

Utah Smoke Management Plan



Revised 2021

First Edition 1999

Utah Smoke Management Plan

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1. BACKGROUND

Utah’s first Smoke Management Plan (SMP) was originally developed in 1999. This document is a thorough update to the SMP driven by the following reasons:

1. Large fires are increasing in severity and frequency.
2. Smoke substantially affects regional air quality and accounts for a disproportionate number of unhealthy days, both nationally and in the state of Utah. ^{1,2}
3. State leadership and land managers increasingly recognize that prescribed fire is one of many important techniques that can maintain healthy landscapes and reduce the risk of catastrophic wildfire³, thereby minimizing overall smoke impacts. While mechanical fuel reduction has increased greatly since 1999, fire is still a key tool.
4. A great number of tools for smoke forecasting have been developed in the last 20 years, with applications for prescribed fire and wildfire. The SMP is being modernized to recognize these tools, allow greater flexibility in decision making, and improve risk analysis of impacts on local population.

In making prescribed fire permitting decisions, risk analysis will include a greater emphasis on population proximity to proposed burns. Of the 1,300 proposed prescribed fires in Utah in the years 2015 through 2019, 986 (75%) were in locations with a population density of 10 or fewer people per square mile. Of those 986 remote burns, 714 (72%) are located above 6,000 feet. For high elevation and/or remote prescribed fires, smoke produced may be less likely to impact communities.

¹ Cascio, W.E. Wildland fire smoke and human health. *Science of The Total Environment* 624, 586-595 (2018)

² Larsen, A.E., Reich, B.J., Ruminski, M., Rappold, A.G. Impacts of fire smoke plumes on regional air quality, 2006–2013. *J Expo Sci Environ Epidemiol* 28, 319–327 (2018)

³ Catastrophic Wildfire Reduction Strategy <https://ag.utah.gov/documents/CatFireFinalReport120213.pdf>

2. PURPOSE

This SMP identifies the responsibilities of federal and state land managers and the Utah Division of Air Quality (DAQ) to coordinate procedures that mitigate the impacts of prescribed fire on air quality, visibility, and public safety, in terms of smoke. This plan is designed to meet the requirements of the Regional Haze Rule, 40 CFR 51.309(d)(6), the policies of the U.S. Environmental Protection Agency's (EPA) Interim Air Quality Policy on Wildland and Prescribed Fires, and to serve as a guide for Title R307, state administrative rule for air quality.

On November 8, 1999, the EPA approved the original Utah SMP under the regional haze state implementation plan (SIP). Subsequent changes to the SMP may require a SIP revision to verify that the SMP continues to meet requirements of the regional haze rule. The SMP may be revised and resubmitted for approval to EPA with the concurrence of the DAQ and all signatories to the statewide master agreement (SMA) for wildland fire.

3. GOALS

To balance the need to minimize smoke impacts on air quality, public safety, and visibility with the need to allow prescribed fires and wildfires to accomplish land management objectives, including catastrophic wildfire risk reduction, hazardous fuel reduction, vegetation management, wildlife habitat improvement, and other ecological functions.

To develop a system for reporting and coordinating burning operations on all forest and range lands in the State.

To develop an emission inventory for pollutants of interest based on reporting of prescribed fire and wildfire events.

To quantify the use of alternative methods to burning for disposing of or reducing the amount of wildland fuels on lands in the State.

4. SCOPE

The SMP serves as an operational plan for the state administrative rule, R307-204, by providing direction and operating procedures for all organizations involved in the management of prescribed fire.

R307-204 establishes the procedures and the permitting process that land managers are required to follow to mitigate the impact of smoke on air quality and visibility in the State. Utah state implementation plans for regional haze and particulate matter rely on emission reduction credits from this rule.

The Utah Enhanced Smoke Management Plan, Appendix B of the SMP, provides details on the visibility requirements of the regional haze rule and operating procedures to reduce visibility impacts from smoke in Class I areas.

There is a Utah statewide master agreement for wildland fire, which includes an annual operating plan. This covers smoke management and spells out shared roles and responsibilities, including that the signatories agree to abide by the provisions of this SMP. The signatories are: US Forest Service, Bureau of Land Management, National Park Service, US Fish and Wildlife Service, Bureau of Indian Affairs, and the Utah Division of Forestry, Fire, and State Lands.

The SMP also applies to landowners who use prescribed fire on lands where the Department of Natural Resources (DNR) provides fire protection during the June-October fire season, with the exception of prescribed fires less than 20 acres and permitted through the DNR's Division of Forestry, Fire and State Lands.

This plan does not apply to agricultural burning and open burning as defined by Utah Code 19-2-114. Lands that have been classified as Conservation Reserve Program (CRP) lands, and are adjacent to agriculture lands, will be treated as agricultural lands and will not have to abide by the requirements of the SMP. However, those CRP lands that are adjacent to federal or state lands will be required to abide by the requirements of the SMP.

5. ORGANIZATION AND OPERATING PROCEDURES

Utah's smoke management program is a cooperative effort between the DAQ and the agencies that manage prescribed fire. The organizational structure consists of the Utah air oversight committee, the Utah airshed group, and a smoke program coordinator. Each signatory to the SMA has full membership in the airshed group.

- A. The air oversight committee consists of the senior management of the signatories to the SMA, plus the director of DAQ. Funding for the coordinator position and support functions will be provided as agreed upon by the air oversight committee.
- B. The airshed group is comprised of leaders from the land management agencies, a DAQ representative, and the smoke program coordinator. The airshed group meets at least once a year to:
 1. Provide overall management direction and guidance to the coordinator by functioning as an interagency steering committee to ensure appropriate implementation of the SMP;
 2. Review and evaluate the results of the previous burning season, de minimis burning, and future prescribed fires;
 3. Review procedures in the SMP and make revisions if necessary;
 4. Advise on appropriate boundaries for airsheds;
 5. Work towards resolving interagency, inter-airshed and inter-state smoke problems; and
 6. Review operating costs of the smoke management program.
- C. The smoke program coordinator (coordinator) is responsible for the daily operation and management of the SMP. Specifically, the role of the coordinator is to:
 1. Act as liaison and facilitate communication with all participating agencies;
 2. Perform smoke mitigation analysis to ensure requested prescribed burns will not cause or contribute to a NAAQS violation;
 3. Evaluate pre-burn and burn request information, meteorological data, and cumulative smoke effects. Based on this, recommend burn approval, conditional approval, or disapproval to the DAQ director (director);
 4. Communicate the director's decision to the land manager;
 5. Review and evaluate dispersion and emission reduction techniques (Appendix A), encourage the use of technology to assess and mitigate smoke impacts;
 6. Coordinate with counterparts in other states, both on day-to-day operations and long-term issues;

7. Manage a database of prescribed fires, emissions and emission reduction techniques from data submitted by land managers. This will be used to create an annual report (due April 15 of the following year) and to document contribution to NAAQS violations, if any;
8. Prepare and disseminate information on prescribed fire, wildfire, and air quality;
9. Provide smoke management training for agencies; and
10. Receive direction and oversight from the Utah airshed group and oversight committee.

6. PRESCRIBED FIRE REQUIREMENTS

This section outlines the reporting requirements for land managers when conducting prescribed fires.

A. Small Prescribed Fires (de minimis).

This category is for prescribed fires less than 20 acres/day and pile burning less than 30,000 cubic feet/day. It is intended for projects that have negligible air quality impacts. An annual review of this category is conducted by the airshed group. The following requirements apply:

1. The land manager shall notify the coordinator on the morning of the day of ignition.
2. Ignition can occur when the National Weather Service clearing index is 500 or greater.
3. With approval of the director, ignition may occur when the National Weather Service clearing index is between 400 and 499:
 - a. This approval is based on fuel type, tons of emissions, proximity to sensitive receptors, downwind values, distance from other burning, current and forecast air quality, and number of requests to burn within the airshed.
 - b. To request approval, the land manager is required to notify the coordinator with the above information via email or phone by 0800 hours the morning of the burn. The coordinator will make a recommendation to the director, and contact the burner with the decision.
 - c. If approved for burning with a clearing index below 500, the prescribed fire burn boss shall submit to the coordinator: hourly photographs, an hourly description of the smoke plume, hourly meteorological conditions, and a record of any smoke-related complaints. This can be done with the standard form for prescribed fire weather/smoke observations (Utah prescribed fire plan template appendix G) or equivalent.

B. Large Prescribed Fires

This category is for prescribed fires covering 20 or more acres and pile burns with 30,000 or more cubic feet of material per day. Three forms are required for large prescribed fires: pre-burn information, burn requests, and emissions reports. Land managers may also elect to submit those forms for small prescribed fires (defined above).

1. Pre-burn. Land managers shall submit pre-burn information to the coordinator at least one week before the burn window. This will be done through the online system or email. This is only required once for each prescribed fire project. In the event of changes or updates to this information, the land manager shall notify the coordinator. Required information includes:

- a. Project name, acres, and latitude and longitude;
 - b. Summary of burn objectives, fuel types, and ignition methods;
 - c. Any sensitive receptors within 15 miles, including any Class I area, nonattainment area, or maintenance area, with distance and direction in degrees from the project site;
 - d. The emission reduction techniques to be employed (Appendix A), smoke dispersion models used and results, and estimated total amount of particulate matter;
 - e. A map depicting both the daytime and nighttime smoke path and down-drainage flow for a minimum of 15 miles from the burn site with smoke-sensitive areas delineated;
 - f. Any other information needed by the director for smoke management purposes, or for assessment of contribution to visibility impairment in any Class I area; and
 - g. An electronic copy of the burn plan including these elements: prescription, resources, smoke management, contingencies and/or management action points, public and partner notifications, and safety.
2. Burn Request. Land managers are required to submit a burn request to the coordinator by 1000 hours two business days before the planned ignition of a large prescribed fire. The request should come through the online system or email. Burn requests shall include the following information:
- a. Project name consistent with the pre-burn information;
 - b. Start and end dates for the burn window, up to seven consecutive days;
 - c. Number of total acres for the burn window and estimated acres per day; and
 - d. Comments or any other information needed by the director for smoke management purposes.

The coordinator will make a recommendation to the director, who will issue a decision, either approving, approving with conditions, or denying burning by 1600 two business days before the beginning of the planned ignition. The burn approval decision will be given through the online system or email. If a land manager is not notified of the burn approval decision by 1600 hours, it is his/her responsibility to contact the coordinator or director to determine if burning is authorized.

The burn approval decision made by the director will be made using all available information regarding the prescribed burn. The criteria for making burn approval decisions include, but are not limited to:

- a. Proximity to populated areas and sensitive receptors
- b. Smoke and emissions modeling
- c. Forecast meteorological conditions
- d. Analysis of the emissions from prescribed fires in progress and proposed;
- e. Analysis of non-fire factors that may affect attaining the NAAQS;
- f. Analysis of the emissions from wildfires, including smoke transported from areas outside of Utah, to ensure cumulative smoke effects do not violate NAAQS;
- g. Existing and predicted local air quality;
- h. Protection of visibility in Class I areas as required by the regional haze rule (40 CFR 51.309(d)(6));
- i. Minimization of smoke impacts in Class I areas, roads or highways, airports, areas that are nonattainment, or other sensitive areas; and
- j. Other factors relating to protection of the NAAQS pursuant to 40 CFR Part 50.

The burn approval decision made by the director can be rescinded at any time, as outlined in Section 8, Part A of this plan. Once a burn request has been approved by the director, the notification of ignition falls on the land manager. The land manager must contact the coordinator by phone, text, or email each day of the burn window during which ignition will take place.

3. Emission Report. Within two business days of completing ignitions, land managers are required to submit an emission report for each day of large prescribed fire activity to the coordinator. The daily emission report will be used by the coordinator to generate an annual report of fire activities. The report will include the following information:
 - a. Date of ignition for the prescribed fire;
 - b. Forecasted clearing index for the airshed or from a spot weather forecast;
 - c. Total affected acres, actual black acres or number of piles burned, and a calculation of PM_{2.5} emissions;
 - d. Public interest regarding smoke, daytime smoke behavior and comments, and nighttime smoke behavior, if witnessed; and
 - e. Emission reduction techniques (ERTs) applied and evaluation of the effectiveness of the ERTs.

C. Annual Burn Schedule

Land managers proposing to burn more than 50 acres per year are required to submit to the coordinator an annual burn schedule by March 15th each year. Each agency will work with the coordinator to do this at the level they deem appropriate, i.e. forest-wide, district-wide, etc. The following information shall be included for all prescribed fires, including those smaller than 20 acres:

1. Project name;
2. Acres for the year, expected burn dates and burn duration; and
3. For projects without pre-burn information already submitted: latitude, longitude, fuel type, and planned use of emission reduction techniques.

This information may be used in state implementation plan development. Land managers will also report their annual accomplishments of non-fire treatments that can be considered alternatives to burning. The coordinator will compile the statewide schedule, including alternatives to burning, and submit it to the DAQ each year by April 15th.

7. WILDFIRE REQUIREMENTS

Land managers will notify the DAQ of wildfires. The coordinator will review the incident management situation report during fire season. Wildfire and prescribed fire emissions will be monitored for impacts on air quality and visibility and to track emissions for inventory and regulatory purposes.

8. MITIGATIONS

- A. Management of Ongoing Fires: If, after consultation with the land manager(s), the director determines that a prescribed fire, wildfire, or any emission from other sources is degrading air quality to levels that could violate the National Ambient Air Quality Standards, he/she may

rescind approved burn requests, and the land manager(s) will promptly stop igniting new prescribed fires and work with DAQ to most effectively mitigate current smoke emissions from fires already burning.

- B. Public Notification/Education: The coordinator, land managers, and DAQ will be responsible for providing the following public notification and education related to the SMP, with the responsible party is indicated in parenthesis:
1. Recent, current, and upcoming prescribed fire projects, location, size, and responsible agency (coordinator, land managers);
 2. Smoke impacts of wildfires and prescribed fires (coordinator, land managers);
 3. The role of prescribed fires and wildfires in accomplishing land management objectives (land managers);
 4. Issuing air quality alerts as appropriate (DAQ);
 5. Education on the health effects of smoke (coordinator, DAQ); and
 6. General contact information for the program (coordinator).
- C. Compliance: Land managers conducting a prescribed fire will permit DAQ staff to enter and inspect burn sites before, during and after burns, to verify the accuracy of the permit or prescribed fire plan information and compliance with the burn plan, if appropriate. Site inspection procedures will be coordinated with the prescribed fire burn boss and land manager for safety purposes prior to any site inspections.

All parties are committed to comply with the Clean Air Act and the best management practices available regarding emission production, reduction, and regional haze issues. Failure to comply with the procedures and conditions specified in state administrative rule or conditional approval may result in an enforcement action, such as a cease and desist order. The National Wildfire Coordinating Group Interagency Prescribed Fire Planning and Implementation Procedures Guide and agencies have direction for any Air Quality Notice of Violations (NOV) and provisions and requirements for reviews.

- D. Monitoring: Land managers will document effects of the prescribed fire on sensitive receptors and visibility in Class I areas. Documentation of smoke may be recorded on the form included in the Utah Interagency Burn Plan Template, or from a general fire behavior log. Nuisance smoke complaints by the public should be passed on to the coordinator as well as noted and recorded in the project file. DAQ staff will forward to the land manager any complaint calls that are received regarding smoke.

For large fires expected to last more than one day, or fires close to sensitive receptors, locating real-time particulate matter monitors at sensitive receptors may be warranted. The DAQ may assist in identification of instrumentation, site selection, installation of instrumentation, operation, calibration, quality assurance, quality control, laboratory analysis, and data interpretation.

Land managers will document pertinent information that may lead to improved future operations and a better understanding of smoke accumulation problems, impacts, and solutions. This will be included in the emission report that is submitted to the coordinator.

9. PROGRAM MANAGEMENT

A. Forms

Smoke management forms are on the smoke management system: www.smokemgt.utah.gov. Preferably, all forms should be submitted through the online system. PDF alternatives will be available from the coordinator.

Annual Burn Schedule. Due by March 15th each year
Pre-burn information. Due one week before first burn window
Burn request. Due by 1000 two business days before planned ignition
Emission Report. Due by 1000 two business days following the burn

B. Contact Info (Current as of 2021)

Director

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10. DEFINITIONS

Airshed - A part of the atmosphere that behaves in a coherent way with respect to the dispersion of emissions.

Air Quality - The characteristics of the ambient air (all locations accessible to the general public) as indicated by concentrations of the six air pollutants for which national standards have been established (e.g., particulate matter, sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide, and lead), and by visibility in mandatory Federal Class I areas. For the purposes of this Smoke Management Plan, concentrations of particulate matter are taken as the primary indicators of ambient air quality.

Annual Emissions Goal - The annual establishment of a planned quantitative value of emissions reductions from prescribed fire.

Burn Window - The period of time when the prescribed fire is scheduled for ignition.

Conservation Reserve Program (CRP)- CRP is a land conservation program administered by the Farm Service Agency. In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. Contracts for land enrolled in CRP are 10-15 years in length. The long-term goal of the program is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat.

Class I Areas - An area set aside under 42 U.S.C. 7491 to receive the most stringent protection from air quality degradation. Mandatory Class I Federal areas are: 1) international parks, 2) national wilderness areas which exceed 5,000 acres in size, 3) national memorial parks which exceed 5,000 acres in size, and 4) national parks which exceed 6,000 acres and were in existence on August 7, 1977. The extent of a mandatory Class I Federal area includes subsequent changes in boundaries, such as park expansions. There are five Class I areas in Utah: Zion National Park, Bryce National Park, Capitol Reef National Park, Arches National Park, and Canyonlands National Park.

Clearing Index - An indicator of the predicted rate of clearance of ground level pollutants from a given area. This number is calculated by the National Weather Service from daily measurements of mixing depth and average windspeed in the mixed layer.

De minimis - Something so small, whether in quantity, importance, or severity, that it is exempt from certain government rules and regulations.

Duff - The partly decayed organic matter on the forest floor.

Emission - The act of discharge into the atmosphere of an air contaminant or an effluent that contains or may contain an air contaminant; or the effluent so discharged into the atmosphere.

Emission Reduction Techniques (ERT) - The techniques for controlling emissions from prescribed fires to minimize the amount of emission output per unit or acre burned.

Director - The director of the Utah Division of Air Quality.

Fuel Loading - The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Land Manager - Includes any federal, state, local or private entity that administers, directs, oversees or controls the use of public or private land, including the application of fire to the land.

Maintenance Area – An area that has been re-designated by EPA from nonattainment to attainment of any National Ambient Air Quality Standard.

National Ambient Air Quality Standards (NAAQS) - The standards for maximum acceptable concentrations of pollutants in the ambient air to protect public health with an adequate margin of safety, and to protect public welfare from any known or anticipated adverse effects of such pollutants (e.g., visibility impairment, soiling, materials damage, etc.) in the ambient air. National standards have been established for particulate matter, sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide, and lead, and are specified in 40 CFR Part 50.

Nonattainment Area - An area which is shown by monitored data or which is calculated by air quality modeling (or other methods determined by the Administrator, EPA to be reliable) to exceed any National Ambient Air Quality Standard for such pollutant and includes any area designated as nonattainment under 42 U.S.C. 7407.

Oversight Committee - A group composed of senior fire management representatives of the agencies with wildfire management responsibilities in Utah: Bureau of Indian Affairs, Bureau of Land Management, National Park Service, US Forest Service, US Fish and Wildlife Service, and Utah Division of Forestry, Fire, and State Lands. For smoke program decisions this committee is termed the “Utah Air Oversight Committee”, and includes the DAQ director.

Particulate Matter - The liquid or solid particles such as dust, smoke, soot, or dirt found in air emissions.

Pile - Natural materials/debris resulting from some type of fuels management practices that have been relocated either by hand or machinery into a concentrated area.

Pile Burning - Burning of individual piles.

Prescribed Fire/Prescribed Burn - A wildland fire originating from a planned ignition in accordance with applicable laws, policies, and regulations to meet specific objectives.

Prescribed Fire Plan/Burn Plan - A plan required for each fire application ignited by management. Plans are documents prepared by qualified personnel, approved by the agency administrator, and include criteria for the conditions under which the fire will be conducted (a prescription). Plan content varies among the agencies.

Prescribed Fire Prescription - The measurable criteria during which a prescribed fire may be ignited to meet the prescribed fire objectives. The prescription will describe a range of low-to-high limits for the environmental or fire behavior parameters (or both) required to meet prescribed fire objectives. Only those parameters needed to identify the acceptable prescription window to meet prescribed fire objectives should be described. In addition to the prescribed fire objectives, the prescription should take into consideration constraints such as smoke management issues and perimeter control concerns.

Smoke Management - Includes but is not limited to techniques to reduce emissions and smoke impacts, to identify and avoid sensitive receptors, to monitor and evaluate the smoke impacts of each burn, and to coordinate among land management agencies to minimize cumulative impacts.

Sensitive Receptors - Population centers such as towns and villages, campgrounds and trails, hospitals, nursing homes, schools, roads, airports, mandatory Class I Federal areas, nonattainment areas, areas whose air quality monitoring data indicate pollutant levels that are close to health standards, etc. where smoke and air pollutants can adversely affect public health, safety and welfare.

Wildfire – A wildland fire originating from an unplanned ignition, such as lightning, volcanos, unauthorized and accidental human caused fires, and prescribed fires that are declared wildfires.

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

Wildland Fuel - Combustible naturally occurring plant materials.

Appendix A - Dilution, Avoidance, and Emission Reduction Techniques

Each land manager conducting prescribed fires will implement as many emission reduction and dispersion techniques as feasible for individual prescribed fires. A list of proposed emission reduction techniques for individual prescribed fires will be included in the annual burn schedule and/or pre-burn information form to support establishment of the annual emissions goal. An evaluation of the techniques used by the land manager to reduce emissions or manage smoke will be included in the emission report submitted by land managers to the director. The following is a list of emission reduction and dispersion techniques that may be used by land managers (there may be other good options not on this list):

1. Dilution: Mixing smoke through a greater volume of air. This can be achieved by igniting burns under good-to-excellent ventilation conditions and suspending operations if poor smoke ventilation conditions develop.
2. Avoidance: Considering meteorological conditions (e.g. wind direction) when scheduling or permitting burn projects to prevent incursions of smoke into sensitive areas.
3. Reducing biomass: timber sales, grazing, or public firewood access (when providing information to the public on the adverse impacts of using green or wet wood as fuel);
4. Using mass ignition techniques such as aerial ignition by helicopter to produce high intensity fires with short duration impacts;
5. When scheduling a burn, consider smoke impacts on activities in the local community;
6. Burning only those wildland fuels essential to meet management objectives;
7. Minimizing consumption of non-targeted fuels such as duff and large diameter classes by monitoring fuel moisture and timing the burn appropriately.
8. Minimizing dirt content when slash piles are constructed by using brush blades on material-moving equipment and by constructing piles under dry soil conditions or by using hand piling methods;
9. Burning piles or windrows, thus shifting combustion to the more efficient flaming phase;
10. Airshed sharing/scheduling: for multiple burn requests in the same vicinity, spread smoke impacts over a broader time period and geographic area;
11. Maintenance burning in a periodic rotation, mimicking natural fire cycles to reduce excessive wildland fuel accumulations and subsequent excessive smoke production during wildfire;
12. Minimizing smoke impacts to roads, highways, and airports by visual monitoring, signage, and soliciting guidance from transportation and airport personnel;
13. Recognizing that Class I airsheds, areas that are nonattainment for the NAAQS, and/or other smoke sensitive receptors may require additional planning and conditions placed on their burn request approval.
14. Ensuring that wildfires that may burn for extended periods of time consider smoke management as part of strategic planning.

Appendix B - Utah Enhanced Smoke Management Plan 2003, revised 2020

I. PURPOSE

The Utah Enhanced Smoke Management Plan (ESMP) contains procedures to evaluate and address visibility impairment from smoke. This plan is designed to meet the requirements of 40 CFR 51.308/309: the regional haze rule. This ESMP is an appendix to the Utah Smoke Management Plan (SMP), is incorporated in the Utah regional haze SIP, and may be revised and submitted to EPA for approval with the concurrence of Utah DAQ and all signatories to the Utah statewide master agreement (SMA) for wildland fire.

II. GOALS

To balance the need to protect visibility in Class I areas with the recognition that these areas are fire dependent ecosystems. Fulfilling the missions of the National Park Service and other land managers necessarily includes the use of fire.

To develop an ESMP that is based on the criteria of efficiency, economics, law, emission reduction opportunities, land management objectives, and reduction of visibility impacts in accordance with the regional haze rule

III. SCOPE

The ESMP provides direction and recommendations for managers involved in wildland fire management. The ESMP was developed cooperatively by all signatories to the SMA and applies to those signatories uniformly across the state of Utah.

IV. ELEMENTS

A. Actions to Minimize Emissions from Fire

Utah's ESMP focuses on three approaches to minimize emissions: use of emission reduction techniques, establishing emissions goals, and use of burn manager qualification programs.

1. Emission Reduction Techniques

An emission reduction technique (ERT) lowers the amount of emissions produced per acre or unit burned. There are six general categories of ERTs: reduce area burned, reduce fuel load, reduce fuel production, reduce fuel consumed, schedule burning prior to new fuel growth, and increase combustion efficiency. Further details and other ideas are in Appendix A of the SMP. Utah land managers use ERTs as appropriate and document them in their pre-burn information and daily emissions report.

2. Emissions Goals

As required by the regional haze rule, the state will have an annual emissions goal- a planned quantitative value of emissions reductions from prescribed fire. The emission goal will be set by April 15. The emission goal will be developed in cooperation with state and federal land management agencies and private entities.

To determine the goal, ERTs will be determined using feasibility criteria for upcoming prescribed fire projects, and then the benefit from using the technique(s) will be

quantified. At the end of the fire season, an assessment will be made of the techniques applied during the previous fire season to verify results.

3. Burn Manager Qualification Programs

Burn manager qualification programs have been developed by federal and state land management agencies that use prescribed fire. These burn manager qualification programs include information on ERTs and non-burning alternatives to fire. A burn manager qualification program certifies that the individual is knowledgeable of alternatives to burning and ERTs and has the experience to implement them. Under the ESMP, land managers will update training on non-burning alternatives and ERTs as research improves.

B. Evaluation of Smoke Dispersion

Under the ESMP, smoke dispersion techniques such as dilution (burning during periods of good atmospheric dispersion, coordinated scheduling of prescribed fires to minimize cumulative effects) and avoidance (transporting smoke away from sensitive areas) will be used to reduce impacts on Class I areas. An evaluation of smoke dispersion will be made using the following tools and methods: the burn authorization process specified in the SMP, use of dispersion modeling (to assist in the evaluation of dispersion conditions), and use of field level data, (e.g., meteorological data, maps, photos, and qualitative observations).

1. Burn Authorization Process

Under the Utah SMP, burn authorization decisions are based on burn request information, meteorological information, national fire databases, information sharing from adjoining states, and air quality monitoring information.

Meteorological information is gathered from the National Weather Service (NWS), various satellites, and other predictive tools. The NWS offices issue the clearing index, a predictor of how quickly pollutants dissipate in an area, and other weather forecast information. Satellite information gives various views of cloud development and paths, and progress of frontal systems.

Daily reports from national fire databases such as the National Incident Coordinator Center (NICC) supply information on wildland fires throughout the country.

Air quality monitoring information is gathered from the UDAQ's Monitoring Center's website that provides readings of particulate matter levels.

All of the above information is part of the burn authorization process in the Utah SMP. Under state administrative rule, R307-204, land managers are required to submit pre-burn information including information on proximity to Class I areas, and burn requests to the director prior to conducting a burn. This allows for the scheduling of prescribed burns to reduce the impacts on visibility in Class I areas and the generation of regional haze. No prescribed fires over 20 acres can be ignited before the director approves or conditionally approves the burn request.

2. Dispersion Modeling

Under the ESMP, smoke dispersion modeling may be conducted by Utah DAQ and land managers to evaluate smoke behavior if there is a concern about smoke impacts from a proposed prescribed burn(s). These tools can be used in the permitting, planning and implementation process in order to better determine impacts, including the cumulative effects of multiple burns.

3. Field Level Data

The Utah SMP and state administrative rule require land managers to submit pre-burn information for approval prior to ignition. This includes sensitive receptors and any Class I or nonattainment areas within 15 miles, including distance and direction of the receptor from the project site. This information, as well as the prescribed fire plan that is submitted by the land manager, provides field level data that is essential for supporting the dispersion evaluation.

C. Alternatives to Fire

Alternatives to fire are techniques that replace fire as a means to achieve a particular land management objective (e.g., reduction of fuel loading, manipulation of fuels, enhancement of wildlife habitat, ecosystem restoration, etc.). Under the ESMP, non-burning alternatives to fire do not include techniques used in conjunction with fire. Projects with multiple treatment techniques, one of which is fire, should employ ERTs.

Federal land managers evaluate non-burning alternatives to fire in programmatic plans as a requirement of the National Environmental Policy Act (NEPA). Therefore, the decision to use fire or non-burning alternatives to fire has often been determined prior to development of the operational-level plan or burn plan.

Under the Utah SMP, the types of non-burning alternatives to fire and the acres treated during the previous calendar year will be summarized annually using land manager databases. The summary will show the treatment types of non-burning alternatives and the acres treated.

D. Public Notification

The Utah SMP emphasizes the importance of public notification by requiring land managers to notify the public of upcoming fire activities. In addition, public notification information is a component of burn plans that are developed by state and federal land managers.

Under the Utah ESMP, a one-stop information center has been added to the existing Utah SMP website to provide a list of upcoming projects as a means to notify the public about prescribed fire or wildland fire projects. This tool provides another means for information dissemination.

E. Air Quality Monitoring

The Utah SMP and state administrative rule require land managers to monitor the effects of prescribed fires on smoke sensitive receptors, and visibility in Class I areas using either visual monitoring or sampling equipment.

Under the ESMP, visual monitoring will be used in areas of little burn activity or areas located farther away from Class I areas. UDAQ in cooperation with land managers may consider conducting a more widespread and comprehensive monitoring program as fire activity increases. The use of cameras, satellite imagery and aerial monitoring to track and document smoke

movement could be considered. The use of IMPROVE monitoring data may have to be supplemented by air quality monitoring outside of Class I areas to track smoke movement.

As an aid to land managers, the coordinator and/or DAQ may provide a description of the monitoring equipment that is available, location of equipment, and equipment training opportunities.

F. Surveillance and Enforcement

Under the SMP, land managers will permit UDAQ staff to enter and inspect burn sites before, during, and after burns to verify the accuracy of the burn plan and compliance with the burn plan, if appropriate. For safety purposes, site inspection procedures will be coordinated by the UDAQ with the prescribed fire burn boss and land manager prior to any site inspections.

G. Program Evaluation

The ESMP will be reviewed for effectiveness by the UDAQ in cooperation with the land managers on an annual basis. In addition, the regional haze rule requires progress reports every five years to EPA describing how well the enhanced smoke management program is being implemented as needed to meet reasonable further progress requirements. Annual evaluations of the overall smoke management program will provide the information needed for periodic reports.

The following elements of the ESMP will be evaluated during annual evaluations:

1. Implementation
2. Burn activity summaries
3. Smoke complaint summaries
4. Compliance and enforcement
5. Sections needing clarification or improvement
6. Progress towards goals including visibility improvement/impact reduction
7. Recommendations for revisions
8. Scientific advancements

H. Class I Awareness

State administrative rule, R307-204, requires land managers to submit pre-burn information for approval by the director prior to ignition of prescribed fires. This inter-state burn authorization program utilizes meteorological information, prescribed burn information, and updates of fire activity in adjoining states to schedule burns to avoid impacts of smoke on public health. Under the ESMP, land managers are required to identify whether a Class I area may be impacted by a burn prior to ignition. This additional information on potential impacts on visibility in Class I areas will be utilized within the burn authorization program to prevent cumulative impacts of smoke to visibility in Class I areas from prescribed fires within Utah boundaries.

I. Regional Coordination

Under the SMP, notification of upcoming prescribed fires is provided to adjoining states for coordination purposes. This process of information sharing is important to help adjoining states that have burn authorization programs prioritize their prescribed burn projects.

Likewise, information on upcoming and ongoing prescribed fires and wildfires in neighboring states is used for burn scheduling purposes within Utah boundaries to reduce cumulative smoke impacts on visibility in Class I areas within and outside of Utah. This information is gained from online products such as the incident management situation report, and phone calls and emails from adjoining states. Smoke from wildfires is more likely to be of longer duration and has the greater potential for impacts on visibility in Class I areas and generation of regional haze.

In the future, it may be necessary to develop and implement a regional coordination center to prioritize burns in areas that would be most likely to create cross-jurisdictional impacts. To do so, regional meteorological and air quality information would be shared in order to produce regional approval and real-time tracking of burns and their smoke impacts.

New modeling frameworks, such as BlueSky, are being developed that provide smoke column footprints and estimates of smoke concentrations. These tools will be useful for regional coordination efforts.