

Fire and Fuels Management Contributions to Sage-Grouse Conservation

A Status Report



WAFWA Wildfire and Invasive Species Initiative Working Group.

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USFWS Conservation Objectives Team Report (2013) Objective:

“The long-term conservation goal for sage-grouse and healthy sagebrush shrub and native perennial grass and forb communities is to maintain viable, connected, and well-distributed populations and habitat across their range, through threat amelioration, conservation of key habitats, and restoration activities.”

U.S. Fish and Wildlife Service. 2013. Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February 2013





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Executive Overview

Within big sagebrush (*Artemisia tridentata*) communities, expansion of invasive plants and changes in wildfire patterns have emerged as the greatest threat to sage-grouse habitats, particularly in the western part of its range. Feedback cycles between invasive species and large intense wildfires effectively fragment habitats, reduce sagebrush cover, and create fire-prone landscape conditions detrimental to sage-grouse. In response to this threat, numerous efforts to respond to wildland fires and manage vegetation are underway, with an overarching intent of conserving sage-grouse and their habitats. This report, developed by the Western Association of Fish and Wildlife Agencies (WAFWA), Wildfire and Invasive Species Initiative Working Group (Working Group), summarizes the current state of Fire Operations and Fuels management functions. While other status reports have been completed, there has been no synthesis of the fire and fuels management programs at the private, local, state, and federal agency scales. The intent of this report is to illustrate the type and responsiveness of efforts being made. Finally, the report concludes by presenting future options and a series of recommendations that may inform future policy and allocation decisions.

Drivers of Report

This report is driven by the need among wildlife management and regulatory agencies for an explanation of the decision-making and allocation processes in wildland fire management, including hazardous fuels management programs. Specifically, the WAFWA Working Group was requested by the U.S. Fish and Wildlife Service (USFWS) to evaluate and explain how sage-grouse and their habitats are included in fire management prioritization, real-time resource allocations, and project development.

Organization of Report

This report is divided into seven sections. The introduction provides the background of the issue and scope of the document. The second and third sections describe the current state of the Federal and State programs, respectively. The fourth section describes efforts taking place at local scales, often involving partnerships between local agencies and private landowners. The fifth section concludes with practices that hold promise, opportunities, barriers, and additional considerations that may be useful in future policy and infrastructure decisions. The sixth section presents recommendations related to policy, funding, and science and technology. The final section contains appendices.





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I Introduction

Wildland fire management, as it pertains to sage-grouse conservation, is a collaborative effort that involves agencies and participants at all levels of government. Because fire knows no political boundaries, its management in the United States is a coordinated effort among federal, state, tribal and local agencies through the National Interagency Fire Center (NIFC), National Interagency Coordination Center (NICC), and the National Wildfire Coordinating Group (NWCG). While land management and fire management objectives vary among agencies and across governmental levels, there are consistent standards, coordination, and agreements that enable all agencies to work together to provide the most effective and efficient response to wildfire regardless of location and land ownership. Federal agencies play a lead role in the coordination of these practices, while state and local agencies are key cooperators and play a coordinated role across the range of sage-grouse. For this document, wildland fire management is referred to as **fire management**, and meant to include preparedness activities, fire operations, and all related logistical coordination. **Fuels management** is defined as those practices intended to modify fire behavior, improve ecological condition, or augment fire suppression efforts. Examples of fuels management practices include prescribed burning, mechanical, chemical, and biological treatments. The explanation of federal, state, and local fire/fuels management programs will be necessarily broad to convey the many interconnected components. Federal

programs are specific to the Bureau of Land Management (BLM), U.S. Forest Service (USFS), USFWS, Bureau of Indian Affairs (BIA), and National Park Service (NPS). While emergency stabilization and rehabilitation (ESR) and burned area emergency rehabilitation (BAER) are key elements of habitat restoration, they are not covered in this report.

[Recent Wildfire Trends and Occurrence](#)

As identified in the 2013 COT report, large fires in sagebrush habitats pose a daunting challenge to land managers. In the past 15 years, the interplay of annual invasive plants, multiple fire ignitions, and climatic extremes have resulted in large-scale habitat losses. Arranged in descending order based on acreage, the largest fires in sage-grouse habitat in the past decade are illustrated below and further described in Murphy et al. (2013). Fire seasons in the west vary greatly year to year, strongly influenced by trends in weather patterns. Large fires typically occur during strong winds (often associated with cold front passage) coinciding with high, flashy fuel loading, multiple fire starts from lightning, and where topography or remoteness slows initial attack (source: John Glenn, BLM Fire Operations Division Chief). Between 1992 and 2012, 33,782 fires occurred in sage-grouse habitat (defined as priority and general habitats). During this time, 97% (32,601) of fires were less than 1,000 acres and 242 (less than 1%) were greater than 10,000 acres. Within the last decade (2005 through 2014), 8,028 fires burned on priority and general habitats.



Of these, 5,760 were lightning caused (72%), and 2,268 were human caused (28%). Fires caused by power lines, vehicles, and equipment use (welding, cutting torches, chainsaws, etc.) were

the most common human ignition sources, followed by railroad fires, warming/cooking fires, agricultural/debris burning, and fireworks.

Fire Name	Acres	Fire Year	State
Murphy Complex	590,808	2007	Idaho
Long Draw	582,707	2012	Oregon
Holloway	461,088	2012	Nevada, Oregon
Buzzard Complex	395,349	2014	Oregon
Milford Flat	356,664	2007	Utah
Rush	315,510	2012	California
Long Butte	306,171	2010	Idaho
Southeastern Montana Complex	248,744	2012	Montana
Winters	238,649	2006	Nevada
Winecup Complex	234,413	2007	Nevada
Crysta	220,052	2006	Idaho
Kinyon Road	210,939	2012	Idaho
Derby	208,771	2006	Montana

Table 1 Largest wildfires in or adjacent to greater sage-grouse habitats, 2006-2014 (source: USGS fire perimeter database).

Fire seasons in the west vary greatly year to year, strongly influenced by trends in weather patterns. Large fires typically occur during strong winds (often associated with cold front passage) coinciding with high, flashy fuel loading, multiple fire starts from lightning, and where topography or remoteness slows initial attack (source: John Glenn, BLM Fire Operations Division Chief). Between 1992 and 2012, 33,782 fires occurred in sage-grouse habitat (defined as priority and general habitats). During this time, 97% (32,601) of fires were less than 1,000 acres and 242 (less than 1%) were greater than 10,000 acres. Within

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The table below illustrates the distribution of fire size classes in sage-grouse habitat (1992-2012).



Fire Occurrence in Sage-Grouse Habitat (all causes)							
Fire Size (Acres)	< 1 acre	< 10 acres	< 100 acres	< 1K acres	<10 K acres	>10 K acres	All Fires
# of fires	17,838	26,580	30,399	32,601	33,540	242	33,782
% of all fires	53%	79%	90%	97%	99%	.7%	100%

Table 2 Fire occurrence in greater sage-grouse habitats, 2006-2014 (source: USGS GeoMac fire perimeter database).

*Sage-Grouse habitat data source: Data submitted by states with sage-grouse habitat and compiled by National Interagency Fire Center.

*Fire occurrence data source: Short, Karen C. 2014. Spatial wildfire occurrence data for the United States, 1992-2012 [FPA_FOD_20140428]. 2nd Edition. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. <http://dx.doi.org/10.2737/RDS-2013-0009.2>

Today's Situation: What does this fire trend mean?

Several conclusions can be drawn from the raw data. First, effective initial attack keeps over 99% of wildfires at less than 10,000 acres. Given the extreme burning conditions which fire managers face, this is a commendable achievement. At the same time, any management actions done before the fire which can eliminate even one “mega-fire” is a valuable investment. While there is little room to further improve the initial attack effectiveness, certain pro-active measures may compliment suppression efforts and potentially result in fewer large fires.

II. Federal Fire and Fuels Management Programs

Federal land management agencies are responsible for all aspects of fire on federal lands as well as for leading the coordination of response to all wildfires in the country that require resources beyond local and regional capabilities, regardless of land ownership. Additionally, the federal government can draw upon or support international fire management resources. To support the goal of managing fire at the lowest jurisdictional level, yet ensure adequate resources are available, fire management is organized in a tiered structure from the local unit to the Geographic Area Coordination Centers (GACC), to the National Interagency Coordination Center

(NICC). Federal agencies assess fire potential in relation to values at risk, such as homes, communities, and natural resources, to determine how to initially position assets across the country to reduce risk and to be prepared for response. As conditions change, these assets can be repositioned to where fire potential is greatest.

Wildfire management has leveraged science and technology to develop a broad suite of fire behavior, fire risk, and fire potential models. These tools are applied by fire managers to inform actions before, during and after wildfire. All federal agencies have land management plans



describing management objectives or desired conditions for a defined area. Fire and fuels program goals tier off of land management objectives. Before the fire season, climatology data is updated, seasonal outlooks are generated, and pre-season training is completed, which includes fire management considerations in sage-grouse habitat (see best management practices, Appendix B). Once a wildfire starts on a unit, the response reflects pre-identified values such as GRSG habitats, infrastructure, or wildland-urban interface. If a unit is unable to meet their objectives with their assets, they can request assistance from other units, agencies, or through the Geographic Area Coordination Center. If sufficient assets are unavailable, they are requested through the National Interagency Coordination Center. In the few instances when fire management needs outstrip resources nationally, resources are allocated based on the values at risk and probability of success. In summary, sage-grouse habitat is but one of myriad values considered in these decisions.

The National Cohesive Wildland Fire Management Strategy (Cohesive Strategy)

This initiative, finalized in 2014, lays the broad framework for fire and fuels management in the years ahead. The Strategy establishes key goals and regional action plans which are specific to the area of interest. All greater sage-grouse habitat falls within the “western” region identified in the strategy. Key cohesive strategy goals include:

- Restore and maintain landscapes:** Landscapes across all jurisdictions will be managed for resilience to fire-related disturbances in accordance with management objectives. Corresponding resource functions include fuels

management, forestry, restoration/rehabilitation, and other vegetation management programs.

- Fire-adapted communities:** Human populations and infrastructure are prepared to withstand a wildfire without loss of life and property. (Communities here are defined as human population locations rather than vegetative communities). Corresponding resource functions include preparedness, mitigation, education, and fire prevention.
- Wildfire response:** All jurisdictions actively participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

Further information on the Cohesive Strategy is available at: www.forestsandrangelands.gov.

Land Use and Fire Management Plans

Fire management response among Federal agencies is pre-planned, coordinated, and guided by Land Use Plans (LUPs), Fire Management Plans (FMPs), and local operational plans. Land Use Plans provide overarching goals and objectives for federal agencies. This guidance may include subdividing a jurisdiction into smaller landscapes, such as management areas, management prescription categories, or other polygons. Unique fire and fuels management guidance within these polygons is further refined in agency Fire Management Plans. The *2009 Guidance for Implementation of Federal Wildland Fire Management Policy* directs all federal units with burnable vegetation to develop Fire Management Plans that refine broad land use plan guidance into specific management actions for the Fire Operations and Fuels Management functions. FMPs identify areas having unique management



guidance related to habitat protection, equipment use, appropriate suppression tactics, planned fuels accomplishments, and desired conditions. An example of guidance might include protection measures for highly valued habitats, heavy equipment constraints, guidance for burning out during fire operations, mitigation efforts to protect leks, or other measures specific to that area. Increasingly, agencies are moving to spatial fire management plans that rely on geospatial data and fewer text documents to convey fire and fuels management guidance. FMP guidance is further refined into operational plans at the local unit level. Information from FMPs is translated to specific, operational guidance to fire suppression resources, dispatch centers, and related support staff. Examples of local operational guidance would include dispatch procedures during multiple-start days, staffing of outstations, local

best management practices, lek locations, and duty officer assignments.

[Process for Fire Operations Coordination and Prioritization](#)

At all times, firefighter and public safety is the overriding tenet for fire operations. Beyond that absolute, the decision framework driving fire operations is highly complex, and driven by values at risk, budget, availability of firefighting resources, and numerous political factors. This complexity is amplified when firefighting resources are scarce, values are threatened, and significant risk to human life or property is involved. The entities described in this section each play a role in real-time decision-making related to the deployment and management of wildfires. Where applicable, the relevance of these entities related to sage-grouse is noted at the end of each section in a text box.

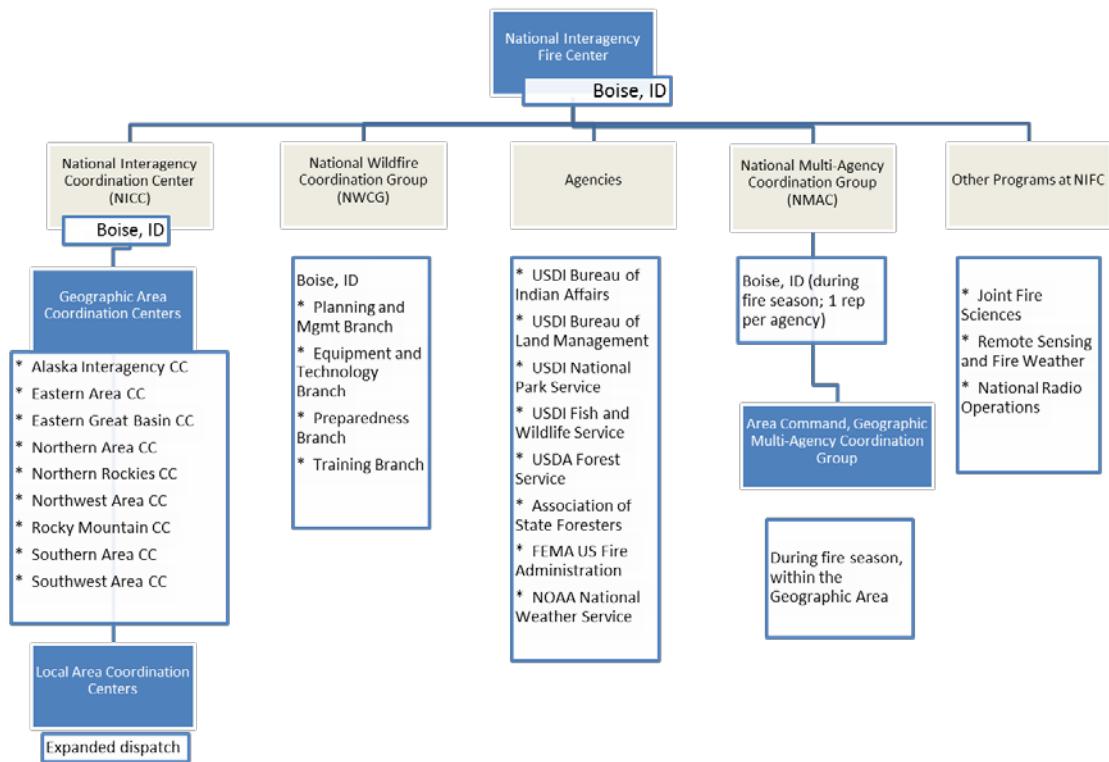


Figure 1 Structure of the National Interagency Fires Center, Boise, Idaho and related fire operations groups.

National Interagency Fire Center

The National Interagency Fire Center, located in Boise, Idaho, serves as the centralized location for coordination of wildland fire management across the United States (see <http://www.nifc.gov/>).

Eight different agencies are represented at NIFC. All facets of fire management such as budget, policy, operations, fuels, training, decision support, resource allocation, supply, logistics, and communication are represented at the fire center.

How does NIFC affect sage-grouse?

As the focal point for coordinating the national mobilization of resources for incidents throughout the United States, NIFC plays a key role in ensuring resources are moved to locations of highest need based on values at risk (e.g., life/property, infrastructure, communities, natural resources). Additionally, the center maintains equipment and supplies that can be easily dispatched to support fire management. Since all agencies are represented at the center, it promotes coordination of fire policy development, implementation, and fire planning.





National Wildfire Coordinating Group

The purpose of the National Wildfire Coordinating Group (NWCG) is to provide national leadership to develop, maintain, and communicate interagency standards, guidelines, qualifications, training, and other capabilities that enable interoperable operations among federal and non-federal entities (see www.nwcg.gov). Core membership includes representatives from the USFS, all DOI agencies, Federal Emergency Management Agency, U.S. Fire Administration, and non-federal entities such as the Intertribal Timber Council and the National Association of State Foresters. The NWCG involves a series of committees including Fire Planning, Fuels Management, Equipment Technology, Training, and Risk Management. Collectively, these

committees provide overarching guidance for Fire and Fuels Management. The functions of NWCG are to:

- Develop and propose standards, guidelines, training, and certification for interagency wildland fire operations.
- Establish qualifications for all wildfire positions, including required training, experience, and competencies in order to perform wildfire support tasks.
- Maintain approved standards, guidelines, training, and certification for interagency wildland fire operations.
- Participate in the development of operational standards and procedures for non-fire incident and emergency management to ensure consistency and interoperability.

How does NWCG affect sage-grouse?

The overarching charge of NWCG is to facilitate efficient fire management through training, logistical, budgetary, and standards development. Consistent standards for operations, training, and qualifications of fire personnel enable movement of resources across the country and across agencies. Use of sage-grouse examples in training curricula is one opportunity to expand awareness.

National Interagency Coordination Center

The NICC, located at NIFC, is the focal point for overseeing all interagency coordination activities throughout the United States. Wildfire suppression is built on a three-tiered system of support - the local area, one of the 11 geographic areas, and finally, the national level. When a fire is reported, the local agency and its firefighting partners respond. If the fire continues to grow, the

agency can ask for help from its geographic area. When a geographic area has exhausted all its resources, it can turn to NICC at the National NIFC for help in locating what is needed, from air tankers to radios to firefighting crews to incident management teams. Additional information on NICC can be found at: <http://www.nifc.gov/nicc/index.htm>.



Figure 2 Map of Geographic Area Coordinating Centers.

How does NICC affect sage-grouse?

NICC serves as a logistical coordination center and facilitates the efficient ordering and dispatch of all fire management resources across geographic areas. NICC does not make allocation decisions.

Geographic Area Coordination Centers

GACCs coordinate resource ordering and showcase fire activity in their area. GACCs participate in meetings and calls used to establish national drawdown and preparedness levels. It

should be noted that the Eastern Great Basin and Western Great Basin Coordination Centers will be combined in 2015, and located in Salt Lake City, Utah.





The screenshot shows the homepage of the Western Great Basin Coordination Center. At the top, there's a banner with the text "Mobilizing incident resources throughout the nation". Below the banner are two images: one of a white aircraft with "FIRE" and "N-57AT" on it, and another of a group of firefighters in orange gear. The main content area is divided into several sections:

- INCIDENT INFORMATION**: Includes links for Restrictions, News & Notes, Website, Twitter, and National Fire News.
- PREDICTIVE SERVICES**: Includes links for Intelligence, Weather, Fuel/Fire Danger, and Outlooks.
- LOGISTICS / DISPATCH**: Includes links for Dispatch Operations, Aviation, Crews, Equipment / Supplies, and Overhead / IMT.
- MANAGEMENT & ADMINISTRATION**: Includes links for GB Coordinating Group, GB Committees / Groups, Incident Business, Policy and Reports, Publications, Safety Management, Software Applications, and Training.
- RELATED LINKS**: Includes links for Area and National.

In the center, there's a large map of the Western Great Basin region, showing state boundaries and major cities like Reno, Sparks, and Carson City. To the right, there are sections for **PREPAREDNESS LEVELS** (WGB 1, National 1), **GREAT BASIN IMT ROTATION** (IMT 1: Lund 10/8 - 10/14, IMT 2: DeMasters/Rosenthal 10/3 - 10/9, IMT 3: Mizer 10/3 - 10/9), **NATIONAL TEAM ROTATIONS**, and **Other News and Information** (links to GB IMT Evaluation pdf and word documents). A sidebar on the right shows a list of tweets from the WGBCC account.

Figure 3. Each geographic area coordination center hosts a website showcasing resource availability and fire activity in their region.

How do Geographic Area Coordination Centers affect sage-grouse?

The primary charge of GACCs is to implement resource assignment decisions made by the Geographic Multi-Agency Coordination group. GACCs which implement GMAC decisions in sage-grouse habitats include Eastern Great Basin (<http://gacc.nifc.gov/egbc/index.php>), Western Great Basin (<http://gacc.nifc.gov/wgbc/>), Northwest (<http://www.nwccweb.us/index.aspx>), and Rocky Mountain (<http://gacc.nifc.gov/rmcc/>).

National Multi-Agency Coordination Group

The National Multi-Agency Coordination Group (NMAC), located at NIFC, is comprised of representatives from the BLM, BIA, NPS, USFS, USFWS, Federal Emergency Management Administration (FEMA), and the National

Association of State Foresters. The NMAC group prioritizes and allocates resources when there are critical shortages of national resources such as smokejumpers, air tankers, or Type 1 Incident Management Teams IMTs). The NMAC provides an essential management mechanism for national





level strategic coordination to ensure that firefighting resources are efficiently and appropriately managed in a cost effective manner. The NMAC is responsible for establishing National and Geographic Area MAC business practices; ensuring timely national level incident information and firefighting resource status; setting national priorities among Geographic Areas; directing, allocating and reallocating firefighting resources among Geographic Areas to meet NMAC priorities; anticipating and identifying future firefighting resource requirements; and coordinating and resolving firefighting resource policy issues. The NMAC delegation specifically provides the authority to manage resource prioritization and allocation between Geographic Areas. Management of resources within a Geographic Area is the responsibility of the GMAC. Further information on NMAC can be found at: <http://www.nifc.gov/nicc/administrative/nmac/index.html>.

Roles and responsibilities of NMAC include:

- Establishing national priorities among the Geographic Areas (GAs)
- Directing and allocating resources among or between GAs to meet national priorities
- Providing oversight of general business practices between NMAC and the Geographic Multi-Agency Coordination (GMAC) groups
- Distributing and archiving NMAC:
 - Decisions
 - Direction
 - Best management practices
- Determining National Preparedness Levels (PLs)
- Determining national fire resource availability to support non-fire/all hazard operations (Reference Support to the National Response Framework)
- Managing Area Command Teams

How does the National Multi-Agency Coordination Group affect sage-grouse?

NMAC affects sage-grouse as a result of allocation decisions made across geographic areas. NMAC establishes the priority order among GACCs, and where scarce resources are placed across the country. NMAC decisions are necessarily broad, and consequently do not address species-specific topics.

Note: Further information on the Objectives, Policy, and Scope for wildland fire operations and supporting groups can be found in the National Interagency Mobilization Guide (<http://www.nifc.gov/nicc/mobguide>).

Area Command, Geographic Multi-Agency Coordination (GMAC) Groups

Area Command teams manage multiple fire incidents in a geographic area, under delegation from local Agency Administrators. They are comprised of an area commander, and leadership for planning, logistics, and aviation. At a slightly

larger scale, each geographic area is represented by a GMAC group, which establishes priorities for resource allocation for all fires within the geographic area. Membership of GMAC groups includes fire management designees, who report to Agency Administrators for affected jurisdictions. GMAC groups review Incident



Status Summaries (ICS form 209) and identified values at risk to assign incident management teams, set priorities, and make key allocation decisions. These priorities include the type and

number of resources which manage fires. For example, GMACs direct the placement of scarce resources such as Hotshot Crews and overhead.

How do Area Command Teams and Geographic Multi-Agency Groups affect sage-grouse?

Area Command teams and GMAC groups make key decisions related to the staffing and prioritization of fires at multiple scales within geographic areas. Their decisions have direct consequences for sage-grouse habitats. Membership of these groups is largely represented by fire operations employees who may not be informed on sage-grouse habitats, populations, and threats. Based upon identified values at risk fire complexity, and information from local dispatch centers, priorities for staffing and support are established. Consequently, decisions made by Area Command Teams and GMAC groups have a strong and direct influence on sage-grouse habitats.



Predictive Services

Predictive Service staff units are located at the NICC and at the GACCs across the country. These units were developed to provide decision support prior to expected fire activity and help determine resource allocation needs. Predictive Services provides information and products for three functional areas; fire weather, fire danger/fuels, and intelligence/resource status. It functions under the guidance of the National Predictive Services Subcommittee (NPSS), which is chartered under NWCG to provide leadership and direction for the program. Predictive Services products include:

(1) 7-Day Fire Potential Outlooks are designed to determine when and where regionally and nationally shared resources will be in demand across the U.S. for the subsequent week. This daily report assesses large fire potential and provides a weather synopsis for a seven-day period. It

combines forecasted fuel dryness with significant weather triggers to identify high-risk areas. A national map is under development to display fire potential across the country for each day of the forecast period.

(2) Monthly Outlooks and Seasonal Trend Forecasts are normally posted on the first workday of each month and produced with input from all of the Geographic Area Predictive Service units using the most recent weather and fuels data available. These outlooks include general reports with maps intended to provide fire management personnel with an area-wide outlook and prediction of where the greatest fire potential will exist during the following month. They also provide a trend forecast for the following three-month period.

How does Predictive Services affect sage-grouse?

Predictive Services indirectly influence sage-grouse by defining patterns of fire occurrence, large fire potential, and fire weather. This information is used at geographic and local scales to position resources and other pre-suppression activities.





Local Dispatch Centers

Fire Operations resources are coordinated at the unit level by local dispatch centers. Although the assignment of fire resources may appear random, pre-planned dispatch procedures reflect direction from Land Use Plans and Fire Management Plans. Dispatch centers convey daily fire weather forecasts, provide daily resource tracking, and assign resources to fire incidents. The assignment of fire operations resources such as engines, dozers, and water tenders is largely pre-planned. These pre-planned decisions are delivered through automated computer dispatching systems, such as Wildfire Computer

Aided Dispatch (WildCAD) that provide specific directions for responding to individual rural properties, including a description of the property, water sources available, and any special information pertinent to fire suppression and rescue operations. In these applications, the type and number of resources dispatched to an incident is pre-identified based upon fire danger rating factors, potential for growth, number of on-going fires, and guidance contained in fire management plans. Finally, local duty officers (typically Fire Management Officers) further refine the prioritization of resources during multiple fire situations or as conditions warrant.

How do local dispatch centers affect sage-grouse?

Local dispatch centers are the conduit for mission-critical information between fire suppression resources and fire managers. Dispatch centers implement staffing assignments according to pre-established factors. Local dispatch centers affect sage-grouse by making decisions that allocate suppression resources based on changing fire conditions.

Predictive Services indirectly influence sage-grouse by defining patterns of fire occurrence, large fire potential, and fire weather. This information is used at geographic and local scales to position resources and other pre-suppression activities.



Duty Officer

During the fire season, most federal agencies are required to designate a duty officer who is the responsible official for tactical coordination of multiple wildfires within a unit. Duty Officers are typically qualified as a Type III incident commander and serve as the connection to local line officers during fires. Duty Officers ensure an

adequate span of control for operational resources, and apply broad oversight to local fire management programs. Duty Officers are commonly drawn from a pool of Fire Management Officers, Assistant Fire Management Officers, Fire Operations Specialists, Fuels Management Specialists, or other managers meeting minimum IQCS qualifications.

How do duty officers affect sage-grouse?

Duty officers influence sage-grouse as a result of staffing decisions that consider safety, values at risk, and myriad operational details. Their decisions are informed by a number of competing factors in a dynamic environment. For example, duty officers must make real-time decisions which balance considerations such as habitat loss, probability of success, and multiple fires, typically with incomplete information.

Incident Commander

All wildfires are managed by an on-site Incident Commander (IC), regardless of fire size or complexity. IC's are responsible for: ensuring safety; proper transfer of command as fire complexity changes; developing objectives, strategies, and tactics; building the organizational structure as conditions change; assigning resources; and completing documentation. Incident commanders and their subordinates

interact with resource advisors for protection or conservation of natural and cultural features. In sage-grouse habitats, these considerations could relate to lek locations, seasonal habitats, and other information relevant to fire management decisions. Incident commanders or their subordinates make real-time decisions related to fire line location, heavy equipment use, or burning out.

How do incident commanders affect sage-grouse?

Incident commanders affect sage-grouse by making tactical decisions in real time. These include fire line locations, direct or indirect attack methods, burnouts/blacklining, and others that affect the scale and location of firefighting impacts and effectiveness. This is the scale at which conservation of locally relevant sage-grouse habitats can occur. Thus, incident commanders are key in the chain of command.





Resource Advisors

Resource Advisors are responsible for anticipating fire impacts on natural and cultural resources, and for advising the Incident Commander. Resource advisors are typically federal agency employees, but may include qualified state-employees. It should be noted that there are opportunities for non-federal biologists to contribute to fire management by serving as resource advisors. Because of their expert knowledge of local conditions, resource advisors play a critical role in

ensuring compliance with Land Use and Fire Management Plans related to location of fire lines, acceptable heavy equipment use, location and concerns related to critical wildlife habitat or populations archaeological sites, management in wilderness areas and other resource conflicts. Resource advisors are currently identified in BLM's Best Management Practices as an important asset in mitigating certain negative effects of fire operations in and around sage-grouse habitats.

How do resource advisors affect sage-grouse?

Resource advisors provide biological expertise to inform tactical decisions, such as fire line locations, direct or indirect attack methods, or heavy equipment use. Resource advisors provide information but do not make tactical decisions. Resource advisors thus indirectly influence populations and habitats through this information exchange with on-the-ground fire managers.



Fire Operations Policy Guidance

Operational federal wildland fire policy is embedded in a document called the “*Interagency Standards for Fire and Fire Aviation Operations*” (also known as the Redbook, reflecting the color of its front and back covers). The Redbook provides fire and fire aviation program management direction for BLM, USFS, USFWS, and NPS managers. Employees engaged in fire management activities are required to comply with all agency-specific health and safety policies. Other resources, such as the NWCG Incident Response Pocket Guide (PMS 461, NFES 1077) and the NWCG Wildland Fire Incident Management Field Guide (PMS 210), provide

operational guidance. BLM-specific guidance on sage-grouse conservation is provided in the Redbook in a section titled “*Sage-Grouse Conservation Related to Wildland Fire and Fuels Management*.” Excerpts from Chapter 2 of the Redbook include:

- Utilize available maps and spatial data depicted sage-grouse habitats during suppression activities;
- Use predictive services to prioritize and preposition firefighting resources in critical habitat areas.

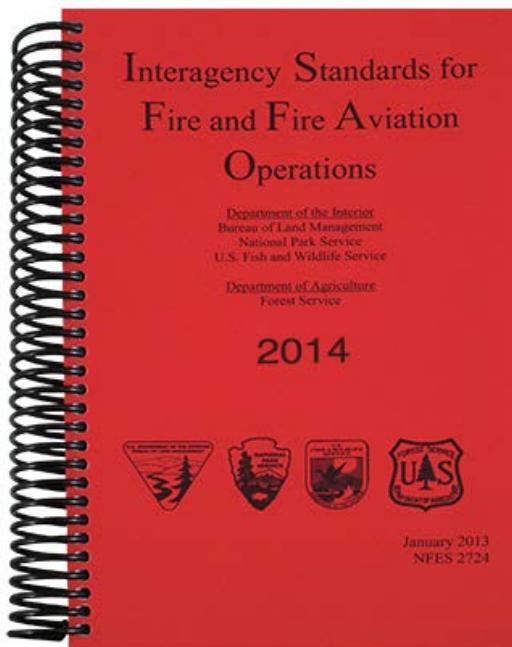


Figure 4 The *Interagency Standards for Fire and Fire Aviation Operations* provides fire management guidance for federal agencies.

BLM’s fire management best management practices for sage-grouse can be found at the BLM’s Fire Operations website (see Appendix 2).



State	Preparedness and Fuels Positions	Engines	Hotshot Crews	Smokejumpers	Fixed Wing Aircraft*	Helicopters
CA	303	28	2	0	0	2
CO	174	16	1	0	2	1
ID	469	49	1	0	4	2
MT	208	18	0	0	3	2
NV	378	50	2	0	4	3
OR/WA	427	51	1	0	3	3
UT	275	31	1	0	3	2
WY	132	16	0	0	0	1
NIFC	50	0	0	80 (national resource)	8	0

Table 3 BLM suppression and fuels management capacity in 2014 (source: 2014 National Preparedness Program Summaries)
(*Includes air attack, lead planes, and smokejumper aircraft. There are an additional 33 Single Engine Air Tankers (SEATs) (Interagency contracts) used heavily in sagebrush fires not accounted for in this column).

Forest Service fire personnel and equipment available nationally include:

Heavy equipment (e.g., dozers, water tenders)	Preparedness Positions*	Engines	Hotshot Crews	Air Tankers	Helicopters
210	8,340	900	67	18	123

Table 4. USFS suppression capacity in 2014

* includes seasonal workforce

Fire Personnel and Equipment

Federal agencies maintain a diverse cadre of seasonal and full-time fire personnel and equipment dedicated to fire preparedness, fire response, and fuels management. Additionally, many personnel in resource, maintenance, administration, and emergency response positions are trained and actively participate in fire management, greatly increasing the overall response capacity. With personnel stationed in sage-grouse habitat as well as throughout the country, federal agencies have the capability to conduct long-term management of fuels management, fire preparedness and response as well as provide surge capacity as necessary.

Decision Support

The Wildland Fire Decision Support System (WFDSS) is a web-based application used by all federal agencies and select state agencies to evaluate wildfire risks and document decisions. Land use and fire management plan information, as well as geospatial layers, are pre-loaded in WFDSS for consideration when determining the response to a fire. This land and fire management plan information, as well as the geospatial display of values and key resources, predicted fire spread through fire behavior modeling and the risk and benefits assessment are utilized in the system to make risk informed decisions on fires.

WFDSS contains geospatial displays of preliminary priority habitat (PPH) and preliminary general habitat (PGH) for both greater and Gunnison sage-grouse which are annually updated as the information is revised at the State scale. These layers are used during wildfire situations to support management decisions related to resource

placement, suppression strategies, and other considerations influenced by the presence of sage-grouse habitat. Opportunities exist to incorporate additional sage-grouse habitat features into WFDSS in the future if it provides value to decision makers.

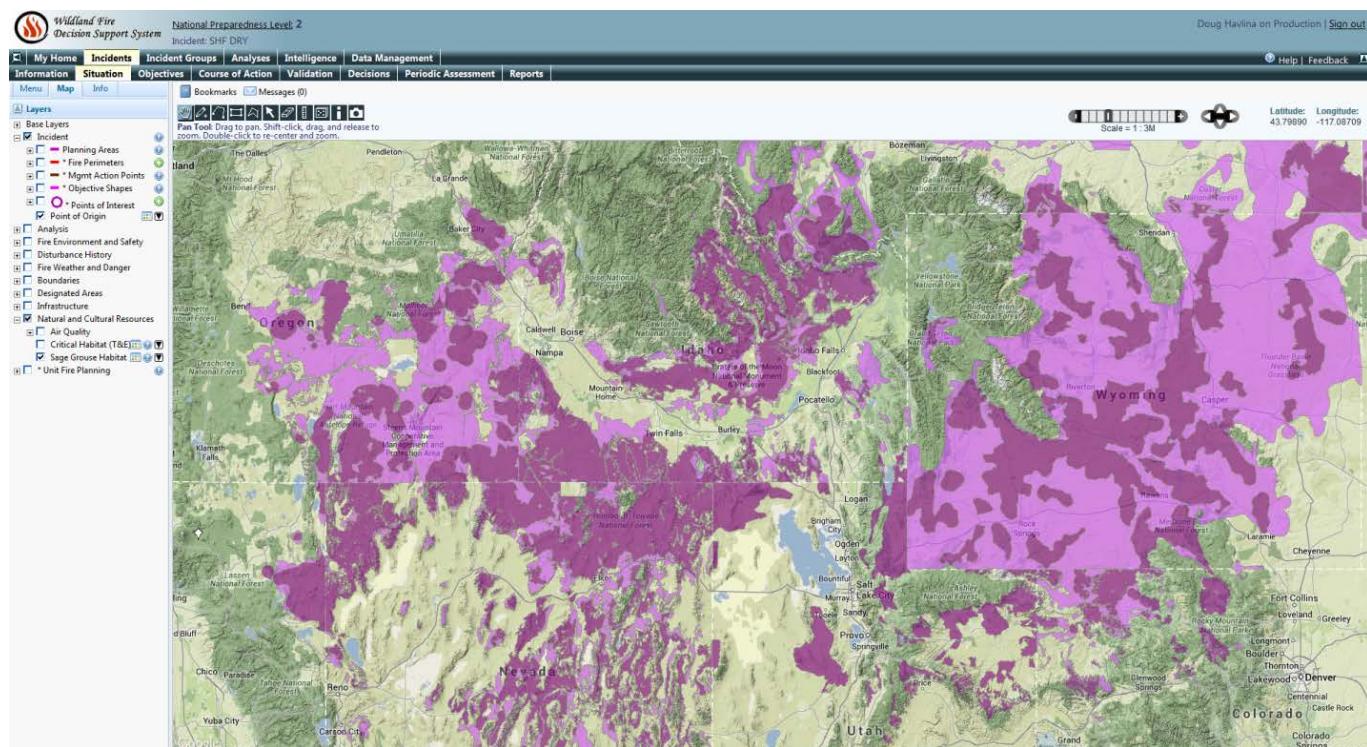


Figure 4. Displays of PPH and PGH in the Wildland Fire Decision Support System

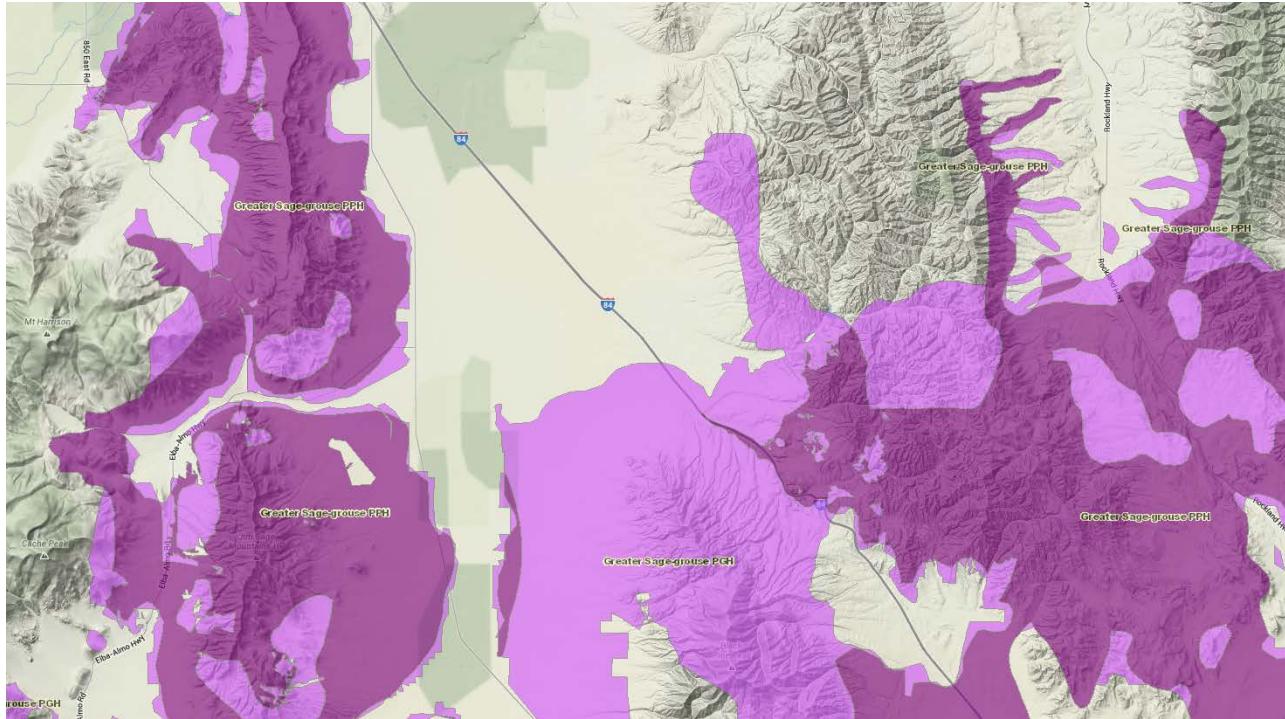


Figure 5. Displays of PPH and PGH in the Wildland Fire Decision Support System (Zoomed)

How does WFDSS affect sage-grouse?

WFDSS provides spatial displays of PPH and PGH across the range of sage-grouse. These data inform real-time fire decisions related to suppression strategies and prioritization. This display allows managers to see the spatial relationship between habitats and on-going fires. A summary of acres of at-risk habitat is included in the WFDSS values inventory page.





Federal Prevention and Fuels Management Accomplishments

The federal fuels management program is led by the NWCG Fuels Management Committee (FMC), which "... has primary responsibility for developing, implementing and providing oversight for an effective and coordinated National interagency wildland fuels management program. The program is designed to help mitigate risks from wildland fires to the wildland/urban interface and its infrastructure and to maintain and restore healthy vegetative communities in other wildland areas." Furthermore, the FMC "...provides national interagency program oversight to: reduce wildland fire risk to communities, restore and maintain land health, ensure that Hazardous Fuels Reduction program funding is targeted to the highest national fuels project priorities, ensure program accountability, effectiveness and efficiency, develop standards and policy for prescribed fire, promote efficient biomass use, promote economic opportunities for rural communities, emphasize landscape scale cross-boundary projects."

From 2002 to present, the FMC has directed \$140 million to \$210 million annually to federal agencies for fuels projects. This work includes management actions such as prescribed burning and mechanical treatments, as well as practical research such as The Sage-Steppe project and the Fire Effects Information System. For further information on the FMC, see <http://www.nwcg.gov/branches/ppm/fmc/index.htm>

Change in BLM Fuels Funding Allocation

As recently as FY 2012, the funding for BLM's fuels management programs was strongly skewed

to treatments in the Wildland-Urban Interface (WUI). At that time, approximately 90% of BLM's fuels budget was allocated to projects which reduced risks to communities and infrastructure in and around urban areas. In three years, the emphasis of the fuels program has changed dramatically to emphasize treatments which benefit sage-grouse. Beginning in fiscal year 2015, BLM is allocating a significant proportion of project dollars (\$25 million) to projects which benefit sage-grouse, following guidance in the Wildfire and Invasive Annual Grass Assessment (FIAT) Step 1. These funds are for projects which address threat factors and include conifer removal, seeding, chemical treatment of invasive species, strategically placed fuel breaks, and other measures which change fire behavior, augment suppression effectiveness, or maintain/restore habitat. BLM's fuels management funding is now skewed to States having the five priority FIAT landscapes which have been identified as most at risk due to fire and invasives. Specifically, BLM's fuels funding is earmarked for projects near or within the focal habitats identified in the FIAT process. Many projects resulting from FIAT assessments will be fuels treatments designed to improve initial attack effectiveness.

In a continued effort to reduce wildfire impacts to sage-grouse habitat, in 2014 BLM treated approximately 239,000 acres. Treatments were mainly focused on building and maintaining fuel breaks (14,000 acres) to conserve existing sage-grouse habitat, reducing conifer encroachment (112,000 acres), and treating invasive species (112,000 acres) to reduce wildfire hazard.



FY14 BLM Fuels Program Summary _Sage Grouse Conservation Work

State	Invasive Species Work		Conifer Encroachment Work		Fuel Break Work		Total Acres in SG	
	Acres Treated	Cost	Acres Treated	Cost	Acres Treated	Cost	Acres Treated	Cost
CA	876	\$0	6,054	\$500,000	80	\$61,000	7,010	\$561,000
CO	1,892	\$256,600	1,470	\$1,052,300	28	\$54,400	3,390	\$1,363,300
ID	56,675	\$3,416,350	16,403	\$2,986,276	4,277	\$265,000	77,355	\$6,667,626
MT	6,624	\$498,525	3,998	\$825,975	0	\$0	10,622	\$1,324,500
NV	10,829	\$755,867	8,034	\$340,165	4,138	\$232,225	23,001	\$1,328,257
OR	11,045	\$123,000	40,175	\$2,997,377	759	\$86,059	51,979	\$3,206,436
UT	20,213	\$419,500	34,107	\$3,257,195	2,902	\$357,268	57,222	\$4,033,963
WY	4,808	\$288,750	2,200	\$430,000	1,441	\$60,000	8,449	\$778,750
BLM Total	112,962	\$5,758,592	112,441	\$12,389,288	13,625	\$1,115,952	239,028	\$19,263,832

Table 5 BLM fuels accomplishments, specific to sage-grouse habitat restoration, maintenance, or conservation, 2012-2014 (units = acres treated).



**BLM Sage-Grouse Fuels Treatment Accomplishments,
2012-Present (units = acres)**

	2012			2012 Total
	Fire	Mechanical	Other	
California	278	2,514	1,783	4,575
Colorado	612	1,044	3,447	5,104
Idaho	543	277,356	33,990	311,889
Montana	6,534	5,036	0	11,570
Nevada	2,535	18,072	378	20,985
Oregon	8,045	1,687	0	9,731
Utah	384	14,867	2,736	17,986
Wyoming	12,467	2,441	1,974	16,881
BLM Total	31,398	323,017	44,308	398,722

	2013			2013 Total
	Fire	Mechanical	Other	
California	268	3,333	0	3,601
Colorado	182	689	246	1,117
Idaho	3,011	22,753	19,549	45,314
Montana	689	1,251	0	1,940
Nevada	0	2,535	0	2,535
Oregon	0	1,815	0	1,815
Utah	14	11,841	3,019	14,874
Wyoming	1,639	1,006	4,306	6,950
BLM Total	5,803	45,222	27,119	78,145

	2014			2014 Total
	Fire	Mechanical	Other	
California	1,071	5,898	0	6,969
Colorado	779	876	0	1,655
Idaho	276	45,905	13,400	59,581
Montana	7,542	2,520	0	10,062
Nevada	731	10,127	7,035	17,893
Oregon	11,928	21,106	0	33,034
Utah	739	35,440	0	36,179
Wyoming	1,111	597	675	2,383
BLM Total	24,177	122,469	21,110	167,756

Table 5 continued





The National Fire Plan Operations Reporting System

The National Fire Plan Operations and Reporting System (NFPORS) is a Department of Interior automated data management and reporting system. NFPORS was established in 2001 to provide accountability for hazardous fuels reduction, burned area rehabilitation projects, and community assistance activities. The system has tabs used to track projects that benefit candidate, sensitive, and TES species. A latitude and longitude is entered for each planned project, and a shapefile is uploaded when projects are completed. Consequently, specific queries about federal projects that have been implemented for sage-grouse can be obtained from the system.

The effectiveness of federal fuels management projects is documented in local monitoring records and also the Fuels Treatment Effectiveness Monitoring (FTEM) database. Federal agencies are required to enter the following observations into this system whenever a wildfire intersects a federally implemented fuels treatment:

- (1) “Did the treatment modify fire behavior?”
(Y/N)
- (2) “Did the treatment help control the wildfire?” (Y/N)

Based upon these and other qualitative observations, some conclusions may be drawn related to fuels treatment effectiveness which can be used to improve the treatment prescriptions.

Federal Prevention, Education, and Outreach Efforts

While treatments that augment suppression efforts or restore habitats are important, public awareness of fire prevention goals is also a component in habitat conservation. The BLM and its partners are working to prevent human-caused fires that burn sage-grouse habitat and educate the public about the need and strategy for reducing the spread of invasive species such as cheatgrass and medusa-head. A recent 10 year *statistical analysis revealed that 28% of all fires that burn sage-grouse habitat are human-caused. During the 2014 fire season, teams of fire prevention and education specialists were ordered in Idaho, Oregon and Washington during periods of high fire activity. These teams incorporated sagebrush habitat preservation and invasive species messaging into public education and outreach efforts. The use of sage-grouse as an icon of sagebrush importance is in its infancy, but is a concept which should be carried forward and strengthened. The graphic below is an example of using sage-grouse in fire prevention messaging.

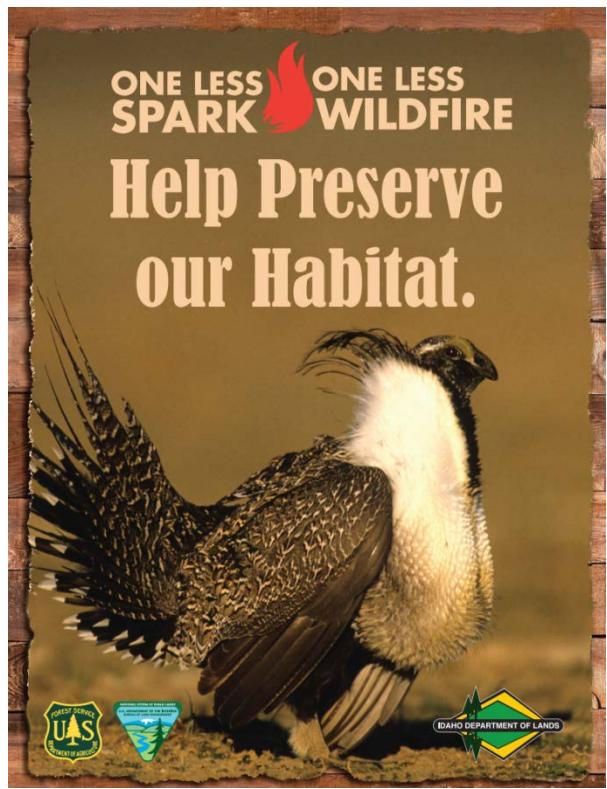


Figure 6. Fire prevention message from Idaho’s “One Less Spark” initiative.

Challenges and Barriers

Impediments to federal fire operations and fuels management efforts include:

- Emerging science which synthesizes our knowledge of ecological resilience and potential for success has not been fully integrated into the design and implementation of fuels management projects and fire operations planning.

- The capacity of federal agencies is constrained in terms of positions, funding streams, and planning.
- Real-time information-sharing between sage-grouse biologists and fire managers is sometimes lacking during periods of high fire activity across the Great Basin. This deficiency is found within Incident Management Teams, Area Command Teams, and Geographic Multi-Agency Coordination Groups.
- Competing priorities that exist across program areas impair integration across these functional areas.
- Federal land management agencies planning processes are often delayed or modified as a result of litigation, appeals, and protests of potential treatments.
- The current fire suppression funding process needs to be revised to allow fire operation budget to function more like a “natural disaster” (dedicated dollars available for firefighting) and not fiscally overburden existing program budgets of the federal fire agencies. Currently, there is no single fire budget that covers the entire yearly firefighting effort. Thus, dollars are redirected from other program budgets to make up the difference, which often negatively affects those programs.



III. State Fire and Fuels Management Programs

Western states vary significantly in their approach to managing wildland fire due to variables including the amount and location of private lands, existing land uses, landscape condition, state statutes, codes, regulations, and available resources. Because of the diversity among states and the need for consistent approaches to managing wildland fire a variety of efforts have been undertaken over the last 20 years including the National Fire Plan, the Healthy Forest Restoration Act, the Quadrennial Fire Review process and most recently the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy). Federal, state and local land and wildfire management agencies developed the Cohesive Strategy together to maintain specific individuality while coming together through consensus on common goals and objectives.

Through the implementation of the Cohesive Strategy, the nation as a whole is poised to manage wildland fire in a more unified and efficient manner. The Western Governors Association (WGA) has also taken a leadership role striving for consistent and effective response to wildland fire through active management programs, data and information collection and educational outreach that reduces the threat of catastrophic wildland fire and associated impacts to sagebrush ecosystems. Wildland fire programs operate in those states that are managing sage-grouse and their associated sagebrush ecosystems. To be effective, landscape-scale management of sagebrush ecosystems requires an interagency approach through local level planning processes for projects and activities. State "Action Plans" have, and are being developed to address the coordinated management of wildfire and sage-

grouse habitat in specific geographical areas. Specific projects are detailed in the Action Plans to reduce fuels, improve preparedness and initial attack response, identify equipment and training needs, and ensure safe, rapid and aggressive response to wildfire ignitions; and address rehabilitation of wildfire damaged lands to mitigate the spread of invasive plant species.

State wildland fire management responsibilities typically reside in state forestry agencies and are integrated with state natural resource departments and Universities. Partnerships also exist with numerous federal land and natural resource management agencies, that bring the latest technology, research and management tools to the forefront for reducing landscape level, catastrophic wildfires and the spread of invasive plant species. State forestry agencies are delivering a wide variety of wildfire management programs in conjunction with their local and federal cooperators (e.g., prevention, fuels management, preparedness, suppression & rehabilitation).

[Process for Fire Suppression Coordination Prioritization](#)

The organic development of wildland fire management capacity and administrative organization across Western states means that there is no one standard model for state fire management. The wildfire management function can be housed in state Departments of Forestry, Natural Resources, Parks and Recreation, and Lands, each having slightly different missions. Some states have comprehensive operational programs while others have only certain components focused more on technical assistance



and support of local governmental or other suppression resources. State wildland fire management agencies, despite distinct administrative organization and capacities, have adopted national wildland fire coordination and operational standards, policies, guidance documents and participate in NICC, NMAC, GACCs and local interagency dispatch centers through National Association of State Foresters representatives. State wildland fire management agencies participate through agency specific representatives on state MAC groups and a variety of interagency Boards or Groups focused on coordination decisions. The result is a process which produces consensus for communication, notification and coordination from a statewide perspective including the local level. The interagency integrated approach to wildfire management has proven successful throughout the country and provides for the rapid movement of suppression resources state-to-state or agency-to-agency efficiently.

Fire Operations Programs

Those state wildland fire management agencies with operational capacities operate on an “interagency” basis that includes federal land managers and local governmental entities given wildfire activity, landownership patterns and applicable laws, state statutes and operational agreements. State wildland fire management agencies operations have developed in response to specific jurisdictional responsibilities, such as state lands (e.g., state forests, state parks & wildlife refuges, etc.), while others have assumed (through agreement and/or state statutes) wildland fire management responsibilities for “some” specific non-federal lands (e.g., private lands, city & county lands, etc.) within their state, up to and

including “all” non-federal lands on a statewide basis.

So while it is difficult to generalize state wildland fire operational programs, it is possible to identify common operational practices in place with interagency partners. For example, utilization of “closest forces” is an adopted concept shared throughout western states in an effort to keep wildfires small. State and local fire management agencies view all wildfires as “full suppression” incidents and every effort is made to suppress them safely and quickly with a strong initial attack. Many states have agreements with their neighboring states to facilitate a rapid initial attack, regardless of topographical challenges or political boundaries. States, local jurisdictions and interagency partners may manage a wildfire utilizing “unified command” concepts, where impacted jurisdictions participate together in operational decisions providing direction to the designated Incident Commander. For extended attack incidents, states will join with their interagency partners as detailed in the federal agency section in executing a WFDSS for an incident as well as “Delegations of Authority” to an Incident Management Team that takes management responsibilities for a given wildfire. Through all of these documents and protocols sagebrush ecosystems may be prioritized for suppression actions.

Fuels Management Programs

Not all states have the capacity to staff and manage statewide fuels management programs, but a majority of states do support and participate in specific fuels reduction projects on state lands, private lands and federally managed lands to varying degrees depending on capacity and available funding. State forestry agencies focus



on non-federal lands, working with private landowners, counties and communities in both the Wildland Urban Interface (WUI) and rural ranching settings.

Projects and activities designed to protect sage-grouse and their sagebrush ecosystems across the west are diverse. Fuels reduction and vegetative management projects are the most common, both at the scale of the individual properties and across multiple ownerships. Fuels reduction in existing highway rights-of-way, utility corridors and designated fuel breaks are ongoing. Areas where pinyon pine and juniper have encroached into sagebrush ecosystems are being treated by mechanical removal on Federal, State, local, and private lands. Hand cutting, pile burning, broadcast burning and utilization of mechanized equipment such as masticators are all techniques being employed by state fire programs in conjunction with federal and local cooperators.

- **State-Specific Challenges and Barriers**

Sufficient funding for preparedness activities including training, heavy

equipment/engines, PPE, radios, and facilities is often lacking.

- There is inadequate time and funding to comply with expanding NWCG qualification requirements.
- Dedicated year-round work force & associated funding is needed.
- Periods of high wildfire activity with multiple ignitions in short time periods can result in shortages of suppression resources that limit effectiveness.
- Clear delineation of the highest priority sage-grouse habitat designated for protection from wildfire is needed at all levels and should be updated appropriately.
- Active and timely land management, especially on federal lands, suffers from limited funding, permitting requirements, and litigation.
- Extensive delays in processing State-submitted fire bills by the federal agencies can create significant cash flow problems and impacts fuel treatment programs.



IV. Local Fire and Fuels Management Programs

Local programs that contribute to fire and fuels management over the range of sage-grouse include Rural Fire Departments (RFDs), Rangeland Fire Protection Associations, and private landowners through their participation with sanctioned entities. Similar to state-level programs, there is a diversity of local government capabilities specific to emergency services including wildfire suppression. On one hand, some larger urban communities and/or counties with WUI areas have developed state-of-the art capabilities, with 24-hour staffing, and ready availability of engines, tenders, aviation assets and hand crews. Many rural communities and/or counties may be forced to rely on aging federal surplus equipment and an all-volunteer firefighting staff working with limited training and high turnover.

One positive development is the advent of community-based organizations such as Fire Adapted Communities, Fire Safe Councils, Fire Wise and Living With Fire programs that are now established in most western states, counties and communities. These entities facilitate fire prevention activities, pursue grant funding and implement local and landscape-level fuels-reduction projects across multiple ownerships. The combined efforts of these interagency efforts and initiatives have greatly improved wildfire management in counties, cities and communities. They are achieving the associated goals of reducing the occurrence and impacts of large wildfires and reducing loss of sage grouse habitat.

[Fire Suppression Coordination/Prioritization](#)

Local governments, urban and rural, are the first responders to all emergency incidents including wildfires within their specific jurisdictions, which are typically delineated by geographic boundaries as a fire district or an agreed-upon response area. Response capability is measured by “level of service” typically desired and funded by the landowners within the fire district. Rural communities typically field a volunteer fire department with varying levels of qualified members, equipment and training. In almost all cases though, local and rural fire departments have adopted NFPA and NWCG standards and qualifications and train their members to those national standards.

Whether an emergency incident is a structure fire, vehicle accident, medical or a wildfire ignition, the first notification is to the local area dispatch center through their 911 system. In the case of a wildland fire incident, once the first responders are on scene and the incident assessed, the coordination and management of the wildfire incident may or may not be transferred to an interagency dispatch center operated jointly by federal and state agencies specifically for wildfire coordination and prioritization. Time of year, level of ongoing emergency activity and size/location/fuel conditions all influence how a wildfire response is managed at the local level. In some areas of the country wildfire ignitions never go any further than the local dispatch center. Interagency dispatch centers are likely to be called on if the ignition occurs during “wildfire season” (e.g., May-August) and if it has the potential to



threaten public safety, structures and adjacent lands. These incidents are then incorporated into the interagency process for wildfire coordination and prioritization.

Fire Operations Program

Significant differences also exist across the western landscape for the management of wildland fire at the local level. Land ownership, vegetation, topography and urban development patterns typically drive wildland fire response capacities. Community capacity varies greatly and may range from a well-staffed, trained and equipped “all-risk” fire department to a volunteer fire department with limited resources or individual ranch owners with a single piece of equipment. Several states now have added “Rangeland Fire Protection Associations” (RFPA) as a component to their volunteer and paid fire services in those rural areas not served by any other means. RFPA’s vary in scope, but can be described as non-profit, non-governmental entities primarily comprised of individual ranchers and landowners. Their ability to provide improved initial attack response to wildfire ignitions is reducing the threat of catastrophic wildfires in rural areas of the west. Local governments, volunteers and RFPA’s are often the first responders across western states to wildfire ignitions in sagebrush ecosystems, particularly outside of an average wildfire season. It may be hours before additional federal and/or state resources reach an incident in rural areas, thus it is important to sustain local response capabilities.

Most federal and state wildland fire programs are designed and managed around their respective fire seasons, rather than staffed year-round. Several western states are expanding year-round wildfire management capabilities in concert with local

governments, given the lengthening of fire seasons beyond historic norms. During those periods when state and federal resources are reduced or may not be available, (fall, winter & early spring) response to wildfire ignitions falls to local government, volunteers and RFPA organizations.

As mentioned previously, the interagency wildfire partnership, structured now within the Cohesive Strategy, includes local government, volunteers and RFPA organizations. At the local level, training and equipping firefighters is achieved in a variety of ways, but an interagency approach is most common. Annual refresher training and required firefighter courses are open to all entities and typically held annually in numerous locations. Federal excess fire equipment is often acquired by state forestry agencies and rebuilt for distribution on a local level. Federal land managers allocate excess fire equipment directly to local governments for their use.

Fuels Management Program

A wide variety of habitat improvement and fuels reduction projects are being implemented on the ground throughout the west, including critical implementation elements at the local level. Water resources, riparian areas and meadows, key to healthy sage-grouse habitat are often in private landownership due to settlement patterns in the west. Private landowners are utilizing both state and federal cost-share programs to improve and protect habitat for sage-grouse in conjunction with their specific land management activities. Designing fuel treatment projects with connectivity across ownerships is increasing, although complications related to NEPA compliance when projects involve federal lands is an issue.



In the WUI areas of the west, communities and local governments are taking responsibility for their jurisdictional lands, educating landowners, designing fuels treatments, pursuing grants and implementing fuels reduction projects. While there is an increasing effort to integrate non-federal land treatments with adjacent federal lands projects, fuels treatment projects often do not line up due to timing and funding challenges. A landscape treatment approach is increasingly viewed as the desired strategy, but navigating project permit processes, including the public review requirements of NEPA, securing sufficient funding and finding qualified contractors remain challenges.

Local Challenges and Barriers

Local Government challenges include:

- Firefighter retention and the loss of institutional knowledge of managing wildfire;
- There is insufficient funding for preparedness and response capacity

including training, heavy equipment/engines, PPE, radios, and facilities.

- Shortages of qualified wildfire management trainers, programs and inadequate delivery systems in rural areas create operational constraints.
- Inconsistent federal land management policies are negatively impacting the sustainability of multiple land uses on public lands.
- There is a significant need for developing and utilization of integrated and dynamic livestock grazing plans that assist with fuels reduction through targeted grazing and consistent monitoring.
- It is difficult to implement a landscape approach to fuels management because of challenges posed by environmental regulations, the availability of sufficient funding, the lack of qualified contractors and the complicated NEPA permit process.

V. Positioning For the Future

The scope of future sage-grouse conservation is enormous. In order to make meaningful progress, collaborative efforts that tie proven technology with strategic placement of management activities will be required. Existing fire programs that provide opportunities for sage-grouse conservation at meaningful scales are identified below. Examples of practices and partnerships making a positive difference for sage-grouse are also identified and discussed. The section concludes with a synthesis of future needs in the fire and fuels management functions.

Example 1: Rangeland Fire Protection Associations

Rangeland Fire Protection Associations (RFPAs) are non-profit corporations established to prevent and suppress rangeland fires, and are governed and directed by its members. These associations require State legislation, status as non-profit

entities, and operate under a Cooperative Rangeland Fire Protection Agreement. Creation of RFPAs is a collaborative effort between local ranchers, State Government, and the Federal Government (typically the BLM or USFS). Local boards and grants generate funding. Federal and State agencies provide equipment and training for RFPAs. Day-to-day operations of RFPAs are spelled out in annual operating plans and memorandums of understanding that are annually updated. The benefits of RFPAs include: (1) faster initial response to small fires; (2) allowing ranchers the ability to protect forage resources important to their livelihood; (3) ensuring firefighting safety through adoption of standardized firefighting practices, equipment, and communication; (4) where sage-grouse are represented on the local landscape, better awareness of sage-grouse habitat by the ranching community.



Figure 7. Engaging ranchers and rural communities in fire management through RFPAs taps local knowledge and expertise in further protecting resource values. (Photo courtesy: Jeremy Maestas, NRCS).

In 2014, Oregon has 17 operational RFPAs and Idaho has five. Nevada does not have RFPAs, but is introducing legislation that would authorize their formation in future years. See Appendix 6 for the RFPA formation checklist.

How do RFPAs affect sage-grouse conservation?

While retention of grazing opportunities is a key incentive for RFPAs, sage-grouse conservation can also be a direct beneficiary of their services. Because federal agencies interface with RFPAs regarding values to be protected, the locations and extent of sage-grouse habitats are directly applied by RFPAs in how they manage wildland fires. RFPAs can also contribute to sage-grouse conservation with other local interests through promoting awareness of habitat location and importance.

Example 2: Cooperative Landscape Approaches South Warner Juniper Removal Project

Warner Mountains, Oregon (2010-2020)

Partners: BLM-Lakeview Resource Area, Private Landowners/Permittees, NRCS Sage Grouse Initiative, Oregon Department of Fish and Wildlife, University of Idaho, Oregon State University, Lake County Watershed Council, Intermountain West Joint Venture, Point Blue Conservation Science

The South Warner Project is a landscape-scale partnership working seamlessly across public and private and public lands to remove encroaching conifers in and around the Western Great Basin PAC of south-central Oregon. Expansion and infill of western juniper into sagebrush communities affects large portions of the western range, fortunately, many areas are still in the early stages of woodland succession, which affords

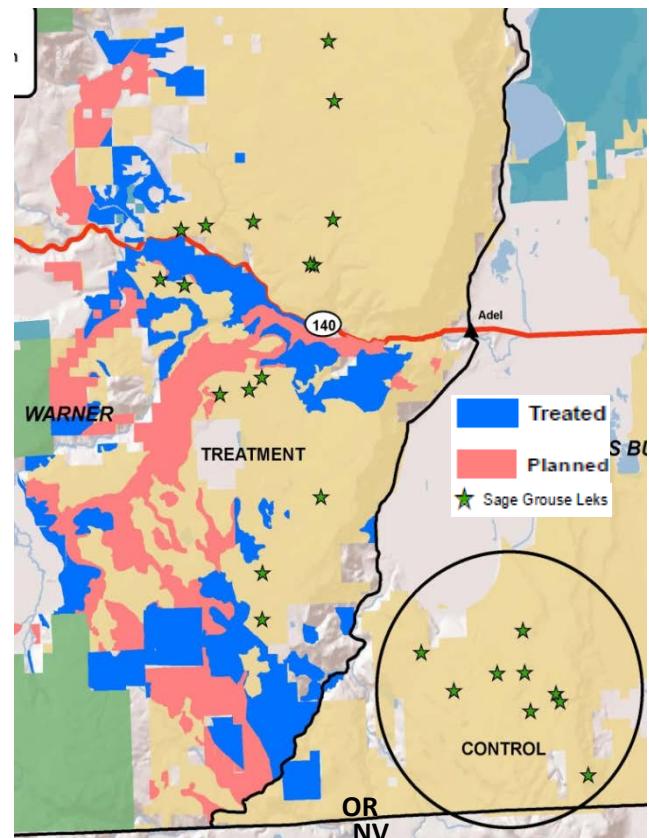


Figure 8 South Warner project area, Oregon.
Polygons depict juniper removal treatments as of 2013.



opportunities to proactively remove trees before sage-grouse are displaced by habitat conversion.

BLM and private landowners, with support from the NRCS Sage Grouse Initiative and other partners, are working side-by-side to remove encroaching conifers trees and reconnect large, intact sagebrush rangelands. Over 47,000 acres are

being treated which encompasses most of the post-settlement trees in this 100,000-acre area. BLM treatments total 25,000 acres, while private landowner treatments exceed 22,000 acres. Roughly half of planned treatments have already been completed. Junipers are removed primarily through hand cutting with chainsaws.

Slash is reduced through a variety of techniques including lop-and-scatter, single tree burning, and pile burning to reduce fuels and vertical structure. All treatments are designed to maximize retention of sagebrush and other native vegetation. Long-term, outcome-based evaluations are also underway in this landscape to assess sage-grouse and sagebrush-obligate songbird response to conifer encroachment and removal. University of Idaho researchers are in the final field season of a five-year management study to assess the effects of conifer encroachment and subsequent removal on sage-grouse and their habitats, with a second phase of research beginning this fall for another five years. The non-profit group Point Blue Conservation Science is also assessing songbird responses to conifer treatments to provide a more holistic understanding of treatment effects. These science evaluations are helping



Figure 9 Chainsaw tree removal allows retention of sagebrush



Figure 10 Before (top) and after (bottom) treatment.
Photos by: BLM



inform conservation delivery and adaptive management range-wide.

Burley Landscape Sage-Grouse Habitat Restoration Project

Cassia County, Idaho (2012-2017)

Partners: BLM-Burley Field Office, Private Landowners/Permittees, NRCS Sage Grouse Initiative, Pheasants Forever, Idaho Department of Fish and Game, Mule Deer Foundation, U.S. Fish & Wildlife Service, West Cassia Soil and Water Conservation District, South Magic Valley Sage-Grouse Local Working Group

The Burley Project is an innovative collaboration across public and private lands reducing the threat of conifer encroachment to sage-grouse and sagebrush ecosystems in the Northern Great Basin PAC of southern Idaho. Encroachment of Utah juniper in this area threatens persistence of sage-grouse and other sagebrush obligate species, as well as, increases the risk of catastrophic wildfire due to heavy and continuous fuel loads.

The project's overall objective is to remove juniper across about 38,000 acres of BLM land by 2017; over 11,000 acres have already been completed. Additional treatments are also being

implemented on adjacent state and private lands to enhance connectivity. Treatments are prioritized in and around priority grouse habitats, such as, breeding areas near leks. Mechanical treatment techniques, including chainsaws and masticators, are employed to carefully remove juniper while retaining understory sagebrush, grasses, and forbs



Figure 11. Days after treatment, sage-grouse take advantage of habitat recently reclaimed from dense juniper invasion. Photo by: BLM.

to the maximum extent possible. The vast majority of treatment areas are still in early stages of juniper expansion.

Project partners are combining technical and financial resources to overcome barriers to get the job done on the ground. BLM resource experts completed initial planning and NEPA, but limited fuels budgets necessitated a partnership to implement the project. The NRCS Sage Grouse Initiative now provides most of the needed funding for treatments through the Farm Bill's Environmental Quality Incentives Program, with

How does cooperative landscape planning affect sage-grouse conservation?

Cooperative landscape planning leverages the diverse resources, skills, and knowledge of multiple partners for the benefit of sage-grouse. Many working groups involve private, state, and federal cooperators, which illustrates the benefits that come from multiple contributors working at landscape scales. The Sage-Grouse Initiative led by the NRCS is one example of a cooperative landscape approach.



matching funds provided by Idaho Department of Fish and Game and others. NRCS coordinates conservation plans and contracts with local permit-holding ranchers on public lands to enable the work. Pheasants Forever facilitates project implementation across land ownerships through a Stewardship Agreement with BLM. PF hires contractors for implementation, administers contracts, and jointly conducts project inspection on contractor work with BLM project representatives. This project serves as a model for how partners can combine resources to accelerate implementation across private and public lands throughout the West.

Example 3: Application of Resistance and Resilience Concepts

The recently completed General Technical Report describing resistance and resilience concepts

(Chambers et al. 2014) is a fundamental synthesis of scientific knowledge with great promise to land managers. This report is intended for broad application in the development of ecologically based management strategies and practices for fuels management, fire operations, habitat restoration, and rehabilitation efforts. Many land management units, such as BLM Districts or National Forests, have applied these concepts in the past with success. The following photos highlight a project which successfully established Wyoming big sagebrush following the 2006 Esmeralda Fire in northeast Nevada, by evaluating site specifics and incorporating resistance and resilience concepts in developing the type and timing of treatments.



Photo 1. Post-fire landscape following 2006 Esmeralda Fire, Elko BLM District (photo courtesy Tom Warren, Elko BLM).



Photo 2. Rehabilitation results two years following the 2006 Esmeralda Fire, Elko BLM District (photo courtesy Tom Warren, Elko BLM)



Photo 3. Rehabilitation results five years following the 2006 Esmeralda Fire, Elko BLM District (photo courtesy Tom Warren, Elko BLM).





Example 4: Linear Fuel Breaks

In the spring of 2012, the BLM's Upper Snake Field Office implemented its first phase of the Big Desert Fuel Breaks Project, as planned in the March 2012 Environmental Assessment of the Big Desert Roads Fuel Breaks Project. The intent of the project was to modify potential fire behavior characteristics (e.g., rate of spread, flame length) adjacent to road corridors in order to protect the remaining intact sagebrush habitat within the field office, and to improve firefighter safety. The initial treatment phase of this plan consisted of mowing approximately 30 miles (1,130 acres) of vegetation adjacent to strategic road corridors. Work was initiated on April 30, 2012 and consisted of roto-mowing the existing vegetation to a height of 8 inches at a distance between 100-150 feet from the centerline, creating fuel breaks 200-300 feet in width. Additionally, the new plan allowed for areas previously treated to be retreated mechanically or with approved herbicides to reduce shrub densities and reduce fuel continuity by removing annual grasses from within the interspaces. To date, approximately 230 acres have been retreated using the chemical method.

The Cox's Well Fire ignited on the afternoon of July 10, 2012 within the NPS Craters of the Moon National Monument and Preserve. Daytime temperatures during the fire ranged between 85-98°F and fire danger indices were extreme. Due to the passage of numerous thunderstorms, fire activity was erratic, resulting in the fire actively burning on multiple flanks. Strong, gusty winds and hot dry conditions allowed the fire to quickly reach 4,575 acres of public lands administered by the BLM's Upper Snake Field Office and 3,225 acres of BLM Monument lands located within the Craters of the Moon National Monument.

Suppression operations of the Cox's Well Fire began around 13:30 with initial attack crews attempting to anchor and tie the fire into the Great Rift within the BLM Monument Lands. When direct attack was unsuccessful, crews backed out to the Arco/Minidoka Road and started improving the road grade and back burning off the road. Recently completed fuel breaks (spring 2012) along the Arco/Minidoka Road served to augment suppression operations. Treated fuels exhibited flame lengths of approximately two feet, providing an area for suppression crews to safely and effectively manage the fire.

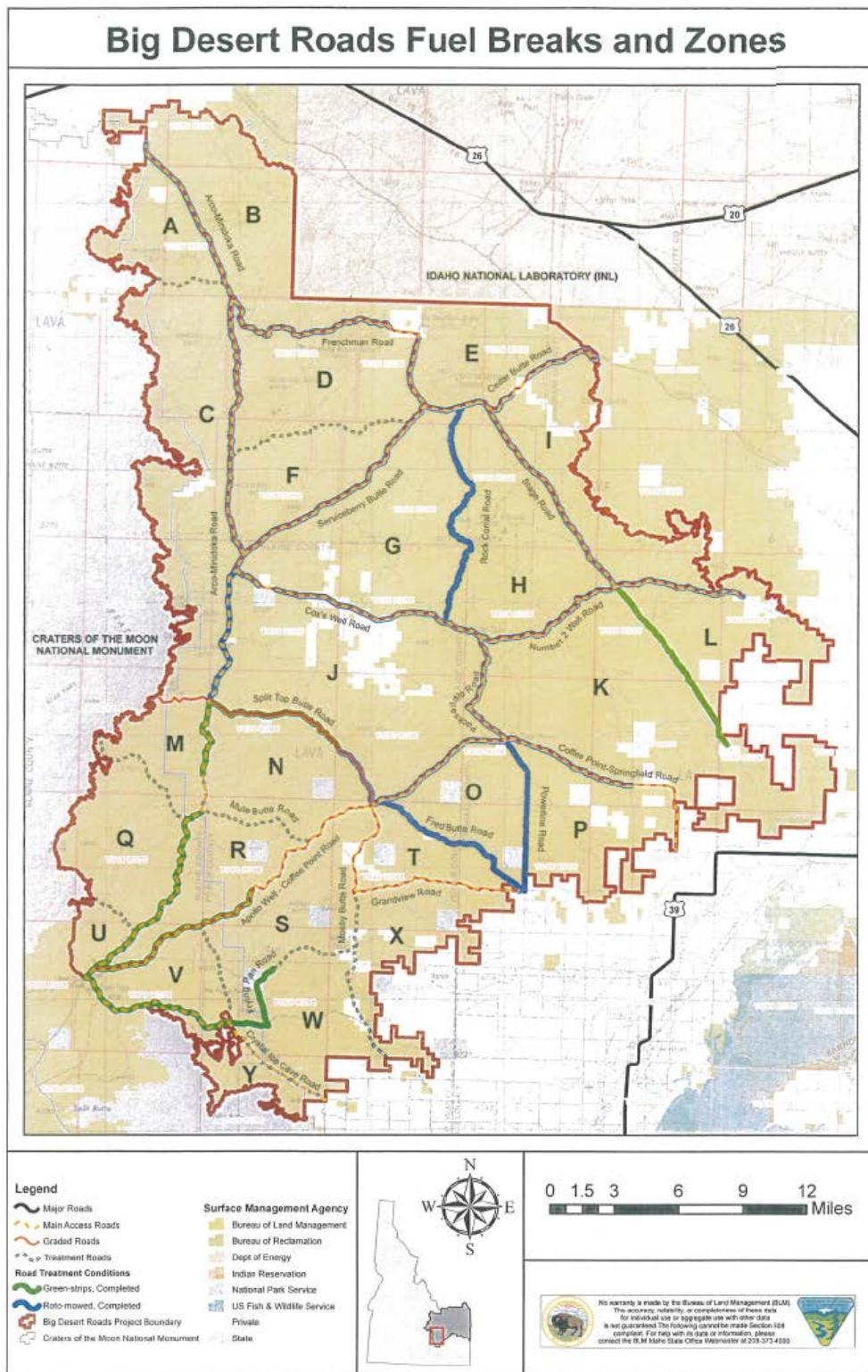


Figure 12. Map of Big Desert fuel break and landscape compartments.



Figure 13. Overview of the fuel breaks size and vegetative height and distribution



Figure 14. Overview of the burned and unburned portions of the fuel breaks following the Cox's Well Fire (photos courtesy Ben Dyer, BLM Fire Ecologist)





VI. Summary and Recommendations

Proactive measures in the fire operations and fuels management arenas are crucial to long-term sage-grouse conservation. Approximately 97% of initial attack efforts are successful at keeping fires under 1,000 acres. Site-appropriate measures before and after the fire represent the greatest opportunities to interrupt the invasive plant and wildfire cycle, and potentially augment initial attack effectiveness. At the same time, the body of knowledge related to “what works” should be bolstered through research and testing.

It is critical to note that there are common themes that are repeated in on-going science assessments dealing with wildland fire and sage-grouse. In the USGS Sage-Grouse Science Needs Assessment, the BLM’s Fire and Rangelands symposium report, and in this document, there is glaring overlap in the identified science, policy, and funding needs. Given the wide range of the scientists contributing to these reports, this overlap should be acknowledged as significant.

In the suite of recommendations which follow, some can be readily addressed in the short term. Others will require long-term institutional change through the development of new policy. In any case, disrupting the feedback loop between wildfire and the loss of sagebrush is daunting. The biological barriers to sage-grouse conservation are well understood (Knick et al. 2011), though extraordinary in scope and complexity. Policy and funding barriers have been recently clarified through this and other reports. Surmounting these barriers will require collaboration, persistence and creativity. Our recommendations represent areas where meaningful change can result in the policy, research, and applied management arenas. To aid

the reader in better understanding the genesis of these recommendations, we have restated the challenges and barriers identified in Sections II through IV of this report below.

From Section II: Federal Challenges and Barriers

- Emerging science that synthesizes our knowledge of ecological resilience and potential for success has not been fully integrated into the design and implementation of fuels management projects and fire operations planning.
- The capacity of federal agencies in terms of positions, funding streams, and planning is limited.
- Real-time information sharing between sage-grouse biologists and fire managers is sometime lacking during periods of high fire activity across the Great Basin. This deficiency is found within Incident Management Teams, Area Command Teams, and Geographic Multi-Agency Coordination Groups.
- Competing priorities exist across program areas. Integration across these functional areas needs improvement.
- Required public review processes, including litigation, appeals, and protests of potential treatments, impede the finalization of land-use plans.
- The current fire suppression funding process needs to be modified to allow fire operations to function more like a “natural disaster” and not fiscally overburden existing program budgets of the federal fire agencies. Currently, there is no single fire budget that covers the entire yearly firefighting effort. Thus, dollars are



redirected from other program budgets to make up the difference, which often negatively affects those programs.

From Section III: State Challenges and Barriers

- There is insufficient funding for wildfire preparedness activities, including training, heavy equipment/engines, Personal Protective Equipment, radios, and facilities.
- Expanding National Wildfire Coordinating Group (NWCG) qualification requirements and associated time required results in shortages of qualified personnel in many positions;
- The historic seasonal approach to wildfire suppression and management is inadequate given the complexities of natural resource management. A dedicated year round work force and associated funding is needed to address the expanding wildfire management challenges;
- Periods of high wildfire activity with multiple ignitions in short time periods, which results in shortages of suppression resources can limit response effectiveness;
- Clear delineation of the highest priority sage-grouse habitat designated for protection from wildfire is needed at all wildfire response levels and mapping updated appropriately;
- There is a lack of active and timely land management actions, especially on federal lands, due to limited funding, permitting requirements, and litigation;
- Extensive delays in processing fire bills by the federal agencies can create significant

cash flow problems and impacts state and local fuel treatment programs;

- Wildfire rehabilitation funding is limited, which perpetuates the invasive plant species problems and increases fire return intervals on all ownerships.

From Section IV: Local Challenges and Barriers

- Firefighter retention and the loss of institutional knowledge of managing wildfire;
- There is insufficient funding for preparedness and response capacity including training, heavy equipment/engines, PPE, radios, and facilities.
- Shortages of qualified wildfire management trainers, programs and inadequate delivery systems in rural areas create operational constraints.
- Inconsistent federal land management policies are negatively impacting the sustainability of multiple land uses on public lands.
- There is a significant need for developing and utilization of integrated and dynamic livestock grazing plans that assist with fuels reduction through targeted grazing and consistent monitoring.
- It is difficult to implement a landscape approach to fuels management because of challenges posed by environmental regulations, the availability of sufficient funding, the lack of qualified contractors and the complicated NEPA permit process.
-





Recommendation #1: Utilize Emerging Science

Incorporate emerging science and analysis (Resistance and Resilience concepts, FIAT Fire and Invasives Assessments) to place management strategies and treatments in the locations with the highest probability of success. While many administrative units have applied knowledge of ecological sites and resilience in past practices, a broader adoption of the resistance/resilience concept is needed and overdue. Emerging science concepts allow managers to prioritize management efforts and scarce resources to achieve successful outcomes. One example would be a broader use of FIAT assessments to apply “the right treatments in the right place”.

Recommendation #2: Fuel Breaks

Conduct research that quantifies fuels treatment effectiveness in terms of limiting fire growth, final fire size, or aiding suppression effectiveness. Currently, the metrics used to evaluate fuels treatment effectiveness are subjective, qualitative, or lack causal relationship (e.g., observed change in fire behavior, dollars spent, acres treated). Current assumptions regarding linear fuel breaks, green-stripping, and other treatments need to be tested and their outcomes quantified. Studies should evaluate variables that include the timing, sequence, and pattern of treatments.

Once the most effective fuel-break techniques are identified, scale up implementation of strategically placed fuel breaks in priority PACS and FIAT focal habitat areas to proactively address the 3% of fires that escape initial attack. While linear fuel treatments may potentially fragment habitats, “mega-fires” eliminate habitat. Managers should consider application of fuel management strategies that can augment suppression effectiveness and reduce the

likelihood of catastrophic fire growth.. While fuel breaks are not intended to stop fires, they can help reduce fire size by providing firefighters with safe anchor points for suppression. Development of effective pre-suppression strategies should be identified through interdisciplinary efforts involving both sage-grouse biologists and fire managers.

Recommendation #3: Involve the Experts

State and federal biologists with sage-grouse expertise and invasive species should inform fire management decisions in Incident Management Teams, Area Command Teams, and Geographic Multi-Agency Coordination groups. This should include increased participation of non-federal Resource Advisors on the line, as well as subject matter experts in real-time decision making with Incident Management Teams. Coordination should also occur before fire season to ensure the real-time participation of key biologists with knowledge of lek locations, populations, and seasonal habitats. All of the above must comply with NWCG qualifications and standards for fireline personnel. A mechanism for overtime compensation for non-federal employees is needed.

Recommendation #4: Promote Awareness

Develop a process whereby sage-grouse and their habitats are highlighted as a high-priority value in the above discussions for the public and. Currently, sage-grouse is viewed as one of myriad natural resource values to consider during fire operations decisions. Sage-grouse sensitivity to fire effects should be highlighted in allocation decisions (e.g., slow recovery of sagebrush ecosystems, bird affinity for lek locations, biological significance of intact sagebrush, etc.). This awareness must highlight the need to



minimize fire growth on fires that threaten valued habitat.

[Recommendation #5: Incorporate Sage-Grouse Considerations in Pre-Season Activities](#)

Fully incorporate sage-grouse information sharing, planning, and coordination in pre-season meetings. This should include full discussions related to delegations of authority, the process for in-briefings, resource advisor roles, and participation by area wildlife biologists with incident managers when fires occur.

[Recommendation #6: Invest now to save later](#)

Develop reliable funding streams focused on pre-fire vegetation management to improve sage-grouse habitat and improving sagebrush ecosystem resilience. This provides continuity for out-year planning and staffing. Prioritize vegetation management opportunities in priority areas identified through the FIAT process where cooperative landscape approaches are being taken across public-private land ownership boundaries. Acknowledge the reality that need for multiple interventions, repeated treatments, and adaptive management will likely exceed agencies' current budgets. Maximize the impact of new funding streams by prioritizing support for collaborative landscape approaches.

[Recommendation #7: Streamline Planning Processes](#)

Work with CEQ to explore mechanisms for accelerating NEPA planning for implementation of key vegetation treatments in priority landscapes identified through the FIAT process to provide real-time protection capability. With current planning efforts often spanning years, increasing fire frequency and magnitude are outpacing our ability to keep up with implementation.

[Recommendation #8: Update Fire Management Plans](#)

Based upon our knowledge of sage-grouse populations, habitats, and related threats, implement the decisions from the revised land use plan EIS's in order to update fire management plans. Subsequently, agencies should revisit operational plans related to fire prioritization, resource placement, and suppression response procedures. Integrate lek, population, and key habitat data into fire management response protocols for Federal and State agencies.

[Recommendation #9: Improve Decision Support Tools](#)

Develop decision support tools that contribute to rangeland fire management decision-making. One specific technical gap is rangeland fire behavior modeling (dynamic fuel modeling). Currently, predicting the dynamics of fire behavior in forested systems is more advanced than that in rangeland ecosystems. This is a technical gap that needs to be closed to improve future treatment planning and fire management decisions.

[Recommendation #10: Adopt an “All Lands” Approach](#)

Develop an “all lands” solution to wildfire and fuels management relative to sage-grouse habitat conservation. Rangeland Fire Protection Associations represent a key component of incorporating private and ranching interests. Expand the cooperation between federal agencies, state fire agencies and local governments to establish RFPA's on a broader scale. Develop commitments to provide training and equipment to RFPA's. Expand training opportunities to include volunteer firefighters, RFPA's, and local fire departments. Expand model programs such



as “Partners in Conservation and NRCS “Sage Grouse Initiative” to develop innovative funding mechanisms for landscape scale habitat restoration projects across multiple ownerships.

[Recommendation #11: Model Fire Funding on Disaster Response](#)

Finalize proposed legislation that allows fire management (suppression) to be funded like natural disasters, as identified in the 2014 WAFWA Gap Report. The current fire suppression funding process should be modified to where fire costs are funded akin to “natural disasters”, thereby easing fiscal competition in federal and state agencies.

[Recommendation #12: Evaluate Grazing as a Fuels Management Opportunity](#)

In concert with research needs identified by USGS and the 2014 WAFWA Gap Analysis, conduct research on the efficacy and opportunities related to livestock grazing as a fuels management tool. Given the high degree of overlap between domestic livestock grazing and sage-grouse habitats, evaluate variables associated with grazing intensity, timing, and extent to determine value as a fuels management tool.



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VII. Appendices

Appendix 1. Glossary of Terms

Source: NWCG Glossary of Wildland Fire Terminology PMS 205 (2014)

Agency

An administrative division of a government with a specific function, or a non-governmental organization (e.g., private contractor, business, etc.) that offers a particular kind of assistance. A federal, tribal, state or local agency that has direct fire management or land management responsibilities or that has programs and actives that support fire management activities.

see also: Assisting Agency

Cooperating Agency

Supporting Agency

Agency Administrator

The official responsible for the management of a geographic unit or functional area. The managing officer of an agency, division thereof, or jurisdiction having statutory responsibility for incident mitigation and management. Examples: NPS Park Superintendent, BIA Agency Superintendent, USFS Forest Supervisor, BLM District Manager, FWS Refuge Manager, State Forest Officer, Tribal Chairperson, Fire Chief, Police Chief.

see also: Line Officer

Agency/Area Coordination Center

A facility which serves as a central point for one or more agencies to use in processing information and resource requests. It may also serve as a dispatch center for one of the agencies.

Anchor Point

An advantageous location, usually a barrier to fire spread, from which to start constructing a fire line. The anchor point is used to minimize the chance of being flanked by the fire while the line is being constructed.

Area Command

An organization established to: 1) oversee the management of multiple incidents that are each being handled by an incident management team (IMT) organization; or 2) to oversee the management of a very large incident that has multiple IMTs assigned to it. Area Command has the responsibility to set overall strategy and priorities, allocate critical resources based on priorities, ensure that incidents are properly managed, and that objectives are met and strategies followed.

Backfire

A fire set along the inner edge of a fire line to consume the fuel in the path of a wildfire or change the direction of force of the fire's convection column.





Backfiring

A tactic associated with indirect attack, intentionally setting fire to fuels inside the control line to slow, knock down, or contain a rapidly spreading fire. Backfiring provides a wide defense perimeter and may be further employed to change the force of the convection column. Backfiring makes possible a strategy of locating control lines at places where the fire can be fought on the firefighter's terms. Except for rare circumstance meeting specified criteria, backfiring is executed on a command decision made through line channels of authority.

Barrier

Any obstruction to the spread of fire. Typically an area or strip devoid of combustible fuel.

Blackline

Pre-burning of fuels adjacent to a control line before igniting a prescribed burn. Blacklining is usually done in heavy fuels adjacent to a control line during periods of low fire danger to reduce heat on holding crews and lessen chances for spotting across control line. In fire suppression, a blackline denotes a condition where there is no unburned material between the fire line and the fire edge.

Burn Out

Setting fire inside a control line to consume fuel between the edge of the fire and the control line.

see also: Backfire

Contained

The status of a wildfire suppression action signifying that a control line has been completed around the fire, and any associated spot fires, which can reasonably be expected to stop the fire's spread.

Cooperating Agency

An agency supplying assistance including but not limited to direct tactical or support functions or resources to the incident control effort (e.g. Red Cross, law enforcement agency, telephone company, etc.).

see also: Agency

Agency Representative

Assisting Agency

Supporting Agency

Cooperator

A federal, tribal, state, or local agency that participates with another agency(s) in planning and conducting fire or emergency management projects and activities.

see also: Agency

Agency Representative

Assisting Agency

Cooperating Agency

Supporting Agency





Coordination Center

Term used to describe any facility that is used for the coordination of agency or jurisdictional resources in support of one or more incidents.

Direct Attack

Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

synonym: Direct Line

Direct Line

Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

synonym: Direct Attack

Dispatch Center

A facility from which resources are assigned to an incident.

Dispatcher

A person who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control efforts.

see also: Agency Dispatcher

Dry Lightning Storm

Thunderstorm in which negligible precipitation reaches the ground. Also called dry storm.

Emergency Stabilization

Planned actions to stabilize and prevent unacceptable degradation to natural and cultural resource, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources.

Extreme Fire Behavior

"Extreme" implies a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning and/or spotting, presence of fire whirls, strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment and behave erratically, sometimes dangerously.

see also: Blowup

Fire Storm

Flare-up

Fine Fuels

Fast-drying dead or live fuels, generally characterized by a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a time lag of one hour or less. These fuels (grass, leaves, needles, etc.) ignite readily and are consumed rapidly by fire when dry.





Fire Behavior

The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Management Plan (FMP)

A plan that identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. A fire management plan defines a program to manage wildland fires (wildfire and prescribed fire). The plan is supplemented by operational plans, including but not limited to preparedness plans, preplanned dispatch plans, prescribed fire burn plans, and prevention plans. Fire management plans assure that wildland fire management goals and components are coordinated.

Fire Management Unit (FMU)

A land area definable by specified management objectives, constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, and other defined elements that set it apart from an adjacent area. The primary purpose of developing Fire Management Units in fire management planning is to assist in organizing information in complex landscapes. A fire management unit may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

Fire Presuppression

Activities undertaken in advance of fire occurrence to help ensure more effective fire suppression. Activities includes overall planning, recruitment and training of fire personnel, procurement and maintenance of firefighting equipment and supplies, fuel treatment and creating, maintaining, and improving a system of fuel breaks, roads, water sources, and control lines.

Fire Weather

Weather conditions which influence fire ignition, behavior, and suppression.

Fire Weather Forecast

A weather prediction specially prepared for use in wildland fire operations and prescribed fire.

Firebreak

A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire line

The part of a containment or control line that is scraped or dug to mineral soil.

Fuel Arrangement

1 A general term referring to the spatial distribution and orientation of fuel particles or pieces.





Fuel Bed

An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition.

Fuel Loading

The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area. This may be available fuel (consumable fuel) or total fuel and is usually dry weight.

Fuel Reduction

Manipulation, including combustion, or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control.

Fuel Treatment

Manipulation or removal of fuels to reduce the likelihood of ignition and/or to lessen potential damage and resistance to control (e.g., lopping, chipping, crushing, piling and burning).

synonym: Fuel Modification

Fuel break

A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled.

Geographic Area Coordinating Group (GACG)

An interagency body of fire management representatives from each federal and state land management agency within a nationally recognized regional area that provides leadership and support to facilitate safe and efficient fire management activities. Working collaboratively, a GACG's mission is not only for wildland fire emergencies, but for other emergency incidents, as necessary.

Geographic Area Coordination Center (GACC)

The physical location of an interagency, regional operation center for the effective coordination, mobilization and demobilization of emergency management resources. A coordination center serves federal, state and local wildland fire agencies through logistical coordination of resources throughout the geographic area, and with other geographic areas, as well. Listings of geographic coordination centers and their respective geographic coordinating areas can be found within the National Interagency Mobilization Guide.

see also: Geographic Area

Geographic Coordinating Area

Geographic Multi-Agency Coordination (GMAC) Group

Interagency group within a geographic which convenes during periods of high fire activity to:

- (1) determine and set geographic area priorities;
- (2) acquire, allocate, and reallocate resources; and
- (3) issue coordinated situation assessment statements.





Head of a Fire

The most rapidly spreading portion of a fire's perimeter, usually to the leeward or up slope.

Hotshot Crew

Intensively trained fire crew used primarily in hand line construction (Type-1).

Incident

An occurrence either human-caused or natural phenomenon, that requires action or support by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Incident Action Plan (IAP)

Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the plan may have a number of attachments, including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map. Formerly called shift plan.

Incident Commander (ICT1, ICT2, ICT3, ICT4, or ICT5)

This ICS position is responsible for overall management of the incident and reports to the Agency Administrator for the agency having incident jurisdiction. This position may have one or more deputies assigned from the same agency or from an assisting agency(s).

Incident Management Team

The incident commander and appropriate general and command staff personnel assigned to an incident.

Incident Meteorologist (IMET)

A specially trained meteorologist who provides site specific weather forecasts and information at an incident. The individual works under the direction of the fire behavior analyst and the planning section chief.

Incident Objectives

Statements of guidance and direction necessary for the selection of appropriate strategy(s), and the tactical direction of resources. Incident objectives are based upon agency administrators direction and constraints. Incident objectives must be achievable and measurable, yet flexible enough to allow for strategic and tactical alternatives.

Initial Attack (IA)

A preplanned response to a wildfire given the wildfire's potential. Initial attack may include size up, patrolling, monitoring, and holding action or suppression.

Jurisdictional Agency

The agency having land and resource management responsibility for a specific geographical or functional area as provided by federal, state or local law.





Land Use Plan

A set of decisions that establish management direction for land within an administrative area; an assimilation of land-use-plan-level decisions developed through the planning process regardless of the scale at which the decisions were developed.

Land/Resource Management Plan (L/RMP)

A document prepared with public participation and approved by an agency administrator that provides general guidance and direction for land and resource management activities for an administrative area. The L/RMP identifies the need for fire's role in a particular area and for a specific benefit. The objectives in the L/RMP provide the basis for the development of fire management objective and the fire management program in the designated area.

Leader's Intent

A concise statement that outlines what individuals must know in order to be successful for a given assignment. The intent communicates three essential pieces of information:

- Task – What is the goal or objective
- Purpose – Why it is to be done
- End state – How it should look when successfully completed

Lightning Activity Level (LAL)

Part of the National Fire Danger Rating System (NFDRS). A number, on a scale of 1 to 6, which reflects frequency and character of cloud-to-ground lightning (forecasted or observed). The scale for 1 to 5 is exponential, based on powers of 2 (i.e., LAL 3 indicates twice the lightning of LAL 2). LAL 6 is a special category for dry lightning and is closely equivalent to LAL 3 in strike frequency.

Line Officer

Managing officer, or designee, of the agency, division thereof, or jurisdiction having statutory responsibility for incident mitigation and management.

see also: Agency Administrator

Local Agency

Any agency having jurisdictional responsibility for all or part of an incident.

Local Resource

Resources within a dispatch center's area of responsibility.

Mobilization

The process and procedures used by all organizations, federal, state and local, for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.





Mobilization Guide

A written description of procedures used by federal, state, and local organizations for activating, assembling, and transporting resources that have been requested to respond to or support an incident.

Mop Up

Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe, or to reduce residual smoke.

Multi-Agency Coordinating Group (MAC Group)

A national, regional, or local management group for interagency planning, coordination, and operations leadership for incidents. Provides an essential management mechanism for strategic coordination to ensure incident resources are efficiently and appropriately managed in a cost effective manner.

Multi-Agency Coordination (MAC)

A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

Multi-Agency Coordination System (MACS)

MACS provides the framework to support coordination for incident prioritization, critical resource allocation, communication systems integration, and information coordination. MACS components include facilities, equipment, emergency operating centers (EOCs), specific multiagency coordination entities, personnel, procedures, and communications.

Multiple Fire Situations

High fire frequency over a short period of time in an administrative unit, usually overtaxing the normal initial attack capability of the unit.

National Fire Danger Rating System (NFDRS)

A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

National Interagency Coordination Center (NICC)

Coordinates allocation of resources to one or more coordination centers or major fires within the nation. Located in Boise, Idaho.

National Interagency Fire Center (NIFC)

A facility located at Boise, Idaho, jointly operated by several federal agencies, dedicated to coordination, logistical support, and improved weather services in support of fire management operations throughout the United States.





National Multi-Agency Coordination (NMAC) Group

During National Preparedness Levels 4 and 5, the National Multi-Agency Coordinating Group (NMAC) is activated and daily briefings are conducted. This body involves representatives from all federal fire agencies, the National Association of State Foresters, and the Federal Emergency Management Administration (FEMA). This group provides national wildland fire operations direction, coordination, prioritization, allocation and oversight.

National Wildfire Coordinating Group (NWCG)

An intergovernmental body that provides national leadership to develop, maintain and communicate standards, guidelines, qualifications, training, and other capabilities that enable interoperable operations among federal and non-federal entities for wildland fire program management.

Natural Barrier

Any area where lack of flammable material obstructs the spread of wildfires.

Overhead

Personnel assigned to supervisory positions, including incident commander, command staff, general staff, branch directors, supervisors, unit leaders, managers and staff.

Predictive Services

Those Geographic Area and National-level fire weather or fire danger services and products produced by wildland fire agency meteorologists and intelligence staffs in support of resource allocation and prioritization.

Preparedness

- 1 Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.
- 2 Mental readiness to recognize changes in fire danger and act promptly when action is appropriate.
- 3 The range of deliberate, critical tasks, and activities necessary to build, sustain, and improve the capability to protect against, respond to, and recover from domestic incidents.

Preparedness Level

Increments of planning and organization readiness commensurate with increasing fire danger.

Prescribed Fire

Any fire intentionally ignited by management actions in accordance with applicable laws, policies, and regulations to meet specific objectives.

Presuppression

Activities in advance of fire occurrence to ensure effective suppression action. Includes planning the organization, recruiting and training, procuring equipment and supplies, maintaining fire





equipment and fire control improvements, and negotiating cooperative and/or mutual aid agreements.

Prevention

- 1 Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards (fuels management).
- 2 Actions to avoid an incident, to intervene for the purpose of stopping an incident from occurring, or to mitigate an incident's effect to protect life and property. Includes measures designed to mitigate damage by reducing or eliminating risks to persons or property, lessening the potential effects or consequences of an incident.

Rate of Spread

The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Red Flag Warning

Term used by fire weather forecasters to alert forecast users to an ongoing or imminent critical fire weather pattern.

Rehabilitation

Efforts undertaken within three years of a wildland fire to repair or improve fire damaged lands unlikely to recover to a management approved conditions or to repair or replace minor facilities damaged by fire.

Restoration

The continuation of rehabilitation beyond the initial three years or the repair or replacement of major facilities damaged by the fire.

Rural Fire District (RFD)

An organization established to provide fire protection to a designated geographic area outside of areas under municipal fire protection. Usually has some taxing authority and officials may be appointed or elected.

Rural Fire Protection

Fire protection and firefighting problems that are outside of areas under municipal fire prevention and building regulations and that are usually remote from public water supplies.

Situational Awareness (SA)

An on-going process of gathering information by observation and by communication with others. This information is integrated to create an individual's perception of a given situation.





Size Class of Fire

As to size of wildfire:

Class A - one-fourth acre or less;

Class B - more than one-fourth acre, but less than 10 acres;

Class C - 10 acres or more, but less than 100 acres;

Class D - 100 acres or more, but less than 300 acres;

Class E - 300 acres or more, but less than 1,000 acres;

Class F - 1,000 acres or more, but less than 5,000 acres;

Class G - 5,000 acres or more.

Smokejumper

A specifically trained and certified firefighter who travels to wildland fires by aircraft and parachutes to the fire.

Spot Fire

Fire ignited outside the perimeter of the main fire by a firebrand.

Spot Weather Forecast

A special forecast issued to fit the time, topography, and weather of a specific incident. These forecasts are issued upon request of the user agency and are more detailed, timely, and specific than zone forecasts. Usually, on-site weather observations or a close, representative observation is required for a forecast to be issued.

Strategy

The general plan or direction selected to accomplish incident objectives.

Suppression

Management action to extinguish a fire or confine fire spread beginning with its discovery.

Tactics

Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Uncontrolled Fire

Any fire which threatens to destroy life, property, or natural resources, and (a) is not burning within the confines of firebreaks, or (b) is burning with such intensity that it could not be readily extinguished with ordinary tools commonly available.

Wildland Fire

Any non-structure fire that occurs in vegetation or natural fuels. Wildland fire includes prescribed fire and wildfire.





Wildland Urban Interface (WUI)

The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Describes an area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.





Appendix 2. BLM Best Management Practices for Fire Operations and Fuels Management.

A. Fire Operations Best Management Practices for Sage-Grouse Conservation

1. Compile district-level information into statewide sage-grouse toolboxes. Toolboxes will contain maps, listing of resource advisors, contact information, local guidance, and other relevant information for each district, which will be aggregated into a statewide document.
2. Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.
3. Assign a resource advisor with sage-grouse expertise, or who has access to sage-grouse expertise, to all extended attack fires in or near sage-grouse habitat areas. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals.
4. On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.
5. As appropriate, utilize existing fuel breaks, such as roads or discrete changes in fuel type, as control lines in order to minimize fire spread.
6. During periods of multiple fires, ensure line officers are involved in setting priorities.
7. To the extent possible, locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas, heli-bases, etc.) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas, grasslands, near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover.
8. Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and all-terrain vehicles (ATV) prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread.
9. Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.
10. Minimize burnout operations in key sage-grouse habitat areas by constructing direct fireline whenever safe and practical to do so.
11. Utilize retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack.
12. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.





13. Adequately document fire operation activities in sage-grouse habitat for potential follow-up coordination activities.

B. Fuels Management Best Management Practices for Sage-Grouse Conservation

1. Where applicable, design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which most benefit sage-grouse habitat.
2. Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally.
3. Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion).
4. Ensure proposed sagebrush treatments are planned with full interdisciplinary input pursuant to NEPA and coordination with state fish and wildlife agencies, and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.
5. Where appropriate, ensure that treatments are configured in a manner that promotes use by sage-grouse.
6. Where applicable, incorporate roads and natural fuel breaks into fuel break design.
7. Power-wash all vehicles and equipment involved in fuels management activities, prior to entering the area, to minimize the introduction of undesirable and/or invasive plant species.
8. Design vegetation treatments in areas of high fire frequency which facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to sage-grouse habitat. Additionally, develop maps for sage-grouse habitat that spatially display current fuels treatment opportunities for suppression resources.
9. Give priority for implementing specific sage-grouse habitat restoration projects in annual grasslands, first to sites which are adjacent to or surrounded by preliminary priority habitat (PPH) or that reestablish continuity between priority habitats. Annual grasslands are a second priority for restoration when the sites are not adjacent to PPH, but within two miles of PPH. The third priority for annual grassland habitat restoration projects are sites beyond two miles of PPH. The intent is to focus restoration outward from existing, intact habitat.
10. As funding and logistics permit, restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs or one of that referenced in land use planning documentation.





11. Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
12. Remove standing and encroaching trees within at least 100 meters of occupied sage-grouse leks and other habitats (e.g., nesting, wintering and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit.
13. Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.
14. Reduce the risk of vehicle- or human-caused wildfires and the spread of invasive species by planting perennial vegetation (e.g., green-strips) paralleling road rights-of-way.
15. Strategically place and maintain pre-treated strips/areas (e.g., mowing, herbicide application, etc.) to aid in controlling wildfire, should wildfire occur near PPH or important restoration areas (such as where investments in restoration have already been made).





RANGELAND FIRE PROTECTION ASSOCIATION FORMATION CHECKLIST

Landowner agreement on fire protection needs

Local contacts requesting support of formation (recommended)

- County Commissioners
- County Sheriff
- County Emergency Coordinator
- Local State Senators and Representatives

Landowner Organization

- Board of Directors
- Chairperson
- Secretary/Treasurer
- Articles of Incorporation or Association
- By-laws
- Boundaries of Association
 - Map (work with IDL)
- Submit Articles (www.sos.idaho.gov)
- Obtain 501(c)(3) tax-exempt status (www.irs.gov/charities)
- Membership
 - Schedule Training
 - Order Personal Protective Equipment (PPE) and Radios through IDL
- Liability Insurance
- Agreement with IDL
- Memorandum of Understanding with BLM and/or USFS
- Mutual Aid Agreements/MOU's with adjacent Departments/Districts
- County Wildfire Protection Plan, through County Emergency Coordinator

Organizational Finance

- Annual budget
- Revenue process
- Insurance

Grants

- Idaho Department of Lands/USFS Volunteer Fire Assistance (VFA)
www.idl.idaho.gov/nat_fire_plan/nfp-grants/nfp-grants.html
- Assistance to Fire Fighters Grant
www.fema.gov/welcome-assistance-firefighters-grant-program
- Idaho Fire Chiefs Association Fire Fighter License Plate Fund
www.idahofirechiefs.org
- Idaho Bureau of Homeland Security
- Local private business or foundation grants





Equipment

- Federal Excess Personal Property (FEPP)
- FEPP Handbook
- Maintenance
- Storage
- Licensing





Appendix 7. Total acreage of PPH and PGH burned in 2012 wildfires on all lands. “Percent burned” column is the proportion of PGH or PPH burned during the year (source: BLM Fire Planning and Fuels Management Division).

National Totals*			
All States	Acres of:	Acres Burned in:	Percent Burned:
PGH	74,782,478	904,049	1.209%
PPH	68,359,525	1,799,138	2.632%
CA	Acres of:	Acres Burned in:	Percent Burned:
PGH	200,503	0	0.000%
PPH	1,129,159	258,464	22.890%
CO	Acres of:	Acres Burned in:	Percent Burned:
PGH	1,486,984	2,064	0.139%
PPH	2,366,262	2,696	0.114%
ID	Acres of:	Acres Burned in:	Percent burned:
PGH	4,518,018	182,679	4.043%
PPH	10,486,107	342,258	3.264%
MT	Acres of:	Acres Burned in:	Percent burned:
PGH	24,965,911	232,520	0.931%
PPH	9,025,071	42,666	0.473%
NV	Acres of:	Acres Burned in:	Percent burned:
PGH	5,850,001	61,733	1.055%
PPH	14,671,966	381,727	2.602%
ND	Acres of:	Acres Burned in:	Percent burned:
PGH	243,471	0	0.000%
PPH	460,167	0	0.000%
OR	Acres of:	Acres Burned in:	Percent burned:
PGH	8,250,034	324,056	3.928%
PPH	6,566,282	693,565	10.563%
SD	Acres of:	Acres Burned in:	Percent burned:
PGH	1,534,564	0	0.000%
PPH	621,607	12	0.002%
UT	Acres of:	Acres Burned in:	Percent burned:
PGH	0	0	0.000%
PPH	7,237,798	37,990	0.525%
WY	Acres of:	Acres Burned in:	Percent burned:
PGH	27,732,993	100,997	0.364%
PPH	15,795,105	39,759	0.252%





Appendix 8. Total acreage of PPH and PGH burned in 2013 wildfires on all lands. "Percent burned" column is the proportion of PGH or PPH burned during the year (source: BLM Fire Planning and Fuels Management Division).

National Totals			
All States	Acres of:	Acres Burned in:	Percent Burned:
PGH	74,793,731	255,601	0.342%
PPH	68,357,707	146,920	0.215%
NOTE: "Acres burned in" equals a cumulative total for 2013			
CA	Acres of:	Acres Burned in:	Percent Burned:
PGH	200,419	0	0.000%
PPH	1,129,404	0	0.000%
CO	Acres of:	Acres Burned in:	Percent Burned:
PGH	1,486,891	540	0.036%
PPH	2,366,262	692	0.029%
ID	Acres of:	Acres Burned in:	Percent Burned:
PGH	4,518,813	151,545	3.354%
PPH	10,485,312	76,615	0.731%
MT	Acres of:	Acres Burned in:	Percent burned:
PGH	24,965,911	1,571	0.006%
PPH	9,025,071	17	0.000%
NV	Acres of:	Acres Burned in:	Percent burned:
PGH	5,850,233	5,745	0.098%
PPH	14,671,966	22,652	0.154%
OR	Acres of:	Acres Burned in:	Percent burned:
PGH	8,250,034	94,010	1.140%
PPH	6,566,282	27,524	0.419%
UT	Acres of:	Acres Burned in:	Percent burned:
PGH	0	0	0.000%
PPH	7,237,798	19,210	0.265%
WY	Acres of:	Acres Burned in:	Percent burned:
PGH	27,733,087	2,190	0.008%
PPH	15,795,105	210	0.001%



Appendix 9. Total acreage of PPH and PGH burned in 2014 wildfires on all lands. "Percent burned" column is the proportion of PGH or PPH burned during the year (source: BLM Fire Planning and Fuels Management Division)

National Totals			
ALL States	Acres of:	Acres Burned in:	Percent Burned:
PGH	74,793,731	305,663	0.409%
PPH	68,357,707	258,310	0.378%
NOTE: "Acres burned in" equals a cumulative			
CA	Acres of:	Acres Burned in:	Percent Burned:
PGH	200,484	0	0.000%
PPH	1,129,178	0	0.000%
CO	Acres of:	Acres Burned in:	Percent Burned:
PGH	1,486,891	262	0.018%
PPH	2,366,262	21,000	0.887%
ID	Acres of:	Acres Burned in:	Percent Burned:
PGH	4,518,813	3,280	0.073%
PPH	10,485,312	33,996	0.324%
MT	Acres of:	Acres Burned in:	Percent Burned:
PGH	24,965,911	3,787	0.015%
PPH	9,025,071	8,442	0.094%
NV	Acres of:	Acres Burned in:	Percent Burned:
PGH	5,850,233	5,160	0.088%
PPH	14,671,966	15,288	0.104%
OR	Acres of:	Acres Burned in:	Percent Burned:
PGH	8,250,034	292,879	3.550%
PPH	6,566,282	168,666	2.569%
UT	Acres of:	Acres Burned in:	Percent Burned:
PGH	0	0	0.000%
PPH	7,237,798	7,298	0.101%
WA	Acres of:	Acres Burned in:	Percent Burned:
PGH	0	0	0.000%
PPH	1,277,919	3,320	0.260%
WY	Acres of:	Acres Burned in:	Percent Burned:
GH	27,733,087	295	0.001%
PPH	15,795,105	300	0.002%