Fire & Fuels Management

Southern California Adaptation Implementation Plan

Overview

During a two-day workshop in January 2016, southern California resource managers and regional stakeholders discussed fire and fuels management goals and core activities, highlighted priority climate change vulnerabilities that could affect the ability to achieve goals, and identified adaptation strategies and actions that reduced highlighted vulnerabilities. Adaptation strategies and actions identified included those currently being implemented as well as new actions prioritized for future implementation. Managers and stakeholders then developed implementation action plans for some adaptation strategies identified as future priorities.

Fire and Fuels Management Goals and Core Activities[1]

1. Restore natural fire regimes to the landscape
    a. Restore ecosystem health
    b. Prevent stand-replacing fire in montane conifer and oak woodlands
    c. Reduce fire frequency by increasing patrols, reducing fuels (focusing first on the immediate vicinity of buildings and then expanding out), engaging a fire-safe council, and increasing education/outreach activities
2. Prevent major erosion events and sedimentation that can result from stand-replacing fire
    a. Use fire prevention strategies (see above)
    b. Increase land use planning and collaboration with watershed agencies and organizations
3. Protect sensitive habitats (e.g., Big-cone Douglas fir, old growth chaparral stands)
    a. Identify high-value areas (e.g., sites that haven't burned recently, areas that burned and are now in recovery)
    b. Strategically reduce fuels in high-value areas
    c. Include information about actions and prioritized high-value areas in fire management plans
    d. Include information about sensitive habitats in the incident commander briefings given during a fire
4. Promote post-fire recovery and restoration of natural vegetation communities
5. Improve fire resilience/resistance and fire safety of communities
6. Avoid placing infrastructure in high-hazard areas by utilizing land use planning

Managers and stakeholders identified how these fire and fuels management goals and core activities may be vulnerable to climate change or other factors, and then identified potential adaptation responses. Climate and non-climate vulnerabilities and corresponding adaptation strategies and actions for these management goals are described below in Table 1.

[1] The management goals and core activities listed are not comprehensive.

Table 1. Priority vulnerabilities and associated priority adaptation responses for fire and fuels management goals.

Management Goals	Priority Vulnerabilities	Priority Adaptation Strategies & Actions

1. Restore natural fire regimes
 	
2. Improve fire resilience/ resistance and safety of communities
 	
3. Prevent major post-fire erosion and sedimentation events
	• Altered fire regimes due to increased drought, increased temperature, precipitation changes, reduced snowpack, and beetle outbreaks, all of which affect fuel and soil moisture. Altered fire regimes may lead to:
	  ○ Extended fire seasons, which may decrease likelihood of effective suppression and increase resources needed (e.g., money, contractors, firefighters, water)
	  ○ Increased fire intensity and severity (stand-replacing), which may increase erosion and decrease the likelihood of management success
	  ○ Changing definition of a 'natural fire regime' for the purposes of restoration, which would require managing for the future rather than the past
	
	Other Vulnerabilities:
	• Increasing human populations may lead to:
	  ○ More sources of ignitions
	  ○ Greater impacts from ignitions that occur, affecting community safety and the
		Strategy #1: *Reduce ignition sources, especially those close to communities*
		
		Current/Future Actions:
		• Increase or rethink recreation restrictions and guidance
		• Install k-rail barriers near major roads and high-ignition areas to stop road ignitions from spreading
		• Implement closures
		• Work with power companies to take preventative action (e.g., shut down power lines during high wind events)
		• Improve land use planning at the county level
		• Increase investments in outreach and education
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		Strategy #2: *Use fire suppression treatments, choosing treatments that will provide the greatest benefit to natural resources*
		
		Current/Future Actions:
		• Train firefighters to handle changes in fire behavior
		• Use fire hazard/risk maps to provide more real-time information on triage needed in key areas
		• Increase reliance on mechanical fuel treatments rather than prescribed fire
		• Use rapid response remote sensing to monitor ignition sources in sensitive areas
		• Increase water source development, water capacity, and access to water in multiple locations
		• Identify locations where Threatened & Endangered Species (TES) restrictions may impact water use and adjust actions as necessary
		• Educate and collaborate with others to better understand how resources may benefit from fire suppression activities
		• Increase public education on actions for individual protection from wildfire
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		Strategy #3: *Increase treatment effectiveness*

	likelihood of management success • Reduced water availability due to increased water extraction and decreased groundwater discharge. Reduced water availability may lead to: ○ Increased distance to water sources, which may affect community safety	***Current/Future Actions:*** • Improve fuelbreaks by focusing the use of limited resources in strategic locations (i.e., prioritize places that will be highly effective in the face of climate change) • Increase reliance on mechanical fuel treatments, rather than using prescribed fire • Identify a method for removing larger amounts of biomass, rather than depending on prescribed fire to remove downed biomass • Focus on removing fine fuels, and avoid using treatments that may increase these fuels • Seek alternative funding sources to support treatments • Require local landowners to treat their land in order for surrounding federal lands to be treated • Collaborate across agencies and work with community groups to increase enforcement and/or incentives for people to treat their private properties within the wildland-urban interface (WUI) • Retrofit community structures in addition to treating fuels, taking advantage of FEMA disaster grants (for example, Big Bear and Idyllwild projects) • Increase long-term maintenance of fuel treatments, and only carry out treatments that have funding/commitment for long-term maintenance --- ***Strategy #4:*** *Identify and protect sensitive, high-risk, and/or high-value sites* ***Current/Future Actions:*** • Mark these sites as places to drop retardants • Build new fire stations in key areas and make sure that resources are available • Add patrols in key areas • Map dieback to identify risk areas • Better incorporate Resource Advisors into fire treatment activities (prescribed fire, suppression) • Identify a clear goal for each site • Provide specific information about actions and locations in fire management plans (e.g., some sites may need to be burned while others should be protected for certain intervals), and update plans and site-specific information annually • Strategically reduce fuels around these areas • Ensure that Incident Commanders receive information about sensitive, high-risk, and/or

		high-value sites during a fire • Use new technologies (e.g., drones, satellite imagery) • Partner with groups (e.g., local chapters of the California Native Plant Society) or with small NGOs to 'adopt' local endemic sites --- ***Strategy #5:*** *Focus on resilience rather than restoration of a particular fire regime* ***Current/Future Actions:*** • Define resilience goals (e.g., carbon storage, native diversity, nutrient and water cycling) • Encourage acceptance of novel communities and focus on the services that they provide rather than what they used 'to be' • Restructure the fire organization to focus on the whole year rather than just gearing up for the suppression season, in order to allow more prescribed fire and restoration activities • Revisit baseline fire return intervals with the assumption that pre-European intervals may no longer be an appropriate target
Promote post-fire recovery and restoration of natural vegetation communities	• Extended drought in post-fire areas ○ Reduced ability of vegetation to recover in burned areas ○ Increased erosion, especially where vegetation fails to recover in the first or second year ○ Loss of native seed sources and reduced availability of some genetic lineages ○ Failed restoration and/or reforestation efforts, especially where different planting strategies are needed (e.g., should not replant same species) or more information is needed (e.g., need more information	***Strategy #1:*** *Learn more about erosion that occurs in burned areas where vegetation is not recovering several years later* --- ***Strategy #2:*** *Carry out restoration/recovery actions in burned areas* ***Current/Future Actions:*** • Select for hardy species (drought-, fire-, people-, and invasive-tolerant) • Promote natural regeneration instead of planting by waiting to see what comes in, thinning shrubs, and controlling invasive herbaceous plants (e.g., herbicide, targeted grazing) • Increase hardiness of plants while still in the nursery • Use targeted watering within restoration sites • Develop a list of desired species for future planting • Harvest seeds from desired species after wet winters and not only when funding is available • Ensure adequate seed storage is available and collaborate with partners to create space for desired species • Use natural features to moderate the environment for planting (e.g., using nurse plants, putting conifers beside shrubs) • Wait for wet years to plant • Use fog catchers in coastal areas

	on whether shrublands will come back)	• Research effective seed delivery strategies (e.g., seed balls) • Hedge bets by planting in multiple years, especially when plantings were unsuccessful in the first year; obtain funding to support planting in multiple years --- ***Strategy #3:*** *Coordinate post-fire recovery across jurisdictions* ***Current/Future Actions:*** • Re-establish Burned Area Emergency Response-like activities on non-Forest Service land • Build on Habitat Conservation Plan efforts (e.g. Coachella Valley) • Find examples of where collaborative fire management/recovery is working well --- ***Strategy #4:*** *Monitor local climate change impacts on the ground* --- ***Strategy #5:*** *Increase water conservation efforts* ***Current/Future Actions:*** • Increase off-site water storage • Consider ways to increase water capacity over the long-term

Adaptation Implementation Action Plan

Managers and stakeholders developed implementation action plans for some of the identified priority adaptation strategies in Table 1. These plans include a list of sequential steps needed to successfully implement the adaptation strategy, and identification of potential implementation barriers and potential solutions.

Adaptation Strategy

Incorporate climate and fire vulnerability into fire management plans; update fire management plans with climate and other stressor information.

Implementation Plan (actions listed in order of occurrence)

1. Identify and map valued resources at risk, most vulnerable sites, and high-value sites
    a. Gather fine scale spatial information and identify gaps in spatial information (FRID, climatic water deficit projections, species distribution)
2. Set clear goals for each location and site
    a. Acknowledge change and set potential trigger points for when new goals need to be developed (e.g. if conifer site converts to shrubs, may want to alter goals rather than fight to get trees back)
3. Identify actions/strategies to achieve site goals; for example:
    a. Protect key areas by reducing vulnerability of suppression activities
        i. Potentially mark areas as retardant drop sites
        ii. Build new fire stations in key locations
        iii. Add patrols in key areas
        iv. Make sure resources are available in key areas
    b. Determine risk/benefit of fire at various stages (e.g. if XX has burned within the last X years, and is sensitive to short return intervals, keep fire out for XX more years OR allow fire in areas that need it)
    c. Reduce fuels in strategic areas around these sites
        i. Rely more on mechanical treatments than fire (less constrained)
        ii. Find solutions to allow the removal of more biomass, rather than relying on prescribed fire to remove downed biomass
        iii. Seek alternative funding sources
        iv. Communicate with local land owners that they must treat their land or the Forest Service will not treat complementary public land
        v. Collaborate across agencies and work with community groups to increase enforcement and/or incentives for people to treat their own land within the WUI
        vi. Retrofit community structures to better tie with vegetation treatments because one is not effective without other; take advance of FEMA disaster grants
        vii. Focus on fine fuels and avoid treatments that increase fine fuel components

viii. Increase long-term maintenance of any treatment, and only implement treatments that have commitment/funding for long-term maintenance

4. Get specific information about actions and locations into annual plan updates
    a. Have USFS staff populate Wildland Fire Decision Support System (WFDSS) during annual data call
5. Ensure that specific information about actions and locations is then included in the information given to firefighters and advisors on any given fire in any given location; train firefighters to benefit these particular resources
    a. Prepare/train fire fighters for very different fire behavior
    b. Use appropriate suppression response tactics to enhance benefits to natural resources (especially in sites identified above)
    c. Collaborate (and educate collaborators) to better understand how resources benefit from suppression activities
    d. Engage in water source planning and preparation
        i. Increase water source development, water capacity, and access to water in many spots, especially in high-risk or high-value sites
        ii. Identify where TES restrictions will impact water use and the best ways to adjust
    e. Use rapid response remote sensing monitoring for ignition sources in sensitive areas
    f. Increase the real-time component of fire hazard/risk maps to provide immediate information to firefighters on triage needed in key areas

Challenges/Barriers to Implementation and Possible Solutions

- Challenges: Scale (need fine scale information), uncertainty, public and institutional support, funding, lack of monitoring, lack of understanding of larger resource context by firefighters, not getting invited to the WFDSS/plan update meetings, cross-jurisdictional activities (e.g., activities on state and private lands), poor data storage and communication across agencies
    - *Solution*: Garner/Facilitate public support through collaborative projects (e.g. agencies involved in Natural Community Conservation Planning (NCCP))
    - *Solution*: Change institutional/operational mind-frame to incorporate information before or during the fire
        - Train fire staff
        - Train resource staff in fire activities, and better incorporate resource advisors in fire activities
        - Incorporate local knowledge of fire staff (i.e., people that may have had many experiences in any area)
        - Adjust fire organizational structure so that they don't 'staff up' right before fire, but have various priorities throughout the year
    - *Solution*: Establish institutional monitoring requirements/efforts that are not one-offs and are incorporated into ongoing efforts where possible
        - Incorporate ongoing long-term, large scale monitoring (e.g., FIA monitoring); collect information on microsites (e.g. soil moisture) and

collect land facet information to help determine which areas may be climate refugia or connectivity areas
        - Add more FIA plots in shrubland sites
    - *Solution:* Facilitate cross-jurisdictional collaboration to get data and vulnerability information into the hands of other land managers
        - Gather organizations together for resource pre-planning communication (e.g., counties, Cal Fire, USFS)
        - Update databases
    - *Solution*: Work with USFS State & Private liaisons to help institutionalize some of these concepts in non-land management agencies/organizations