigation is shared by all. Work to be inclusive from planning to implementation. • While all residents share wildfire risk, its impacts are often borne disproportionately by lower-income populations.

Strategies	Insights
Leverage Resources	• Ask partners, volunteers, and residents to help with activities. They can help support home fire risk assessments, project, or mitigation event coordination, volunteer time tracking, funding, and/or equipment sharing.
Focus on Outcomes over Outputs	• An outcome is a consequence of action. • An output is the amount of something produced. • If practices (outputs) do not lead to wildfire risk reduction (outcomes), reconsider that investment.
Stay Strategic, Selective, and Flexible	• Take the time to understand your community's specific challenges and needs. Identify a range of potential mitigation activities and prioritize ones that reduce wildfire risk and meet additional community needs. Such efforts are more likely to be responded to positively. • Know when to say you do not know enough about a subject. Be honest about your ability. • For areas outside of your expertise, identify alternative individuals you can direct people to. • Learn from others. Identify aspects of successful programs and projects elsewhere that might work in your community. • Review programs annually to highlight areas of improvement. • Learn lessons and strive to do the best you can. • Adjust inefficient programs, services, or projects when outcomes are less than desired. • Allow flexibility in program design. Adjust programs as conditions and/or needs change.

The NWCG Wildland Urban Interface Mitigation Field Guide is developed and maintained by the Wildland Urban Interface Mitigation Committee (WUIMC), an entity of the National Wildfire Coordinating Group (NWCG).

Previous editions: None

While they may still contain current or useful information, previous editions are obsolete. The user of this information is responsible for confirming that they have the most up-to-date version. NWCG is the sole source for the publication.

This publication is available electronically at https://www.nwcg.gov/publications/pms053.

Printed copies may be ordered from the Great Basin Cache at the National Interagency Fire Center in Boise, Idaho. Refer to the annual *NWCG NFES Catalog – Part 2: Publications*, PMS 449-2, and ordering procedures at https://www.nwcg.gov/publications/pms449-2.

Submit comments, questions, and recommendations to the appropriate agency program manager assigned to the WUIMC using the NWCG Publication Review Form, https://www.nwcg.gov/publications/publication-review-form. View the complete roster at https://www.nwcg.gov/committee/wildland-urban-interface-mitigation-committee/roster.