

2.9 Fire Ecology & Management

Current Setting

Fire is a natural and historical component of ecological processes in Garfield County. Historically, fire has played an important role in the promotion of plant succession and the development of plant communities and wildlife habitat. The environment created prior to European settlement was developed under a regime of natural and man-induced intermittent fire. Artificial suppression of fire during the past century combined with several decades of passive federal land management have changed plant communities and resulted in conditions that are often incapable of resilience from and resistance to fire. These conditions have led to an imbalance in fire adapted plant and animal communities and an increase in extreme wildfire potential. Management on public lands has resulted in vegetation and fuel loadings that support uncharacteristically large, catastrophic fires. Complicating management further, fire susceptibility and behavior vary with many factors, including vegetation type, topography, stand health/density, drought, wind, and site productivity.

Garfield County's fire management program focuses on two general categories of fire: unplanned ignitions (wildfires) and planned ignitions (prescribed fires). In the western portion of the County (west of Capitol Reef National Park), fire and fuels management activities, including planned and unplanned ignitions, are managed in accordance with the Southwest Utah Support Area Fire Management Plan. Capitol Reef National Park and areas to the east are managed by the Central Utah Fire Management Plan. The fire management plans (FMPs) were prepared in response to the Federal Wildland Fire Management Policy, which directs federal agencies to have an FMP for all areas with burnable vegetation.

National fire management policy has evolved in response to increased fatalities, property losses, local economic disruptions, risks to ecosystems associated with increasingly severe wildland fires, and increasing wildland urban interface (WUI) conflicts. National policy requires that federal fire management practices reflect protection of human life and safety and reduce risk to natural resources and private property. This section of Garfield County's Resource Management Plan provides fire management direction that is compliant with national and interagency direction.

Garfield County's fire management program requires coordination among local and regional jurisdictions, including the BLM, Forest Service, National Park Service, and Utah Department of Forestry, Fire and State Lands. The FMPs, in accordance with federal policy, provide for firefighter and public safety and include fire management strategies, tactics, and alternatives based on direction outlined in RMPs. Suppression tactics outlined in the FMPs vary by vegetation type and resource values at risk. Land use management direction influenced portions of the FMP that include lands managed by the various state and federal agencies. A vast majority of the land in Garfield County is under federal ownership, so details regarding methodologies for prescribed fires, non-fire fuels treatment, community assistance/protection procedures, emergency stabilization, and rehabilitation for federal lands are applicable to federal agencies.

National and state fire policy for federal agencies requires current and desired resource conditions related to fire management be described in terms of five fire regimes and three condition classes tabulated below. The Healthy Forest Restoration Act adopted this classification system, known as the Fire Regime Condition Class (FRCC), which describes the amount of departure of an area or landscape from historic vegetation conditions to present vegetation conditions. This departure from the natural state can be a result of changes in one or more ecosystem processes. This information can be used to prioritize areas for treatment.

Fire Regimes
I (0-35 year frequency and low to mixed severity-surface fires most common)
II (0-35 year frequency and high severity-stand replacement fires)
III (35-100+ year frequency and mixed severity)
IV (35-100+ year frequency and high severity-stand replacement fires)
V (200+ year frequency and high severity-stand replacement fires)

Fire Regime Condition Classes defined vegetative communities in terms of the relative risk of losing one or more key components that define an ecological system based on five ecosystem attributes—disturbance regimes (patterns and frequency of insect, disease, fire), disturbance agents, smoke production, hydrologic function (sedimentation, stream flow), and vegetation attributes (composition, structure, and resilience to disturbance agents). Condition Classes are described as follows:

Condition	Condition Class Description
Condition Class 1	Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range. Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.
Condition Class 2	Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. Where appropriate, these areas may need moderate levels of restoration treatments, such as fire use and hand or mechanical treatments, to be restored to the historical fire regime.
Condition Class 3	Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. Where appropriate, these areas may need high levels of restoration treatments, such as hand or mechanical treatments, before fire can be used to restore the historical

Lands classified as Condition Class 1 have the smallest amount of acres in Garfield County. Some estimates indicate fire regimes within the historical range make up less than 5% to 10% of all lands in the County, and some agencies may have less than 2% within their specific jurisdiction. Class 2 lands are estimated to be 10% to 20% of the County's land base. Lands identified as Condition Class 3 make up the vast majority of lands in Garfield County. Some estimates indicate lands where fire has been significantly altered from the historic condition comprise as much as 60% to 90% of the County.

Federal agencies have also divided the County into fire management units (FMUs) defined by fire management objectives, management constraints, topographic features, access, values to protect, political boundaries, and fuel types. The FMUs generally have prescribed management objectives and preselected fire suppression strategies assigned to accomplish the specific objectives.

Fuel structure in the County is gradually changing due to management practices and incursion of non-native annual grasses, especially cheatgrass, and the encroachment of pinyon/juniper woodlands. In areas where fuels are continuous, there is the potential for fires to spread readily and rapidly during the height of the average fire season. Much of this area is grouped typically in fire regimes I and II, but many of the pinyon and juniper stands have much older stand characteristics, which often have heavier fuel accumulations and burn with stand replacement fire behavior. Many areas exist where sparse fuels and other natural barriers limit the spread of wildfires. Most are dry sites where the vegetation is of a moderate to old age class distribution. In specific locations, cheatgrass has significantly increased from historically inhabiting scattered pockets to becoming a dominant fine fuel component intermixed with sagebrush and pinyon-juniper stands.

The moderate to long return fire interval, fire exclusion and other management practices, and passive management of forests and rangelands have rendered many of the vegetative communities in peril of large severe wildland fires. These areas have achieved a level of vegetation stocking and dead and down fuel loads to exacerbate large fire spread through the dry seasons of the year. Recent insect and wind episodes have also increased fuel loadings in localized areas to critical levels.

The hazard component varies across the County from very low to very high. Mature stands of pinyon/juniper woodlands inhabit much of the lands formerly occupied by sagebrush vegetative communities. Decadent stands of sagebrush are common. Insect-killed Spruce stands also contribute to high hazard areas.

Historically, the most prolific wildfire events have been wind-driven, especially in the brush plant cover types. Plume-dominated fires have occurred particularly during very dry years in the older stands of pinyon-juniper and the mixed conifer stands. Rates of fire spread through the canopies of sagebrush can exceed three miles per hour, while spread through mixed conifer and pinyon-juniper stands of one-half mile per hour are not uncommon. Periods of better than average moisture tend to keep the light fuels (i.e., grasses) green, which helps curtail fire progression. The incursion of annual grasses, such as cheatgrass, is changing the fire environment. Light fuels available to burn through the height of the fire season are becoming

more abundant by way of the species morphology. Much of the timbered lands in the County experience long return intervals between fire events. Burn severity in these communities tends to be moderate to severe resulting in stand replacement of the dominant species. Examples of these vegetation types are high elevation sub-alpine fir and spruce and some pinyon-juniper stands. Examples of a more moderate to frequent return interval would be sage/grasslands and the lower elevation shrub communities.

Wildfire in many of Utah's vegetation communities was historically a regular occurrence that helped define species composition, structure, and productivity. As such, many plants that make up these communities are adapted to withstand wildland fire. Grasslands, sagebrush, mountain shrub, aspen and mixed conifer forests are examples of fire-adapted communities in Utah. In contrast, frequent wildland fire is not part of the normal ecology of other vegetation communities with long fire return intervals such as salt desert scrub and blackbrush, which typically are not dominated by fire adapted species. Fire in these communities is generally viewed as detrimental because plant succession may take decades to centuries for the vegetation to recover. Some species may never recuperate.

The widespread presence of invasive nonnative species has greatly altered the resource character and values across the landscape and may pose an even greater threat in the future. Historic post-fire recovery processes may no longer dominate the recovery and regeneration process due to introduced species. Cheatgrass and some of the knapweeds are known to alter (shorten) fire return intervals and may dramatically expand their range and coverage after fires. Degraded communities may facilitate expansion of invasive species (e.g., cheatgrass), have lower biological resource values, and pose increased fire hazards. For location of acres and additional descriptions of these vegetation types in the planning area, refer to agency specific fire management documents.

Land management agencies use planned ignitions (prescribed fires) in a controlled manner for specific purposes, such as improving habitat, plant community health, including protection and enhancement of desirable age class stands, and reducing hazardous fuels. Projects in agency fuels programs generally focus on achieving two goals: (1) reducing fire hazard, with an emphasis on Wildland Urban Interface (WUI) areas, and (2) restoring and/or improving FRCC. These goals supported through interdisciplinary partnerships such as the Utah Watershed Restoration Initiative (UWRI). Together, these partnerships identify priority watersheds to address a variety of interdependent resource issues and improve long-term watershed conservation and restoration.

Specific watersheds are targeted and prioritized for treatment and are coordinated through participating federal, state and local entities. Treatment types include prescribed fire and mechanical and chemical treatments. These treatments are completed for a variety of reasons, including fuels reduction, protecting WUI areas, improving wildlife habitat, improving watershed conditions, and improving rangeland resources. Prescribed burns, if conducted properly, will also return less carbon dioxide to the atmosphere than uncontrolled wildfires, which helps to maintain the carbon dioxide sequestration capacity of vegetation communities.

Most prescribed fire projects on public lands in the planning area are closely tied to habitat, watershed, and other natural-resource objectives, and hazardous fuels reduction. These projects are almost always followed by seeding/planting and additional vegetation enhancement work. Prescribed burns are carried out to reduce fuel loads (existing dead and dormant vegetation) and reduce the threat and severity from wildfires should one occur. Prescribed burns also reduce woody plant encroachment and are beneficial for many native plant species in a way mechanical and chemical management treatments cannot duplicate. Wildlife, both game and nongame species, also benefit from prescribed burning which results in new plant growth and restoration of habitats which they utilize for food and cover. Purposes for conducting prescribed burn activities may include

- Reduce hazardous fuels, protect communities from wildfires
- Reduce the spread of pests and disease
- Provide habitat and forage for game and nongame species
- Recycle nutrients back into the soil
- Promote desirable native and non-native species
- Promote a diverse natural landscape

Drivers for future increases in wildland fires in the County include steady increases in live and dead fuels, continued encroachment of invasive annual grasses and conifer woodlands into sagebrush and native grass areas, and unfavorable climatic conditions. Indicators of stress on vegetation in the planning area include periods of drought, expansion of invasive weeds such as cheatgrass, and reduced areas of sagebrush presence.

Fire frequency and fire severity are expected to be higher than historical levels because most of the County is in FRCC 2 and FRCC 3 condition. It is expected that due to the current fire regime conditions in the County and factors affecting wildfires (e.g., invasive weed control, vegetation management issues, drought, and timber harvest), FRCC categories will be maintained at or in excess of their current conditions. Based on current management, prolonged drought conditions and establishment of invasive species, the potential for uncharacteristic wildfire effects will likely continue. It is also anticipated that under present management, live and dead fuel loadings in forest stands and conifer/juniper encroachment into aspen and higher-elevation sagebrush communities will continue to increase with a proportional increase in the risk for wildfires with potentially uncharacteristic fire effects.

Need for Management Change

- 1) Lands in in FRCC 2 and FRCC 3 condition need to be significantly reduced.
- 2) Prescribed fire needs to be used as part of an integrated approach after mechanical, chemical, grazing, and vegetative harvesting techniques have been appropriately used.
- 3) Managers need to harvest an average of at least 8 million board feet annually for the next 20 years to restore woodlands to desirable Fire Regime Condition Classes.

- 4) Managers need to implement aggressive vegetative treatments to restore vegetative resources to desirable Fire Regime Condition Classes.
- 5) When managing for potential climate change, managers need to reduce areas in FRCC 3 by at least 5% annually.
- 6) Managers need to be consistent with Garfield County's fire ecology and management plans, programs and policies, including air, water quality, vegetation and other impacted resources. Land managers need to coordinate wildfire management and prescribed fire programs with Garfield County.
- 7) Managers need to reduce fire hazards for WUI areas and around other infrastructure through non-fire fuel treatments prior to implementing prescribed fire.
- 8) Effective emergency stabilization and rehabilitation programs need to be incorporated in all wildland and prescribed fire events.

Desired Future Conditions

Garfield County desires:

- a) Resources are managed to ensure fire resilience and resistance. Desired FRCCs in Garfield County are: 30% to 50% FRCC1; 30% to 40% FRCC2; and less than 25% FRCC3.
- b) Prescribed fire is used as part of an integrated approach after mechanical, chemical, grazing, and vegetative harvesting techniques have been appropriately implemented.
- c) An average of at least 8 million board feet are harvested annually for the next 20 years to restore woodlands to desirable Fire Regime Condition Classes.
- d) Managers implement aggressive vegetative treatments to restore vegetative resources to desirable Fire Regime Condition Classes.
- e) Areas identified as FRCC3 and managed for potential climate change are reduced by at least 5% annually.
- f) Managers are consistent with the County's plans, policies and programs for fire ecology and management and impacted/related resource values.
- g) Managers prevent fire related impacts to WUI areas and other areas occupied by infrastructure.
- h) Aggressive and effective emergency stabilization and rehabilitation programs are incorporated in all wildland and prescribed fire events.

Finding Policy, Goals & Objectives

Policy: Public health, safety and welfare and firefighter safety are compatible, co-equal priorities for wildland and prescribed fire management in Garfield County. All fire management plans and activities shall maximize a) public health, safety and welfare and b) firefighter safety.

Finding: Land managers have failed to actively manage resources in Garfield County to provide resilience and resistance to wildfire.

Finding: Wildfires impact a wide variety of the County's resources and can be reasonably controlled by implementing an integrated approach of mechanical, chemical, grazing, and harvesting techniques to provide resilience and resistance to wildfire.

Policy, Goal & Objective: Managers shall maintain resources in a condition that they are resilient and resistant to fire, including rehabilitation and restoration efforts undertaken to protect and sustain ecosystems, public health and safety, and to protect infrastructure.

Policy, Goal & Objective: Consistent with the County's plans, policies and programs for fire ecology and management and impacted/related resource values, land managers shall implement an aggressive integrated program to ensure all lands in Garfield County are resilient and resistant to fire and to restore woodlands to desirable Fire Regime Condition Classes.

Policy: Lands in Garfield County will be deemed to be making progress toward resilience and resistance when the following ranges for Fire Regime Condition Classes are met:

FRCC 1	30% to 50%
FRCC2	30% to 40%
FRCC3	Less than 25%

Finding & Policy: Positive impacts of wildland fire can be mimicked through integrated mechanical, chemical, grazing, and harvesting techniques that provide resilience and resistance to wildfire.

Policy: Where fire is used to as an ecological process and natural change agent lands will be seeded and restored to desirable vegetative conditions prior to the first rainy season following the burn.

Policy, Goal & Objective: An average of at least 8 million board feet shall be harvested annually in Garfield County for the next 20 years to restore woodlands to desirable Fire Regime Condition Classes.

Finding & Policy: Allowing lands to remain in FRCC3 is inconsistent with managing for potential climate change. Where land managers are required to manage for potential climate change, FRCC3 lands in their jurisdiction shall be reduced by at least 5% annually.

Policy, Goal & Objective: Based on a 10 year rolling average and consistent with desired ecological site descriptions, at least 25% of the Class II and Class III pinyon/juniper woodlands having a median age of less than 200 years shall be restored to sagebrush / semi-desert grassland vegetation communities.

Finding & Policy: Bull hogging, accompanied by appropriate seeding, is the environmentally preferred method of vegetative treatment in Class II and Class III pinyon juniper woodlands. Bull hogging and seeding shall be prioritized over use of fire in restoring Class II and Class III pinyon juniper woodlands to desirable vegetative communities.

Policy: Prescribed fire is most judiciously used after thinning, harvesting, mechanical mastication, and other treatment techniques are completed.

Policy, Goal & Objective: Aggressive and effective emergency stabilization and rehabilitation programs shall be incorporated in all wildland and prescribed fire events.

Policy, Goal & Objective: Unless otherwise approved by Garfield County and consistent with ecologic site conditions, the following minimum objectives are established when lands are treated with prescribed fire or experience wildland fire in sagebrush habitats:

1. Retain 40 percent ground cover after the burn with recruitment to 60 percent ground cover before the first rainy season following the burn.
2. Cupped fire lines should have water gaps every 20 feet to allow captured water to exit.
3. Existing disturbance areas, such as roads and trails, should be used as fire lines to the greatest extent possible.

Policy: Land managers shall prevent fire related impacts to WUI areas and other areas occupied by infrastructure.

Finding & Policy: All wildland and prescribed fires impact air quality. Prior to wildland or prescribed fire, land managers shall analyze and disclose ambient and proposed air quality conditions, including BACTs that can be implemented to reduce air quality impacts.

Policy: Land managers shall initiate BACTs, including commercial harvesting of excess fuels and other methods for reducing potential fire related air pollutants and for achieving harmony between man and his environment.

Policy: Managers of wildland and prescribed fire shall comply with Garfield County Air quality plans, policies, programs and ordinances.

Policy: Garfield County will cooperated and coordinate with federal, state and local entities to address barriers and challenges associated with fire and fuels management in areas impacting the County's resources.

Finding & Policy: Restoration of a natural fire regime is neither desirable nor attainable. As a result of past management and the extent of vegetative ecosystem alteration, natural conditions

no longer exist in the County. While it is known that there have been large vegetation alterations since historical times, the extent or severity of most of these alterations remains uncertain. As a result of ecosystem change, passive restoration techniques, such as restoring naturally occurring fires to the land, would not have the same benefit to ecosystems as in the past. Without active restoration techniques, fires dramatically increase resource damage which could result in the permanent loss of historical ecosystem structure and function.

Finding & Policy: The principles and policies in this plan provide an optimum approach to wildland and prescribed fire management on federal, state and local lands. Managers are encouraged to use fire as a tool for accomplishing resource management objectives after other integrated management techniques have been exhausted. Consistent with public health and ecologic processes, agencies are encouraged to emphasize active, integrated resource management over passive fire suppression.

Policy, Goal & Objective: Land managers shall incorporate emergency stabilization and burned-area rehabilitation as part of a holistic approach to addressing post wildland and prescribed fire impacts and shall include suppression activity damage and long term restoration. Emergency stabilization shall be completed 1 year of wildland fire containment. Short-term actions shall minimize and mitigate threats to life or property, and stabilize/prevent unacceptable degradation to natural and cultural resources resulting from the effects of fire. Burned area rehabilitation to repair or improve damaged lands to acceptable conditions or to repair or replace facilities damaged by fire shall be completed within 3 years the fire event.

Policy: The use of fire in priority, crucial, and general wildlife habitat shall be allowed when compatible with protection, maintenance, enhancement, or development of desirable habitat conditions.

Finding & Policy: Fire is often a destructive force that impacts sensitive species. The use of motorized vehicles to construct fire lines and control fire in habitat for special status plant and animal species is allowed.

Policy: Low intensity ground fires from natural or management ignitions in ponderosa pine or aspen stands are allowed.

Policy: The full range of upland vegetation treatment methods and tools (i.e. chaining, plowing, bull hog, pipe harrow, hand cutting, herbicide, aerial seeding, drill seeding, and broadcast seeding) are encouraged and allowed prior to the use of prescribed fire in vegetative treatment and enhancement projects.

Policy: The use of native and non-native seeds for fuels management treatment shall be based on availability, adaptation (site potential), and probability of success. Desirable non-native seeds may be used to meet Sage Grouse habitat objectives. When reseeding, use fire resistant native and desirable non-native species for fire breaks is allowed.

Policy: Where land managers implement an integrated approach using the full range of upland treatment methods, prescribed burning shall be allowed on all suitable lands up to 20% of the lands within the manager's jurisdiction.

Policy: In Sage Grouse management areas, post burn stabilization and rehabilitation shall be completed within two growing seasons. Changes in livestock grazing shall be limited to two full growing seasons or less.

Policy: Greater Sage Grouse Landscape Wildland Fire and Invasive Species Habitat Assessments shall be developed in cooperation and coordination with Garfield County and shall be consistent with the County's RMP to the maximum extent allowed by law.

Finding & Policy: Garfield County's plan program and policy for wildland and prescribed fire provides the highest and best management across agency boundaries. Annual treatment needs for wildfire and invasive species management as identified in local unit level Landscape Wildfire and Invasive Species Assessments shall be coordinated across jurisdictional boundaries and shall be consistent with Garfield County's RMP.

Finding & Policy: Lands impacted by wildland fire no longer retain desirable qualities of naturalness, solitude, or opportunities for primitive, unconfined recreation and no longer exhibit wilderness characteristics. Lands impacted by natural fire shall not be managed for wilderness values until such time as native vegetative communities consistent with ecologic site descriptions are restored and the visual effects of fire are eliminated.

Finding & Policy: Post fire restoration and rehabilitation of lands managed for wilderness character is prioritized over management for wilderness values that have been impaired due to wildfire. Use of vehicles, motorized tools and other restoration and rehabilitation techniques that optimize recovery of desirable vegetative communities and eliminate the visual effects of fire shall be allowed in areas managed for wilderness characteristics.

Finding & Policy: Lands managed for wilderness values that have been impacted by wildfire are impaired and no longer qualify for wilderness management until such time as the ecologic and visual impacts of the fire event are eliminated.

References:

Southern Utah Support Area Fire Management Plan Environmental Impact Statement, UT-040-04-054, United States Department of the Interior, Bureau of Land Management, November 2005

Central Utah Interagency Fire Management Plan, Fishlake National Forest, Richfield BLM Field Office, Fillmore BLM Field Office, 2010

Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach, Chambers et al., September 2014