



Bureau of Indian Affairs Fuels Management Program

Supplement to the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide



2008

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1. Introduction

PURPOSE

This document sets standardized operating procedures, guidelines and policy for the management and administration of the BIA Hazardous Fuels Reduction (HFR) Program for Indian Country. **It is intended to function as a supplement to Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide, hereafter referred to as the Interagency Guide.** The program is administered through the BIA Branch of Wildland Fire Management located at the National Interagency Fire Center (NIFC) in Boise, Idaho.

SCOPE

This volume addresses Bureau of Indian Affairs practices and procedures for hazardous fuels management on Indian lands and other lands as described in the following section. Notwithstanding requirements set forth in specific Tribal Compacts, the appropriate Agency Administrator shall ensure that the practices and procedures prescribed herein are followed.

OPERATIONS ON NON-TRUST LANDS

Tribal trust, individual allotments, and restricted Indian lands shall be considered the highest priority for treatments. However, there may be occasions when it is justifiable to extend HFR operations to other adjacent lands (such as tribal fee, private, state, or federal property).

Fuels treatments may be funded or partially funded within WUI areas when an approved Cooperative Agreement authorizing the BIA to develop and implement a Prescribed Fire or Mechanical Fuels Treatment Plan on the Landowner's property is in place. The agreement must clearly describe the affected lands, treatment objectives, and the responsibilities of each party (example agreement is contained in the BIA Business Rules Handbook).

Fuels treatments may be funded or partially funded within non-WUI areas when the following additional conditions have been met:

- Planning and implementation is conducted collaboratively.
- Treatments can be justified for firefighter or public safety, or protection of property.
- When it is economically beneficial to the government to include private land adjacent to or intermixed within a fuels treatment unit (for example, moving a perimeter of a prescribed fire to a road or natural barrier on private land to avoid the cost of constructing a significant amount of control line). In such cases, the cost saving is clearly a benefit to the government.

Accomplished acres may only be reported on private land if those acres are included in the Prescribed Fire Plan or Mechanical Fuels Treatment Plan.

TERMINOLOGY

Wildland fire definitions established by the National Wildfire Coordinating Group (NWCG) should be used consistently at all locations, particularly in the interagency fire community, to maintain clarity in describing actions being undertaken, and are hereby incorporated by reference. A complete glossary of wildland fire terms can be found through the NWCG website <<http://www.nwcg.gov/pms/pubs/pubs.htm#PMS205>>.

Selected Definitions

Following are some important terms, not included in the NWCG Glossary, provided to assist in the use of this volume of the Manual:

- **Air Quality.** The composition of air with respect to quantities of pollution therein; used most frequently in connection with “standards” of maximum acceptable pollutant concentrations.
- **Burn Prescription.** Measurable criteria that define conditions under which a prescribed fire may be ignited and allowed to continue burning, guide selection of appropriate management responses, and indicate other required actions.
- **Escaped Prescribed Fire.** Fire which has exceeded or is expected to exceed prescribed fire holding and contingency capabilities, prescription elements or criteria established in the prescribed fire plan triggering the declaration of wildfire.
- **Mechanical Fuels Treatments.** Refers to mechanized and hand biomass removal, thinning, chipping, mastication, mowing, crushing, hand and machine piling, and lop and scatter.
- **Other Non-Fire Fuels Treatments.** Refers to any non fire treatments other than mechanized and hand treatments. Includes biological, chemical, seeding and grazing treatments.
- **Prescribed Fire Complexity.** Summary rating of prescribed fire project complexity as determined by the current NWCG Complexity Analysis Worksheet.
- **Silvicultural Prescription.** Measurable criteria that define a specific treatment(s) that will meet resource and management objectives within desired timeframes. It is a detailed descriptive narrative of the stand diagnosis, prescribed silvicultural treatments, and schedule for future treatments and usually stand specific, but may encompass several stands, a cover type or forest type (landscape level treatments), where the desired treatment result is the same.
- **Silvicultural Examinations.** The silvicultural examination is the process for obtaining data needed to identify existing conditions for stand diagnosis and prescription development.

2. Program Leadership, Policy and Guidance

MISSION STATEMENT

The Bureau of Indian Affairs National Fuels Management Program provides leadership, executive direction, technical assistance and guidance to regional, tribal and agency hazardous fuels management programs. Our aim is to support fuels projects that:

- Create a safe environment for fire fighters and those who live and recreate in fire prone ecosystems
- Meet tribal resource management goals
- Involve collaborative efforts with stake holders to reduce risks to communities, restore and maintain healthy ecosystems, and protect our cultural and natural resources
- Restore fire as a natural and managed process in fire dependent ecosystems
- Develop and maintain a competent and skilled work force
- Integrate fuels reduction with other natural resource program activities
- Support biomass utilization and promote healthy economies
- Incorporate fire monitoring to measure fire effects and assure desired conditions are met

We will accomplish these goals by developing and maintaining policy and guidance, allocating funds to high priority projects, providing technical assistance, distributing information, participating in national interagency initiatives and working groups, and conducting regional program reviews and evaluation.

We are committed to work with regions, tribes, agencies and those living in fire-prone ecosystems in a collaborative working environment using sound social, economic and ecological management principles and effective communication.

PROGRAM MANAGER RESPONSIBILITIES

Associate Director, Fire Use and Fuels

The Associate Director provides national leadership for Bureau's Hazardous Fuels Management program which includes prescribed fire, mechanical treatments, fire effects monitoring, biomass utilization, and fire prevention-education programs. The position provides executive oversight, coordination, and develops procedural policy guidance for the planning and implementation of hazardous fuels treatments and distribution and use of program funds. The position is accountable for the appropriate use of these funds as guided by the National Fire Plan, its supporting strategy documents, and Departmental Directives. The Associate Director integrates national policy direction, with objective decision models and tribal land management goals to assess risks, evaluate program capacity, prioritize treatments, and weigh program efficiencies to effectively allocate HFR and Wildland Fire Prevention funds to the Regions. The position participates on national interagency working teams and

task groups and provides leadership to the National Interagency Fuels Coordination Team which is comprised of national fuels leads responsible for national interagency HFR program coordination, budget development, policy and program continuity.

Deputy – Fire Use and Fuels

The Deputy position in the Fire Use and Fuels program is responsible for a vast number of duties within the overall Fuels Program many of which support the daily requirements of the Fuels Program. The emphasis of the position is to coordinate the development of the Bureau's prescribed fire and fuels management annual program of work; to ensure proper distribution of fuels management funds to Regions; to track records of all fuels management funds distributed and prior year carryover funds; and to provide national leadership which is in accordance with national interagency direction and in a manner that provides quality and timely services to the BIA and Tribes.

In addition, the position is responsible for the development and implementation of the Bureau's wildland fire prevention and education program and national fire trespass and investigation policies and procedures as well as serve as the Bureau's technical advisor in prevention, education, fire investigation and fire trespass providing guidance and assistance to field offices in the development of local policies and practices. To accomplish this, the position is a direct supervisor for three Regional Prevention/Wildland Urban Interface Specialists located at various duty stations throughout the nation.

Fire Ecologist

The National Office Fire Ecologist is the agency lead for the fire effects monitoring program, smoke management and air quality issues, wildland fire use planning and implementation, and application of LANDFIRE and other advanced tools for fuels management planning.

The position is responsible for providing resources and policy guidance to regional and local fuels managers to ensure:

- Monitoring of fuels treatments is adequate to meet agency and interagency policy and direction and provide information useful for decision-making at all levels.
- Ecological knowledge and adaptive management principles are applied to fuels treatments in Indian Country.
- Applicable smoke management and air quality policies and regulations are adhered to in prescribed fire planning and implementation.
- Wildland fire use events are managed in accordance with interagency policy and tribal land management objectives.
- Analysis tools are available and useable to assess, manage and prioritize hazardous fuels reduction projects.

Fuels Program Analyst

The Fuels Program Analyst supports the fuels management program through data management, analysis, archiving and reporting. The position provides technical support and coordinates technical transfer and training in the application of LANDFIRE, GIS, NFPORS and other advanced tools for fuels management planning.

The position is responsible for providing resources, technical assistance and policy guidance to regional planners and fuels specialists to ensure:

- NFPORS data is entered accurately and timely
- HFR program targets are accounted for
- Analysis tools are available and useable to assess, manage and prioritize hazardous fuels reduction projects and perform mid to fine-scale risk assessments.
- National data is available for regional and local planning applications

The position provides data analysis and resources to national program staff to ensure:

- Accomplishment reporting is timely and accurately.
- Data for HFR program performance measures is maintained and accurate.
- Consistency between the national HFR database, NFPORS and FFS.
- Planning data is maintained and accurate for application in objective funding allocation models.
- Data and trend analysis is available to aid in key management and policy decisions.

BIA FUELS MANAGEMENT POLICIES

Basic Policies

The following policies apply to all Indian trust lands managed by the Secretary:

- Hazardous fuels reduction treatments will be designed and implemented to reduce the risk and consequences of wildfire to communities and ecosystems.
- Hazardous fuels treatments may be used to restore and maintain healthy ecosystems.
- Fuels management will promote the safety of firefighters, employees, and the public, and meet land management objectives.
- Fuels treatments may be used to affect reductions in both naturally occurring fuels and fuel accumulations resulting from resource management activities.

- Optimally, fuels treatments should be incorporated with other land management practices, like timber harvest, to meet tribal goals and objectives in a holistic management approach.
- Fuels management planning will be fully integrated with land management planning, particularly Fire Management Plans and Wildfire Prevention Plans.
- Hazardous fuels reduction treatments should be planned and implemented in an interdisciplinary and collaborative manner with Tribes, other Federal, State, and local partners.
- Public education is critical to the success of the fuels management program and should be integrated with the planning and implementation of hazardous fuels treatments.

Environmental Compliance

Fuels projects must comply with the National Environmental Policy Act (NEPA) in accordance with direction found in the Bureau NEPA Handbook, IAM Part 59, 3-H. Agency fuels management actions shall be fully addressed in a programmatic NEPA document associated with a Fire Management Plan, Fuels Management Plan, or other applicable land management plan. The NEPA document should provide for the full range of hazardous fuels reduction treatments to be employed. Adequate Tribal involvement is an essential aspect of the NEPA process. Other key environmental compliance laws associated with hazardous fuels management include:

- National Historic Preservation Act
- Endangered Species Act
- Clean Air Act
- Clean Water Act

The initial step in the NEPA process involves determination whether proposed fuels treatments are addressed in an existing Categorical Exclusion (CE), Environmental Assessment (EA), or Environmental Impact Statement (EIS). If necessary, it may be possible to supplement or amend an existing document to include the proposed treatments. If this is not possible, a new NEPA document must be prepared.

If site-specific treatments are not addressed in a programmatic NEPA document, Categorical Exclusions are available for use under Bureau authorities found in the NEPA Handbook or Departmental authorities established by the Healthy Forest Initiative. The key in Appendix 2a may be used to determine whether a hazardous fuels project may be categorically excluded under Bureau or Departmental authorities. Appendix 2b contains detailed information on the NEPA compliance process for fuels treatments; see Chapter 6 and Appendix 6a for the NEPA compliance process for Fuels Management Plans.

Silvicultural Prescriptions

A silvicultural prescription is a detailed descriptive narrative of the stand diagnosis, treatment objectives, prescribed silvicultural treatments, and schedule for future treatments. In reference to commercial harvest and utilization of forest products The Indian Forest Management Handbook, Volume 3, Chapter 2.4 states: “In order to ensure quality and uniformity of management on Indian forest lands silvicultural prescriptions shall be required for all treatments that affect the present and/or long term character of a forest stand. These include commercial harvesting, reforestation, pre-commercial thinning, fuels treatments, etc.” A silvicultural prescription prepared for commercial timber harvest, woodlands management, or other management activity should include any necessary hazardous fuels reduction treatments associated with the prescribed treatments.

In addition to the requirements set forth in the Indian Forest Management Handbook, a silvicultural prescription is recommended for all hazardous fuels management actions on forested lands.

Appendix 2a. Categorical Exclusions Table

	Old 516 DM 6 Appendix 4 BIA Cat X's 9/14/98	New 516 DM 2 Appendix 1 DOI Cat X's 6/30/03	Effect of New Cat X on Bureau Activities	
			Current Management Plan in Place with Programmatic EA/ EIS	No Current Management Plan /No Programmatic EA/EIS
Reduction	Allows: • Prescribed fire on less than 2000 acres when in compliance with a current management plan addressed in an earlier NEPA analysis.	Allows: • Hazardous fuels reduction activities using prescribed fire not to exceed 4,500 acres.	• Increases prescribed fire project size from 2000 to 4,500 acres. However, additional 2,500 acres must meet all other requirements of New Cat X.***	• Allows for the implementation of burn treatments up to 4,500 acres in size which meet all other requirements of New Cat X.***
Fuels	• Forest Stand Improvement projects less than 2000 acres when in compliance with a current management plan addressed in an earlier NEPA analysis.	• Mechanical methods for crushing, piling, thinning, pruning, cutting, chipping, mulching, and mowing, not to exceed 1,000 acres.	• No Effect. In fact, the old BIA Cat X provides for an additional 1000 acres to be treated.	• Allows for the implementation of mechanical treatments up to 1,000 acres in size which meet all other requirements of New Cat X.***
Hazardous Activities		***Such activities: Shall be limited to areas (1) in wildland-urban interface and (2) Condition Classes 2 or 3 in Fire Regime Groups I, II, or III, outside the wildland-urban interface; Shall be identified through a collaborative framework as described in AA Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan;@ Shall be conducted consistent with agency and Departmental procedures and applicable land and resource management plans; Shall not be conducted in wilderness areas or impair the suitability of wilderness study areas for preservation as wilderness; Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and may include the sale of vegetative material if the primary purpose of the activity is hazardous fuels reduction.		
Post-Fire Rehabilitation Activities	• BAER Activities on not to exceed 10,000 acres.	• Post-fire rehabilitation activities not to exceed 4,200 acres (such as tree planting, fence replacement, habitat restoration, heritage site restoration, repair of roads and trails, and repair of damage to minor facilities such as campgrounds) to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire. Such activities: Shall be conducted consistent with agency and Departmental procedures and applicable land and resource management plans; Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure; and Shall be completed within three years following a wildland fire.	• No Effect. In fact, the old BIA Cat X provides for an additional 5,800 acres to be treated.	

Appendix 2b. NEPA Compliance Process for Fuels Treatments

The National Environmental Policy Act of 1969 (NEPA) established the Council on Environmental Quality (CEQ) which promulgates regulations for implementing the Act. All statutory authorities, and specific roles and responsibilities of BIA officials for compliance with NEPA are contained in 59 IAM 3.

Categorical Exclusions (CEs) pertain to actions that have been pre-determined to not have a significant impact on the environment. CEs that apply to all agencies within the Department of Interior are found in 516 DM 2, Appendix 1; those specific to the Bureau of Indian Affairs in 516 DM 10.5. Most CEs have qualifying conditions, such as acreage thresholds or a requirement that the actions be addressed in prior, overreaching NEPA analysis. If it is determined the proposed project is covered by a valid CE, an Exception Checklist must be completed and signed by the BIA Regional Archaeologist, the appropriate BIA Agency of Regional Office Environmental Coordinator, and the appropriate BIA line officer. Once signed, the proposed project may proceed without public comment or any further delay. The approved BIA Exception Checklist is found in Appendix 7 of the BIA NEPA Manual.

Actions not Categorically Excluded must be addressed in an Environmental Assessment (EA) disclosing the environmental effects of alternatives, including the “No Action Alternative.” All programmatic plans, including Fuels Management Plans and Fire Management Plans, must be addressed in an EA. Upon review of the EA, if warranted, the appropriate line officer will sign a “Finding of No Significant Impact” (FONSI) which must be available for public review for a period of 30 days. A “Notice of Availability” must be posted in public locations and detail where and when the FONSI and EA are available for review and where any public comments may be submitted. Depending on the scope of the EA, additional posting via local media may be appropriate.

All proposed fuels projects must comply individually with cultural resource protection legislation. The most prominent is the 1966 National Historic Preservation Act, specifically Section 106, which considers the presence of archaeological resources within a project area and how the undertaking (proposed treatment methods) may affect them. The process consists of staged consultation and review between the BIA, Tribe, and State or Tribal Historic Preservation Office combined with inventory and documentation of cultural resources (archaeological sites and Traditional Cultural Properties) within the targeted area. The aim of the consultation and review is to arrive at a consensus agreement for the protection of cultural resources. In most cases for fuels projects this means avoidance of significant cultural resources. All cultural resources are protected under the Archaeological Resources Protection Act and any inadvertent or intentional damage can result in legal prosecution.

All proposed fuels projects must also comply with Section 7 of the Endangered Species Act of 1973. Section 7(a)(2) of the Act directs all federal agencies to consult with the Secretary of the Interior, as represented by the US Fish and Wildlife Service, to ensure that federal actions are not likely to jeopardize the continued existence of Threatened and Endangered species or their habitats. A professional biologist must prepare a Biological Assessment (BA) to determine how a project is likely to affect listed species or designated Critical Habitat,

both positively and negatively. The BA must make one of three conclusions regarding each listed species: “No Effect”, “May Affect (Not Likely to Adversely Affect)”, and “May Affect (Likely to Adversely Affect).” A “No Effect” determination may be made by agency biologists and does not require submittal to or approval by US Fish and Wildlife Service. Both “May Affect” determinations trigger consultation with US Fish and Wildlife Service and require their concurrence and typically render projects ineligible for Categorical Exclusion.

The cultural resource clearance and BA can then be inserted into overarching NEPA documentation, including CEs and EAs.

3. Prescribed Fire Supplemental Policies and Procedures

INTRODUCTION

The Interagency Guide provides unified direction and guidance for prescribed fire planning and implementation. All Bureau prescribed fire management activities will comply with the requirements and procedures set forth in the Interagency Guide.

This Chapter addresses additional Bureau of Indian Affairs (Bureau) specific requirements. These requirements pertain to all Bureau prescribed fire actions including those undertaken by contractors and private individuals authorized by permits or lease agreements, provided these actions are supported in an approved Land/Resource Management Plan, Forest Management Plan, Fire Management Plan or other relevant Bureau-approved strategic plan.

Monitoring activities associated with prescribed fire, including smoke monitoring, is addressed in the Chapter 7, Monitoring.

IMPLEMENTATION ORGANIZATION AND QUALIFICATIONS

Qualification Standards

With the exception of contractors and cooperators, as described immediately below, all personnel involved in prescribed fire operations will meet qualification standards set forth in the National Wildfire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualification System Guide (PMS 310-1).

Contractor/Cooperator Qualifications.

Qualification requirements for non-federal contractors and private individuals authorized by permits or agreements will be determined jointly between the Bureau and the cooperators in accordance with NWCG PMS 310-1 and prescribed fire complexity (as determined by the Complexity Analysis). These requirements, including training, experience, qualifications, personal protective equipment, and fitness, will be documented in a formal agreement approved by both parties. The Bureau may contract or otherwise permit implementation of all or part of authorized prescribed fires conducted on Indian trust lands. If the contractor/cooperator does not meet NWCG qualifications, this authorization will be limited to low complexity burns.

Type 3 Burn Boss

The Interagency Guide provides for assignment of a Type 3 Burn Boss to implement low complexity prescribed fires excluding those with greater than a negligible potential for spread or spotting outside the project area, multiple fuel models, or

aerial operations. In addition, for Bureau-authorized prescribed fires, assignment of a Type 3 Burn Boss will be limited to those prescribed fires with a Complexity Summary Rating of low for each of the three complexity factors (risk, potential consequences, and technical difficulty).

Due to the nature of these types of burns, a Type 3 Burn Boss may perform multiple duties such as Firing Boss, Holding Specialist, or Fire Effects Monitor.

RESPONSIBILITIES

Prescribed fire program oversight and review is conducted to ensure programs are successful in meeting established goals and objectives, conform with established policies and procedures, identify deficiencies, and initiate corrective action(s). Responsibilities for this oversight and review have been delegated to various organization levels. IAM Part 90 Section 1.7 identifies the responsibilities of Bureau officials including the Director, Bureau of Indian Affairs; Chief, Division of Forestry; Chief, Branch of Fire Management; Regional Director; and Agency Superintendent.

Agency Administrator

The Interagency Guide determines responsibilities for Agency Administrators, Fire Management Officers, and other key prescribed fire positions. All Agency Administrator responsibilities stipulated in the Guide fall under the authority of the Regional Director, unless all or parts of these responsibilities have been formally delegated to Agency Superintendents.

Multi-Jurisdictional Plans

Prescribed fire projects extending beyond the boundaries of Indian Trust lands will require a multi-jurisdictional plan and approval by all cooperators.

SAFETY

Managers and all personnel will adhere to established policies and procedures to safely implement prescribed fire.

Accident Investigation

DM Part 485 Chapter 7 specifies the requirements for reporting of Departmental incidents and accidents and conducting serious accident investigations. Appendix 2 of Part 485 specifically addresses prescribed fire serious accident investigation. The Bureau Safety and Health Handbook, Release 1-1657, provides additional guidance relating to accident investigation and reporting.

Commitment to Safety

Additionally, all prescribed fire personnel will openly demonstrate commitment to safe prescribed fire operations by:

- Insisting on daily briefings and ensuring good communication up and down the chain of command in all operations; and
- Considering all viable safe alternatives to high-risk operations; and
- Encouraging all personnel to promptly report (through the SAFECOM or SAFENET [aviation] processes) safety discrepancies or plan deviations without fear of retaliation; and
- Taking timely actions to address unsafe behavior, operations or attitudes and to appropriately reward positive actions; and
- Requiring timely and complete post project evaluations including concise documentation of safety-related issues that addresses any needs for operational improvements.

PRESCRIBED FIRE PLAN

Information provided in prescribed fire plans should address the full range of burn prescriptions, ignition strategies and methods, holding requirements, smoke management techniques, and other plan elements that will be conceivably applied during implementation. Furthermore, the plan should be sufficiently detailed to provide for safe and efficient implementation by any qualified off-unit Burn Boss, from any of the five federal wildland fire agencies, with only a minimal need for local orientation.

Programmatic Plans

Programmatic plans may be developed to address prescribed fire projects within a single administrative unit (approving authority) encompassing multiple burn units with the same complexity rating, ignition methods, holding requirements, burning prescriptions, organizations and equipment, etc. Vegetation types and fuel models can vary within the unit as long as fire behavior remains within prescribed conditions. Programmatic prescribed fire plans should not be considered for high complexity burns. Typical categories of prescribed fires for which a programmatic planning approach may be appropriate include low and moderate complexity field burning, ditch bank burning, pile burning, jackpot burning, and broadcast burning of activity slash.

Programmatic plans are also appropriate for larger scale, landscape level moderate complexity restoration/maintenance underburns, where the conditions described above exist. The complexity rating for a programmatic plan should reflect the highest potential rating for conditions under which the plan will be implemented.

Burn unit supplements may be developed to address site-specific considerations and requirements. Supplements must fall within the scope and be tiered to the associated programmatic prescribed fire plan. Supplements are intended to provide the required site-specific information to safely and efficiently conduct the prescribed fire. They describe characteristics unique to each burn unit including description of the fire area, objectives, pre-burn considerations, ignition and holding plans, smoke management, etc. The scope and detail of burn unit supplements will vary depending on the level to which they are addressed in the programmatic prescribed fire plan. Supplements may be prepared subsequent to the programmatic plan. Like prescribed fire plans, subsequent supplements are considered amendments and must be technically reviewed and approved prior to implementation.

Project File

In addition to the required elements referenced in the Interagency Guide, the following information will be documented and maintained in the project file:

- After Action Review (AAR)
- Implementation Costs
- Monitoring Plan and Post Burn Monitoring Report
- Smoke Monitoring Data Sheet

Escaped Fire Review

In accordance with the Interagency Guide, all escaped prescribed fires declared a wildfire will have an investigative review initiated by the Agency Administrator. Superintendents are normally responsible for conducting these reviews. Superintendents will promptly notify the Regional Director of any escaped prescribed fires that are declared a wildfire.

The Regional Director is responsible for conducting escaped fire reviews when:

- A “serious accident” is involved, as defined by Departmental Manual (DM) Part 485, Chapter 7; or
- The escaped fire spreads onto private or other governmental agency land; or
- Fire shelters are deployed; or
- Significant property or resource damage is involved.

The Regional Director will promptly notify the Director, Branch of Wildland Fire Management of escaped fires meeting any of these criteria. The Director is responsible for ensuring adequate and proper review and investigation of all prescribed fires that result in fatalities or have national level interagency conflicts, social or political issues or concerns.

Fire Use Restrictions

At Regional and National Preparedness Levels 4 and 5, prescribed fire and wildland fire use implementation is restricted. Procedures for requesting authorization to implement Wildland Fire Use or Prescribed Fire under Preparedness Levels 4 and 5 is contained in the BIA Wildland Fire and Aviation Program Management and Operations Guide.

4. Smoke Management & Air Quality Monitoring

Personnel developing and implementing prescribed fire plans must adhere to applicable Federal, State, and Tribal policies and procedures regarding smoke management and air quality.

PROJECT LEVEL SMOKE MANAGEMENT

Smoke management must be addressed when planning and implementing prescribed fire treatment. This section is intended to provide the user some considerations for the management of smoke from a prescribed fire.

1. Planning

Determine the need to manage smoke and develop objectives based on the following considerations:

- Nature and significance of the potential smoke impacts.
- Whether the smoke impacts will violate any state or Tribal standards.
- Location of smoke sensitive receptors and their potential to be impacted by the project.
- Risk to public health and safety, such as on highways or at airports.
- Limitations or management constraints that could affect the amount or duration of smoke production.

2. Smoke Modeling and Prediction

Smoke modeling may be used to identify potential problems and develop mitigation strategies. There are several ways to model smoke ranging from complex to simple. During the planning process, the Burn Boss must estimate possible visibility and particulate violations using an appropriate model that is simple, but produces acceptable results.

Smoke trajectory may be manually plotted in order to predict the occurrence of smoke within designated wind quadrants. This trajectory is determined for both day and nighttime situations. The purpose is to identify smoke sensitive areas or receptors such as Class I airsheds, hospitals, and population areas. Smoke prediction models are used to anticipate and mitigate smoke impacts and determine the level of smoke monitoring required for the project: **If no sensitive or critical receptors are identified in the modeling process, the minimum acceptable monitoring is visual, with written documentation on the Basic Smoke Monitoring Data Sheet (Appendix 4a). Impacts on sensitive or critical receptors require the use of the Detailed Smoke Monitoring Data Sheet (Appendix 4b).**

3. Strategy Development and Implementation

Sensitive or critical receptors previously identified become the basis for selection of smoke strategies and mitigations. **Appropriate smoke management techniques, methods, and potential remedial actions to achieve smoke management objectives must be included in the burn plan, or other planning documentation.**

Consider, select and implement the methods and techniques necessary to achieve smoke management within the range of prescription, ignition, fire behavior, and other conditions necessary to achieve the objectives of the prescribed fire.

Highway Safety Effects

Prescribed fire smoke, with and without fog, has been responsible for a number of safety-related accidents and fatalities. **Smoke from prescribed fires impacting visibility on roads and highways must be considered during the planning and implementation of prescribed fires.** Smoke impacts must be considered after actual firing operations have ceased and the burning period is over. Smoke monitoring data sheets (Appendix 4a and 4b) will be used to record actual readings to substantiate safe operating procedures.

Basic Smoke Management Practices

Prescribed fire projects will incorporate applicable and reasonable elements of basic smoke management practices and will document these actions in the project file.

Basic smoke management practices could include, among other practices, steps that will minimize air pollutant emissions during and after the burn, evaluate dispersion conditions to minimize exposure of sensitive populations, actions to notify populations and authorities at sensitive receptors and contingency actions throughout the project to reduce exposure of people at such receptors, identify steps taken to monitor the effects of the prescribed fire on air quality, and identify procedures to ensure that the burn boss is using basic smoke management practices.

4. Smoke Monitoring

Managers should develop and maintain a working knowledge of air quality monitoring techniques in order to develop a systematic and objective method to evaluate the effectiveness of smoke management efforts. This will enable the evaluation of program effectiveness and facilitate communication with the public and local air quality personnel.

At a minimum, prescribed fire projects that are not expected to impact sensitive or critical receptors will use the Basic Smoke Monitoring Data Sheet (Appendix 4a) to document smoke observations; projects that are predicted to impact sensitive or critical receptors will use the Detailed Smoke Monitoring Data Sheet (Appendix 4b) to collect and document quantitative air quality and smoke monitoring data. The Smoke Monitoring Data Sheets must be included in the project file.

PROGRAMMATIC LEVEL SMOKE MANAGEMENT

Smoke management should be addressed at the programmatic level as well as the project level. Smoke management considerations and alternative vegetation management tools should be considered and addressed in the development of the land management plan. A smoke management program should also be developed to guide project implementation. The smoke management program should establish a basic framework of procedures and requirements for managing smoke from fires that are managed for resource benefits. The purposes of smoke management programs, within the Clean Air Act are to mitigate the nuisance and public safety hazards posed by smoke intrusions into populated areas; to prevent deterioration of air quality and National Ambient Air Quality Standards (NAAQS) violations; and to address visibility impacts in mandatory Class I Federal areas in accordance with the regional haze rules. Smoke management considerations in the land management plan and the development of the smoke management program should be an open collaborative process between tribal air quality managers and the fire and resource management organizations.

Tribes meeting "treatment in the same manner as a state" criteria (refer to section 301(d) of the Clean Air Act) should be encouraged to develop Tribal Implementation Plans (TIP) to meet the intent of the Clean Air Act and develop Tribal Smoke Management Programs to monitor and manage emissions. States do not have jurisdiction over Tribal Reservation lands. However, Tribes and the BIA should collaborate with inter-agency partners (other Tribal, state, federal, regional) on air quality and smoke issues (monitoring, airshed management, funding). Collaboration should occur at different levels (Zone, GACC, State, and Region). The Tribes, BIA and their interagency partners should also develop protocols for notifications and monitoring to mitigate smoke impacts.

INFORMATION RESOURCES

The *EPA Interim Air Quality Policy on Wildland and Prescribed Fires*, released in April 1998 (due to be revised in mid-2008) is an excellent source explaining the various smoke management and air quality considerations and the roles and responsibilities of those involved. This policy statement integrates two public policy goals, (1) to allow fire to function, as nearly as possible, in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility.

Available at: <http://www.epa.gov/ttncaaa1/t1/memoranda/firefnl.pdf> <Accessed 2/21/08>

The NWCG *Smoke Management Guide for Prescribed and Wildland Fire* (2001) provides comprehensive background information, along with techniques to reduce emissions and impacts. The Wildland Fire in Ecosystems series Volume 5: *Effects of Fire on Air* (2002) is also a useful reference.

Available at: <http://www.nwcg.gov/pms/pubs/SMG/SMG-72.pdf> <Accessed 2/21/08>

Appendix 4a. BASIC SMOKE MONITORING DATA SHEET

For use on prescribed fires not expected to have smoke impacts on sensitive or critical receptors

Plot ID: _____

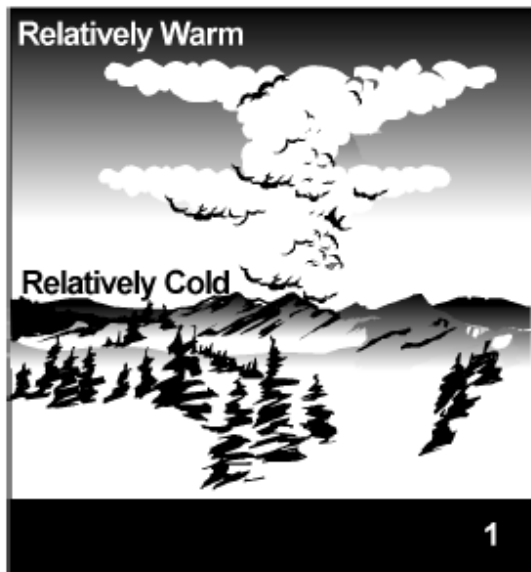
Date: ____ / ____ / ____

Burn Unit/Fire Name—Number: _____

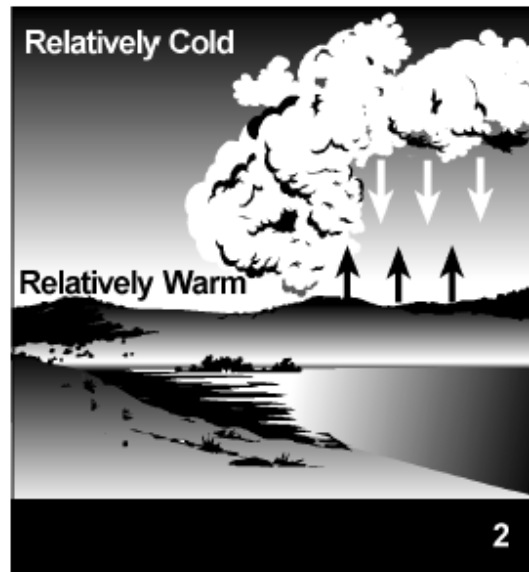
Recorder(s): _____

Date	Time	Observer Location and Elevation	Elevation of Smoke Column Above Ground	Smoke Column Direction	Approx. Elevation Smoke Inversion Layer Above Ground	Fireline Visibility	Roadway Visibility	Which Illustration (See Back) Best Describes the Smoke Column (Circle One)
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3
								1 - 2 - 3

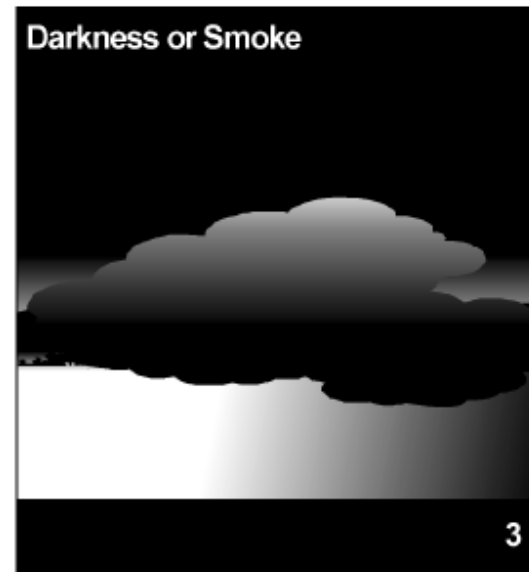
Adapted from USDI National Park Service (2003). Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center.



- Clouds in layers, no vertical motion
- Stratus type clouds
- Smoke column drifts apart after limited rise
- Poor visibility in lower levels due to accumulation of haze and smoke
- Fog layers
- Steady winds



- Clouds grow vertically and smoke rises to great heights
- Cumulus type clouds
- Upward and downward currents of gusty winds
- Good visibility
- Dust whirls



- Smoke column is not observable because of nighttime conditions or observer's location is in smoke

From USDI National Park Service (2003). Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center.

Appendix 4b. DETAILED SMOKE MONITORING DATA SHEET

For use on prescribed fires expected to have smoke impacts on sensitive or critical receptors

Plot ID: _____

Date: ____/____/____

Burn Status (Indicate number of times treated, e.g., 01 Burn, 02 Burn, etc.): _____-Burn

Burn Unit/Fire Name-Number: _____

Recorder(s): _____

Monitoring Variable (RS)	Each box on the data sheet is divided in two; place the time of your observation in the top portion of the box, and the observation value in the lower portion of the box.														Recommended Thresholds
Fireline Visibility/CO (ft, m)															Visibility <100' Exposure NTE 2 h
Highway Visibility (ft, m)															
Visibility Downwind (mi, km)															Pop. 0-5 K Min. Dist. 3-5 miles 5 K-50 K 5-7 miles >50 K 7-9 miles
Mixing Height (ft, m)															Maintain 1500'. Do not violate for more than 3 h or past 3:00 PM.
Transport Wind Speed (mph, m/s)															5-7 mph at mixing height. Do not violate for more than 3 h or past 3:00 PM.
Surface Wind Speed (mph, m/s)															1-3 mph-Day 3-5 mph-Night No violations over 1 h
Complaints (Number)															Consult local Air Quality Control District Regs. Do not exceed 5/treatment
CO Exposure (ppm or duration)															Discretion of PBB. Refer to Rx burn plan

- OTHER
1. Total Emissions Production (Tons/Acre or kg/ha): _____ Fuel Load Reduction (Total): _____
 2. Preburn Fuel Load Estimate (See PBF): _____ Postburn Fuel Load Calculation
 3. Particulates (Amount/duration)—If Applicable: ∞ = _____ (Specify Cycle)
 4. Other Monitor Observations:

Adapted from USDI National Park Service (2003). Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center.

5. Mechanical and Other Non-Fire Fuels Treatments

INTRODUCTION

Mechanical and other non-fire fuel treatments require a level of planning and preparation comparable to prescribed fire projects. Treatments should be planned and developed through an interdisciplinary process. Tribal representatives should be encouraged to participate to ensure Tribal goals and objectives are identified and to better design projects to meet these goals and objectives.

HERBICIDE USE

Any proposed use of herbicides will be addressed in the project plan, including methods, compliance criteria, and applicator qualifications. Herbicide transportation, application, storage and disposal will meet all Environmental Protection Agency (EPA) label requirements and the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR, Part 1910, Subpart Z).

MECHANICAL & OTHER NON-FIRE FUELS TREATMENT PLANS

Every mechanical and other non-fire fuels treatment project will require a project plan. This plan may be a stand-alone document (herein referred to as a treatment plan) or may be incorporated in another document such as a silvicultural prescription or tribal thinning contract.

A prescribed fire/fuels specialist is responsible to coordinate the preparation of treatment plans with other staff as necessary including range specialist, silviculturists, foresters, etc. The following components of treatment plans are required as a minimum:

1. Signature Page

Identifies the name of the project and provides signature lines and dates for individual(s) preparing and reviewing the document and the approving official. Approval authority will normally reside with the Agency Superintendent, unless this authority has been delegated to a subordinate level. The list of required reviewers will be determined by the approving official.

2. Project Area Description

This section of the plan should describe the physical and biological features of the project area.

- **Location**

Narrative description of the location of the treatment unit in relation to the reservation and/or other management unit descriptors. Legal description including township, range section, subdivision, and latitude/longitude (decimal degrees).

- **Size**
Area of individual treatment units, in acres.
- **Topography**
Identify the upper and lower range of elevation; maximum, minimum and average slope as a percent; and aspect(s).
- **Description of Boundaries**
This section must provide a narrative description of the physical, natural and/or human made boundaries of the project.
- **Vegetation and Fuels Description**
Describe the current structure and composition of the vegetation type(s) and fuel characteristics (natural or activity, fuel bed depth, fuel arrangement, live and dead fuel load by time-lag class) within the unit. Describe the percent of the unit composed of each vegetative type and the corresponding fuel model(s). Include a description of any significant insect and disease conditions. Identify the fire regime and current condition class.
- **Desired Future Condition**
This is a description of the vegetation and fuels characteristics (listed above) that are desired once planned treatments have been completed. The desired future condition should be consistent with land management goals and objectives. Identify projected post treatment condition class.
- **Abiotic Conditions**
Describe any abiotic conditions, (such as climate, soils, watershed) that may be considered important in view of the proposed treatments.

3. Management Requirements and Constraints

Address any pertinent requirements or constraints set forth by land management plans, environmental compliance documents, directives, or tribal ordinances or resolutions.

4. Objectives

Describe in clear, concise statements the objectives of the project. Objectives should be specific, measurable, achievable, relevant, and trackable to guide project design and facilitate project monitoring and adaptive management.

5. Organization and Budget

Identify the resources and costs required to implement the project. Projects to be implemented with different funding sources will identify the cost share by funding source.

6. Proposed Schedule

Identify the proposed timeframes for the various levels of project completion, including the sequence of activities and treatments, by project area if considered necessary.

Include a schedule for treatments needed after mechanical treatment(s) e.g. prescribed fire, chemical application, etc., that are necessary to meet desired future conditions.

7. Pre-Project Considerations

List and discuss on-site and off-site actions that must be completed to implement the project and special precautions or considerations that must be addressed. Identify responsible individuals and establish timeframes for initiation and/or completion.

8. Project Implementation Actions

Describe the silvicultural prescription(s) and/or treatment specifications and methods of project execution. Specific technical implementation criteria may be included, as required, such as marking guidelines, mitigation actions, etc. Describe the range of acceptable results expected.

9. Cooperation

Describe provisions for interagency and intra-agency coordination and cooperation as applicable.

10. Monitoring and Evaluation

A monitoring plan should be developed to identify the procedures to be used to document project accomplishment and evaluate treatment success in relation to stated project objectives. The plan should identify who will be responsible for gathering the required information and establish timeframes for action and/or completion. Further guidance on monitoring procedures is contained in Chapter 7 of this Supplement.

11. Personnel and Public Safety

A Job Hazard Analysis should be prepared for each project or category of action, identifying potential hazards and required actions or controls to ensure worker and public safety. The plan should consider threats to life and property, potential impacts on key resources, public land users, cooperators, and communities. All workers should be briefed on identified hazards and required safety measures, including personnel protective equipment. Describe any communication needs and channels to be used if necessary. Identify emergency medical procedures, evacuation routes, emergency medical services (EMS) personnel and emergency facilities, unless addressed in other plans.

12. Safety

Bureau-specific safety requirements and considerations for mechanical and other non-fire fuels treatments are contained in the BIA Safety and Health Handbook. The use of pesticides or other chemicals must comply with OSHA's Hazard Communication Standard, 29 CFR 1910. Material Safety Data Sheets (MSDS) should be made available for all projects utilizing hazardous materials, and communicated in safety briefings.

13. Appendix

The Appendix should include the following items:

- **Maps**
The type of maps, size, scale and level of detail should be appropriate for the complexity of the project. As a minimum the treatment plan should include a vicinity and project map. The vicinity map should depict the project boundaries, main roads, and other prominent planimetric features useful for navigation to and from the project area. The project map(s) should identify features in sufficient detail to guide implementation actions. Project maps should include topographic features.
- **Job Hazard Analysis**
The Job Hazard Analysis should address all foreseeable safety concerns and describe restrictions and controls adopted to mitigate risk. An example Job Hazard Analysis is included in Appendix 5a.
- **Additional Information**
Additional information may be included in the Appendix, as considered necessary, including inventory summaries, silvicultural prescriptions, chemical use plans, and modeling runs.

14. Project File

Final accomplishment reports should be prepared at project completion. Reports should address level 1 (pre-treatment condition) and level 3 (short term change) monitoring results (see Chapter 7, Monitoring) and include the following items:

- **Accomplishments.** Acres accomplished by treatment method.
- **Cost.** Summarize costs of personnel, equipment, supplies, contracting, etc.
- **Maps.** Depicting areas treated by various methods.
- **Monitoring.** Assessment of effectiveness of treatments in meeting project objectives.
- **Recommendations.** List recommendations for improving future treatments.

Appendix 5a. Example Job Hazard Analysis

Activity	Hazards	Action to eliminate hazard
Driving to and from work site	Muddy, icy, or dusty road conditions	Use 4-wheel drive vehicles and/or chains under icy road conditions Avoid using roads under extremely muddy conditions Drive defensively under dusty conditions
	Steep, narrow roads	Drive cautiously to ensure less than half the usual stopping distance, lights on
	Unsecured loads	Check loads before departing Use tie downs
	Transporting sharp tools	Use guards, cages, boxes or tool mounts
	Loading vehicles	Use proper lifting techniques
	ATV use	Operated by trained and licensed drivers only Running lights on Scout access routes to avoid steep slopes
	Public safety	Post signs if needed due to falling operation or to provide for worker safety
Walking to and from work site	Loose, slippery walking surface	Wear proper footwear with high-traction soles
	Long walks on steep and broken ground	Take frequent rests to avoid fatigue Pre-determine best access into work areas
	Lifting and carrying heavy loads (chainsaws, tools, fuel, water, etc.)	Avoid excessive loads, make additional trips if necessary Use vehicles and ATV's to carry loads as close to work sites as possible Take frequent rests
Environmental conditions	Over heating	Take frequent rests Drink ample fluids Wear adequate head covering
	Cold/wet working conditions	Wear adequate cold-weather clothing and/or rain gear as appropriate
	Poisonous plants and insects	Be aware of local hazards (bees, spiders, poison ivy) Identify hazards prior ahead of work if possible and avoid Pre determine any crew susceptibility to bees or other poisonous insects and have appropriate treatments (inhalers, etc.) on site

Activity	Hazards	Action to eliminate hazard
Chainsaw use	Sharp cutting chain	Wear proper personal protective equipment (hard hats, long sleeve shirts, chaps, leather gloves and boots) Rest frequently to avoid fatigue Assure adequate spacing from nearby workers or the public
	Loud noise	Wear proper ear protection
	Debris thrown into eyes	Wear approved eye protection, avoid contact of saw chain with soil, rocks, or other debris.
	Contact with falling, twisting, or rolling trees and limbs	Ensure adequate training in falling techniques Size up and mitigate potential hazards (decayed stems, loose logs or limbs) Wear appropriate PPE (hard hats and eye/face protection) Assure all nearby workers and the public are at an adequate distance
Piling slash	Exposure to gas and oil	Transport gas and oil in approved, properly labeled containers Take adequate care and precautions in filling motorized equipment Clean hands after any skin exposure Use proper lifting techniques
	Lifting, dragging, throwing limbs and round wood	Wear proper PPE (hard hats, gloves, boots, eye protection) re other workers are clear before throwing slash
Mechanized Shredding	Falling and shredding trees and shrubs	Use swamper as lookout for falling or shredding hazards (rocks, fence wire, other laborers, etc.)
	Thrown debris	During operation keep all personnel at least 200 feet from the front of the cutting head Inspect and maintain cutting hear in accordance with manufacturer's recommendations
	Lifting equipment during maintenance	Use assistant whenever necessary to lift parts and equipment
	Exposure to gas and oil	Take adequate care and precautions in filling motorized equipment Clean hands after any skin exposure
	Sustained loud noise levels	Operators and swampers will wear ear protection

6. Fuels Management Planning

INTRODUCTION

The Departmental Manual, Indian Affairs Manual (IAM) Part 90 and Federal Wildland Fire Management Policy require a Fire Management Plan for all areas with burnable vegetation. Direction for preparation of Fire Management Plans is contained in IAM Part 90 Chapter 2 Section 2.1, which stipulates that Fire Management Plans will, “within the framework of tribal land use objectives, document management strategies based on resource values to be protected or enhanced, while implementing hazardous fuels reduction treatments.” Hazardous fuels management may be addressed within the context of a Fire Management Plan, Land Management Plan that incorporates elements of a Fire Management Plan, or alternately, through a stand-alone Fuels Management Plan tiered to the Fire Management Plan. Because hazardous fuels management falls within the category of actions to be addressed in a Fire Management Plan, all policies pertaining to fire management planning apply equally to fuels management planning.

The purpose of fuels management planning is to translate resource goals and objectives into appropriate management strategies for each fire management unit, zone or other ecological unit, with associated suitable tactics, priorities, resource values, constraints, and desired future conditions. The management plan must address the full range of fuels management actions that might be considered. The plan should also include fuel treatment schedules, guidelines for setting priorities for treatments, and workload analyses to determine staffing levels needed to implement the plan.

The BIA Fuels Treatment Selection Guide has been established for regional application in the BIA Fuels Business Management Handbook. This guide may be used to facilitate project selection at the tribe/agency level as well.

ENVIRONMENTAL AND CULTURAL RESOURCE COMPLIANCE

Fuels Management Plans must comply with the National Environmental Policy Act (NEPA) in accordance with policies set forth in the BIA NEPA Handbook. Appendix 6a provides an example flow chart for fuels management plan preparation and associated NEPA compliance.

STRATEGIC FUELS MANAGEMENT PLAN

The Fuels Management Plan should be incorporated into or otherwise tiered to a Fire Management Plan and integrated with related documents such as a Prevention Plan, Preparedness Plan, etc. The Fuels Management Plan should also be tiered to other pertinent land-use plans as well, such as an Integrated Resource Management Plan, Forest Management Plan, or Range Management Plan. Manual direction relating to strategic land-use planning is contained in IAM Part 53.

The following is a recommended format for a Fuels Management Plan. The level of detail will depend on size, scope, and complexity of the land base, resource values, risk, and treatments considered.

A. Introduction

The Introduction states the needs and reasons for the Fuels Management Plan and the collaborative process followed in plan development.

B. Management Requirements and Constraints

Reference Departmental and Agency policies and directives and Tribal ordinances concerning fuels management. Specific policies and management direction already referenced in an overarching Fire Management Plan need not be recited. Summarize those specific policies, management direction, and local standards that are particularly pertinent to the proposed actions.

C. Local Standards or Guidelines

Additional local standards or guidelines not contained in previously referenced policy or management direction may be adopted through incorporation in the Fuels Management Plan, such as Best Management Practices, prioritization procedures, land management constraints, etc.

D. Smoke Management

A smoke management program should be developed to guide prescribed fire implementation. The purposes of smoke management programs, within the Clean Air Act, are to mitigate the nuisance and public safety hazards posed by smoke intrusions into populated areas; to prevent deterioration of air quality and National Ambient Air Quality Standards (NAAQS) violations; and to address visibility impacts in mandatory Class I Federal areas in accordance with regional haze rules. The smoke management program should establish a basic framework of procedures and requirements for managing smoke from prescribed fires.

Tribes meeting "treatment in the same manner as a state" criteria (refer to section 301(d) of the Clean Air Act) should be encouraged to develop Tribal Implementation Plans (TIP) to meet the intent of the Clean Air Act and develop Tribal Smoke Management Programs to monitor and manage emissions. Tribes and the Bureau should collaborate with interagency partners (other Tribes, Federal, State, local governments) on air quality and smoke management issues, including monitoring, airshed management, and funding. This collaboration should occur at various levels, such as the Zone, Geographic Area Coordination Center (GACC), and region. The Tribes, Bureau, and their interagency partners should develop protocols for notifications and monitoring to mitigate smoke impacts.

E. Existing Condition

Describe the existing condition in relation to hazardous fuels reduction goals. Incorporate by reference any descriptive information from Land/Resource, Forest, or Fire Management Plans. Vegetation and fuels classification and GIS spatial analysis may be used to create the various map layers.

Identify reservation-wide fuels information, including:

- Fuel Models
- Fire Regimes and Condition Classes
- Communities at Risk or of Interest and WUI Areas
- Risk Assessment and Prioritization of WUI and Non-WUI Treatment Areas
- Past Treatment Areas

F. Goals and Objectives

The goals and objectives should integrate national program direction with the tribe's land management ethic. Pertinent goals listed in other Resource Management Plans should not be restated, but incorporated by reference. Any additional, more specific goals relating to hazardous fuels management on the local unit should be identified.

The objective section is particularly important because the identified objectives provide focus and guidance to the overall planning process, and will determine the scope of monitoring to be conducted. Objectives must be specific, quantifiable, attainable, and address the appropriate spatial and temporal scales.

G. Fuels Management Strategies

Identify the general management approach(es), including treatment prioritization based on various land classifications (such as wildland urban interface, fire regime and condition class, fuel models, etc.). Describe specific fuels treatment strategies including scope, methods and timeframes for conducting the work. Identify any opportunities created by hazardous fuels reduction treatments. The strategies should incorporate all fuels work to be conducted, both Tribal and Agency. Address all treatments that may conceivably be used, including chemical use and prescribed fire. Be specific and comprehensive since these strategies determine the effects to be addressed in the plan Environmental Assessment (EA), and any treatment you fail to include will need to be addressed in a subsequent EA or amendment.

Describe desired future conditions for various vegetation and fuels types. These should be general in nature, outlining the range of conditions based on site characteristics and management emphasis.

A detailed schedule of treatments and priorities should be included in the Appendix with the qualification that it is subject to revision and dependent upon annual funding levels.

H. Monitoring

Describe the strategic monitoring strategy to be implemented to evaluate success in meeting Fuels Management Plan objectives. This information may be included in a

stand-alone document, or included in the Fuels Management Plan; in either case, the elements to be addressed include (see Chapter 7 for additional direction):

- Responsible Parties
- Monitoring Objectives
- Monitoring Protocols
- Sampling Strategy
- Scheduling of Monitoring
- Data Analysis
- Data Management
- Application of Results

I. Organization and Proposed Budget

Indicate your organization needs, both permanent and temporary, and develop a proposed budget to carry out the fuels management strategies. The budget should include salaries, contracts, equipment lease, and capital equipment purchases; to be used as a basis for future program, project, and supplemental funding requests. Organization and budget levels should reflect the fuels management strategy developed through the scoping and analysis process, and should reasonably track anticipated budget levels.

J. Collaboration

Identify the roles of stakeholders and partners and methods to be used to engage them in project planning and implementation to improve program efficiency, reduce risk, and expand capacity.

K. Public Information

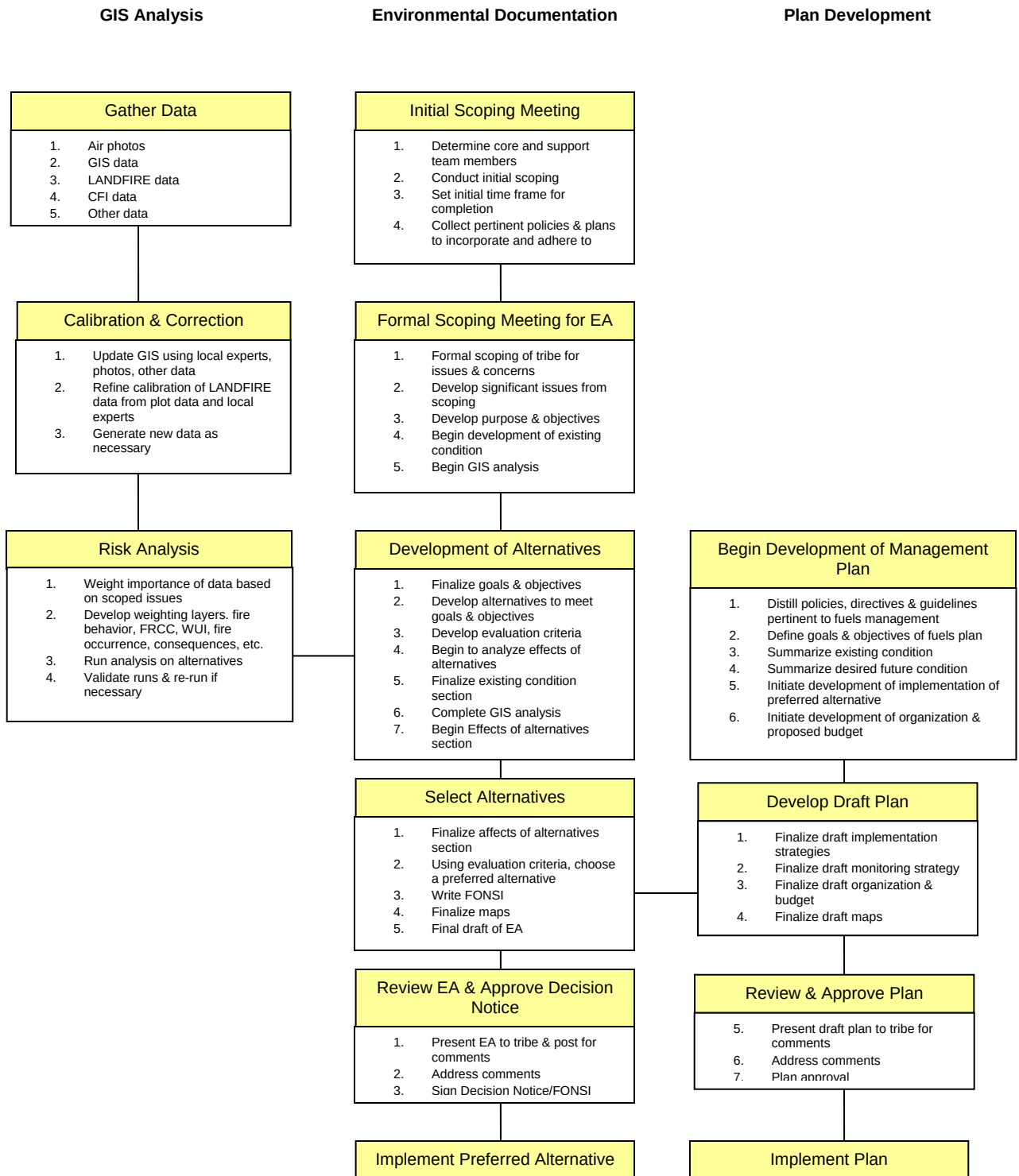
Describe the communication processes to be used to inform the public of the role of fire in fire-dependent ecosystems, management actions to restore landscapes and protect lives and property, and the public's responsibilities when living and recreating in fire prone ecosystems. List media contacts and identify the role of appropriate staff, such as public information officers during the implementation of complex and controversial prescribed fire projects.

L. Appendix

A variety of information may be included in the Appendix. At a minimum the following items should be provided:

- Maps, including vicinity and project maps
- GIS Layers. Include fuel models, fire regime/condition class, fire, etc.
- Inventory Summaries. Include estimates of fuel loading and arrangement, biomass availability, etc.
- Computer Modeling
- Detailed Treatment Schedule(s) and priorities. May list individual projects or simply list acreage to be treated on a periodic basis by land classification or fuels treatment strategy.

Appendix 6a. Flow Chart for Fuels Management Plan preparation and associated NEPA compliance.



7. Monitoring Fuels Treatments

INTRODUCTION

The purpose of this chapter is to provide policy guidance to ensure:

- Establishment of effective and efficient fuels treatment monitoring strategies on lands administered by BIA agencies and tribes
- Compliance with national and interagency policies and directives establishing fuels treatment monitoring requirements
- Ability to support management actions and decision-making processes
- Ability to demonstrate degree of success in meeting program and tribal goals
- Improved ability to inform stakeholders and partners of treatment effects
- Application of fuels treatment funding in the most cost-effective manner

As stated in the Interagency Guide, monitoring is defined as *the collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a management objective*. By this definition, monitoring is a process that targets specific management objectives, and evaluates and reviews specific project objectives and implementation techniques in relation to their ability to meet these management objectives (Elzinga, Salzer and Willoughby, 1998).

TREATMENT PLAN MONITORING

All fuels treatment projects funded by the Bureau of Indian Affairs Fuels Program require monitoring consistent with the direction provided in this chapter. **The minimum standards to determine the adequacy of project-level monitoring at the tribal or agency level will be:**

- **Monitoring must be sufficient to provide a defensible answer to the question, “Was the treatment successful in meeting the project’s management objectives?”**
- **The information necessary to answer this question must be documented in the project file.**

STRATEGIC PLAN MONITORING

In addition to documenting treatment effectiveness, monitoring can also be implemented to measure success in meeting the objectives of broader management plans such as Fuels Management Plans, Fire Management Plans and Integrated Resource Management Plans. These strategic-level monitoring programs are more complex and must be carefully designed and guided by an approved written monitoring plan (see table in Appendix 7a for elements of a strategic monitoring plan).

Strategic-level monitoring programs based on the objectives of Fuel Management Plans or Fire Management Plans may be funded with Fuels Program funds; monitoring programs based on broader resource management activities such as Continuous Forest Inventory (CFI), Integrated Resource Management Plans and Forest Management Plans may be partially funded by Fuels Program funds to the extent that they incorporate Fire Management or Fuels Management Plan objectives (see *BIA Fuels Management Program Business Rules Handbook*).

FOUR LEVELS OF MONITORING TREATMENTS

A. Level 1 – Pre-Treatment or Existing Conditions

This data is a description of the physical and biological characteristics of the treatment unit and is usually collected during the planning process. The information in this category may include: location, size of treatment area, elevation, aspect, vegetation type/structure/condition, fuels characteristics, and specific concerns and values to be protected.

The type and extent of fuel condition data required for planning is dependent upon local conditions and fire management objectives. The following are types and sources of fuels data used in program management:

- Fuel Type - Utilize maps, aerial photos, digital data, and/or surveys to determine and map fuel types.
- Primary fuel models (Fire Behavior Prediction System fuel models (1-13), Scott & Burgan 40 fuel models or custom fuel models).
- Fuel Load - Utilize maps, aerial photos, digital data, and/or surveys to determine and map fuel load.

An important part of pre-treatment data collection is the identification and evaluation of existing or potential concerns, threats, and/or constraints concerning values at risk.

- Improvements - including structures, signs, boardwalks, and fences.
- Sensitive natural resources - including threatened and endangered species habitat, endemic species and other species of concern, alien plant and animal distributions, erosion potential, watersheds, and riparian areas.
- Socio-political - including public perception, cooperator relations, and impacts upon staff, visitors, or neighbors.
- Cultural/archeological resources - including exposed artifacts, historic structures, cultural landscapes, traditional cultural properties, and viewsheds.
- Monitoring/research locations - including plots and transects.
- Smoke management concerns - including non-attainment zones, smoke-sensitive targets, class I airsheds, and minimum acceptable visibility standards for roads.
- Basic resource inventories - including species lists, soil types map, etc.
- Areas with commercial and urban development.

Observations may be based on photo points and informal inventories using photo series guides and comparisons with similar sites. The FIREMON Plot Description (PD) form is the recommended protocol for collecting data for this monitoring level; narrative descriptions may be useful to expand on this protocol. **At a minimum, the data collected in Level 1 monitoring must support the pre- and post-treatment analysis of treatment effectiveness in meeting project or program objectives.** For example, a management objective calling for the reduction of 10-hour fuel loading to less than 2 tons/acre would require at least the pre-treatment monitoring of the existing fuel load in the 10-hour fuel category.

B. Level 2 – Fire Behavior Observations

This category of data is required to document prescribed fire events, including specific burning conditions and fire behavior characteristics. These data are collected prior to and at various intervals during the fire event. Information collected will include:

- Ambient conditions – dry bulb temperature, relative humidity, wind speed and direction, shading and cloud cover, fuel moisture, live fuel moisture, drought index, and duff moisture.
- Fire characteristics – rate of spread, flame length, flame depth, and smoke characteristics.

The FIREMON Fire Behavior protocol is the recommended method of collecting data for this level of monitoring.

C. Level 3 - Short Term Post-Treatment

This level provides information on immediate vegetation change, fuel reduction, and/or other variables determined by management objectives as a direct result of a management action. Monitoring at this level generally occurs within the same field season as the treatment implementation; for some variables or management objectives, it may be necessary to repeat the measurements over the course of several seasons. Examples of variables that may be monitored during this level include:

- Woody fuel consumption on both the horizontal and vertical planes
- Litter and duff reduction as it relates to opening natural seeding areas
- Soil heating
- Burn patterns for verifying prescribed mosaics
- Plant mortality
- Crown scorch height, percent of crown scorched, percent of crown consumed
- Root damage
- Crown damage on shrubs and grasses

The primary purpose for the selection of the variable(s) to be monitored in this level is to determine whether short-term treatment objectives were met; in most cases, the variable(s) selected must be monitored both pre-treatment and post-treatment.

D. Level 4 - Long Term Re-Measurement

Monitoring in this level identifies significant trends that can guide management decisions. This level usually requires monumented permanent plots that have been well documented and can be relocated. Monitoring frequency is based on a sequence of sampling at an interval defined in the monitoring plan based on specific management objectives. Agency/Tribal staff should select monitoring variables (with input from resource management specialists and other scientists if needed) by examining (1) fire management goals and objectives, (2) their ecosystem's sensitivity to treatment-induced change, and (3) special management concerns. This level is generally used for strategic-level monitoring, but it may also be appropriate at the treatment level when the management objectives are complex and involve species of special concern or those that have a long life span.

Appendix 7a describes which levels are appropriate for use by scale and treatment type.

MONITORING PLANS

Monitoring is a required element of both prescribed fire and mechanical fuels treatment plans, and results of monitoring must be documented in a manner that facilitates the access and auditing of monitoring data to demonstrate compliance with established policies. The most efficient means to ensure these requirements are met is through the development of a written monitoring plan. The following section describes the elements of a monitoring plan, which may be incorporated into a treatment or management plan, or developed as a stand-alone document. The advantages of incorporating the monitoring plan into the treatment or management plan include avoiding the repetition of elements and approvals common to both plans, ability to more clearly make the tie between monitoring and specific management objectives, and less overall paperwork. Appendix 7a lists the elements of incorporated and stand-alone plans; note that Elements A-F are not necessary for incorporated monitoring plans, as these elements are covered elsewhere in the encompassing plan.

A. Introduction

Describe the scope and purpose of the monitoring plan, such as the treatment or management plans the monitoring plan is tiered to, and how the treatments or strategies meet the goals of the Fire Management Plan.

B. Approvals/Signature Page

The stand-alone monitoring plan should be approved and signed by the same official as the plan it is tiered to. The approving official may require additional approvals or reviews. Official review by the regional fire ecologist, regional fuels specialist and/or the national office fire ecologist is optional, but strongly encouraged; regions may establish additional review requirements.

C. Responsible Parties

Name the authors of the monitoring plan, and the person(s) responsible for the implementation of the monitoring plan. On prescribed fire treatments, the burn boss implementing the treatment plan is responsible for ensuring that Level 2 (fire behavior,

weather and smoke) monitoring occurs consistent with the direction provided in the Interagency Guide and this chapter unless another party is specifically identified in the monitoring plan. The local Fuels Specialist/Fire Use Specialist is responsible for ensuring that pre-treatment (Level 1) and post-treatment (Level 3 and/or Level 4) monitoring is conducted and documented in the project file in accordance with the Interagency Guide and this chapter.

D. Description of Vegetation Type to be Treated

This section should include a description of the vegetation, e.g. habitat type, seral class, species composition, structure and density, the historic and present fire regimes, general description and fire ecology of the pertinent plant species, and the effects of other resource uses on the species of the area. Much of this information may be found in the reservation's Forest Management Plan, Integrated Resource Management Plan or Fire Management Plan; it may be briefly summarized and referenced in the Monitoring Plan.

E. Description of Treatments

Briefly describe specific fuels treatment methods that will be used to meet management objectives. Address all treatment methods that may conceivably be monitored under this plan.

F. Management Objectives

State the management objectives of the treatment or the strategic plan that the monitoring plan is tiered to.

The following elements are required for all monitoring plans, incorporated or stand-alone:

G. Monitoring Objectives

State the monitoring objective(s) of the treatment, including target population of interest, time frame, variable to be measured and how sample size will be addressed (either in number of plots to be measured or in terms of certainty and confidence level).

Monitoring objectives differ from management objectives in that management objectives describe a desired condition or change in condition, while monitoring objectives define how the progress toward the desired condition will be measured.

Monitoring objectives must be directly tied to management objectives.

Example:

Management Objective— In the ponderosa pine-gambel oak habitat type, reduce the fine fuel load to less than 5 tons/acre after the initial prescribed fire.

Monitoring Objective— In the areas of the pine-oak forest type treated with prescribed fire, measure the fine fuel loading in 5 representative plots per 100 acres within 2 weeks of the prescribed fire and again in one year.

H. Sampling Strategy

Describe the sampling design including sampling approach and sampling intensities. Sampling strategies must be defensible, although they may be as simple as establishing a minimum number of representative plots based on acreage or preliminary variability.

The Bureau policy regarding sampling strategy is to conduct sampling with the purpose of providing meaningful data to fire managers as opposed to the scientific community. With some exceptions, sampling approach and intensity will be determined by budget constraints, practicality, objectives, and resource availability, not statistical measures. The FIREMON Integrated Sampling Strategy (ISS) describes alternative methodologies under these constraints and is the recommended reference for sampling strategies. Generally, the relevé approach with the simple sampling intensity as described in the FIREMON ISS is appropriate for treatment-level monitoring. Strategic-level monitoring and controversial projects may require more rigorous sampling designs.

I. Description/Reference of Monitoring Protocols

Describe the monitoring protocols that will be used. Standard FIREMON protocols can be referenced to the FIREMON Handbook rather than described. Discuss any deviations to the protocols referenced, or any alternative protocols that you will use. **Protocols may be as simple as ocular observation or multiple photo points if these methods meet the minimum standards for monitoring as described above,** but they must be described in the plan. Describe methods used to monument permanent plots and how these plots will be re-located.

J. Scheduling of Monitoring

State which of the four monitoring levels will be measured. Describe what time of year plots will be measured, any seasonal/temporal constraints, and how often the plots will be re-measured.

K. Estimated Monitoring Costs and Funding Strategy

Estimate the total cost for the monitoring project, and specify funding sources and methods, including contributing sources outside the BIA Fuels Program (see *BIA Fuels Management Program Business Rules Handbook* for BIA Fuels funding procedures).

L. Data Analysis Approach

Describe which empirical or statistical analyses will be applied to the data to determine if management objectives were met or how the treatment varied from the intended results. Again, the data produced may be as simple as some photographs or **documented** observations, but at a minimum, the analysis should address the following:

- An analysis of pre-treatment versus post-treatment vegetation change.
- A discussion of the treatment's effectiveness in meeting the management and/or project objectives.
- Cost per acre per year based on the longevity of the treatment estimated from monitoring results, empirical data, modeling and/or scientific literature.
- How any required performance measures pertaining to monitoring will be addressed.

REPORTING AND DOCUMENTATION

A. Project File Documentation Requirements

A report summarizing the results of the monitoring activities will be placed in the official treatment project file, along with the treatment and monitoring plans, and all other monitoring documentation. At a minimum this should include:

- Comparison of monitoring plan protocols with methods actually used
 - Document deviations from plan
 - Discuss reasons for/advantages of method(s) used over plan
- Data Analysis Results
 - Pre-treatment versus post-treatment vegetation change
 - **Effectiveness in meeting the management and/or project objectives**
 - Treatment costs
 - Treatment Effectiveness (life cycle costs)
 - **How performance measures (NFPORS) were assessed**
 - Any other remarkable or notable effects of the treatment
- Adaptive Management: What actions will be taken to adjust prescriptions or other management actions if results were unfavorable?
- Data Management
 - Database information
 - Metadata
 - Storage of and Access to Data

A suggested template for post-treatment monitoring documentation is provided in Appendix 7b.

B. Annual Monitoring Work Plan

An annual work plan is a summary of the monitoring to be accomplished in the coming season based on the monitoring plan(s) and/or treatment plans. Annual work plans are strongly recommended for all fuels programs; they may be required to qualify for some funding sources (see *BIA Fuels Management Program Business Rules Handbook*). The annual work plan should include:

- Responsible Parties with contact information
- Brief description of work to be accomplished (tabular format recommended):
 - Names of projects that will be monitored
 - Type of treatment (prescribed fire, mechanical, chemical, other non-fire)
 - Individual acreage
 - Number of plots by monitoring level
 - Scheduled date(s) of measurement (estimated or by constraints)
 - Type of plots/protocols to be used
 - Estimated staff hours required
 - Estimated monitoring costs
- Staffing and scheduling
- Budget and funding sources

A template for the Annual Work Plan is included in Appendix 7c.

C. Annual Monitoring Summary

An annual summary is an update of the annual work plan based on monitoring accomplished in the past season. **Annual summaries are required for all fuels monitoring projects funded through supplemental requests;** otherwise, they are recommended at the local unit or regional level. The annual monitoring summary should include:

- Author(s) of the Summary and contact information
- Brief description of work performed (tabular format recommended):
 - Names of projects monitored
 - Type of treatment (prescribed fire, mechanical, chemical, other non-fire)
 - Individual acreage
 - Number of plots by monitoring level
 - Date(s) of measurement
 - Type of plots/protocols used
 - Actual staff hours
 - Actual monitoring costs.
- Summary statistics
 - Total plots by treatment type and monitoring level
 - Average cost per acre by treatment type
 - Average plots per treatment
- Distribution of Annual Summary: List of individuals or offices who will receive a copy of the Annual Summary. At a minimum, the Annual Summary should be sent to the Agency Administrator or signatory authority on the monitoring plan, the Regional Fire Ecologist, and the National Fire Ecologist.

A template for the Annual Summary is included in Appendix 7d.

INFORMATION RESOURCES

Specific tools and techniques useful in implementing a monitoring program and complying with these requirements will be contained in the *BIA Fuels Monitoring Reference* (in development); interim guidance is provided in the FIREMON General Technical Report (Lutes, et. al. 2006) and the BLM Monitoring publication (Elzinga, et. al. 1998). Mechanisms and procedures for funding monitoring are contained in the *BIA Fuels Management Program Business Rules Handbook*.

LITERATURE CITED

Elzinga, C. L., D. W. Salzer, J. W. Willoughby. 1998. Measuring and Monitoring Plant Populations. BLM Technical Reference 1730-1.

Lutes, Duncan C., R. E. Keane, J. F. Caratti, C. H. Key, N. C. Benson, S. Sutherland, L. J. Gangi. 2006. FIREMON: Fire effects monitoring and inventory system. Gen. Tech. Rep. RMRS-GTR-164-CD.

Appendix 7a. Elements of an Effective Monitoring Plan

Type of Plan	Incorporated in Prescribed Fire Plan	Incorporated in Mechanical Tx Plan	Incorporated in Fuels Management Plan	Stand-Alone or Programmatic Monitoring Plan
Element of Plan				
A. Introduction				X
B. Approvals				X
C. Responsible Parties				X
D. Description of Vegetation				X
E. Description of Treatment(s)				X
F. Management Objectives				X
G. Monitoring Objectives	X	X	X	X
H. Sampling Strategy	X	X	X	X
I. Monitoring Protocols	X	X	X	X
J. Scheduling of Monitoring	X	X	X	X
– Level 1: Pre-treatment/ Existing conditions	X	X	X	X
– Level 2: Fire Behavior	X			x ²
– Level 3: Short-term Post-treatment	X	X		x ³
– Level 4: Long-term Re-measurement	x ¹	x ¹	X	x ¹
K. Costs & Funding	X	X	X	X
L. Data Analysis Approach	X	X	X	X
M. Documentation Requirements	Results documented in project file	Results documented in project file	Results documented in annual summary	Strategic: Documented in annual summary Project: Documented in project file

X = Required element

x = Required as noted

¹ Conditional for treatment-level plans: If the treatment objectives require long-term monitoring to evaluate treatment effectiveness, long-term re-measurements will be incorporated into the monitoring plan. Required for strategic-level monitoring plans.

² Required only in stand-alone plans incorporating prescribed fire treatments.

³ Required only for stand-alone monitoring plans for treatments.

Appendix 7b. Post-Treatment Assessment Report (Template)

Project Description:

Name of Project	<i>NFPORS identifier, PCAS accounting code</i>
Project Location	<i>Agency/Reservation, coordinates, legal description, quad map name(s)</i>
Type of Project	<i>RX fire, mastication, hand thinning/piling, WUI, Non-WUI</i>
Vegetation Type	<i>Forest type, LANDFIRE zone, Fuel Model (Scot/Burgan), Fire regime condition class.</i>
Management Objectives	<i>Fuels reduction, stocking control, species composition, cultural resources, wildlife habitat</i>

Treatment Chronology:

Treatment Specifications	<i># of acres treated, firing techniques applied, type of mechanized equipment used, personnel involved, schedule of treatments</i>
Notable events	<i>Precipitation/weather events, favorable conditions, unexpected fire behavior, equipment malfunctions, smoke behavior, public response</i>
Logistical Requirements	<i>Amount and types of resources used, hours logged, amount of fuel consumed, road conditions, communications</i>

Monitoring Methodologies:

Monitoring applied	<i>Sampling protocols applied, # of plots installed, releve'/statistical, permanent/temporary plots, control/measure plots, photo plots</i>
Schedule of Monitoring	<i>Timing of pre and post treatment data collection, fire behavior data collection processes, need for further sampling</i>
Data Analysis and Storage	<i>Analyses conducted, responsible person, location and format of data</i>

Data Analysis

Pre-treatment conditions	<i>Fuel loading, stocking levels, species composition, crown base height, cover frequency,</i>
Post-treatment conditions	<i>Fuel loading, stocking levels, species composition, crown base height, cover frequency,</i>
Fire Behavior	<i>Flame length, flame height, rate of spread, weather observations, live fuel moisture readings, smoke observations,</i>
Data Analyses Conducted	<i>FIREMON data analysis tool, other software packages, statistical analyses, other resource considerations</i>
Graphic presentation of results	<i>Graphs, tables, photos, maps, narratives</i>

Project Evaluation:

Treatment Effectiveness	<i>Were objectives met, what was successful, what was ineffective,</i>
Impacts on Ecological Conditions	<i>Pre and post FRCC, influence on adjacent areas, long term implications</i>
Effectiveness of Monitoring Activities	<i>Proper protocols used, sampling size, timing of measurements, analyses applied,</i>

Recommendations:

Adjustments to RX	<i>Recommended changes to treatment prescription?</i>
Logistical Adjustments	<i>What could be done to increase effectiveness of resources?</i>
Follow-up treatments	<i>What can be done to increase effectiveness of treatment?</i>
Monitoring Adjustments	<i>What can be done to increase effectiveness of monitoring?</i>

Appendix 7c. Annual Monitoring Work Plan

Agency/Tribe/Region:_____ **Year**_____

Prepared by:_____ Phone:_____ e-mail:_____ Date prepared:_____

Projects to be Monitored

Project Name	Treatment Type	Acres	Number of Plots Planned by Level					Date(s) Scheduled to be Measured	Protocols to be Used	Est. Staff Hours Req.	Est. Monitoring Cost
			1	2	3	4	Total				
									<i>(Example: FIREMON PD, TD, SC, FL)</i>		

Total plots for annual work plan =

Staffing and scheduling

Supervisor of monitoring project:

Estimated total staff hours to implement monitoring work plan:

Range of dates when monitoring is scheduled to occur:

Constraints on monitoring dates:

(Examples: Snowcover persists on ground until late May; monsoons limit monitoring after early July)

Budget and funding sources

Total costs to implement monitoring work plan:

Funding sources *(list amount per source)*:

(Examples: \$60,000 incorporated into treatment costs; \$20,000 from tribal natural resource program; \$5000 State DEQ grant)

Appendix 7d. Annual Monitoring Summary

Agency/Tribe/Region:_____ **Year**_____

Prepared by:_____ Phone:_____ e-mail:_____ Date prepared:_____

Projects Monitored

Project Name	Treatment Type	Acres	Number of Plots by Level					Date(s) Measured	Protocols Used	Actual Staff Hours Req.	Annual Monitoring Cost
			1	2	3	4	Total				
									<i>(Example: FIREMON PD, TD, SC, FL)</i>		

Summary Statistics

	Prescribed Fire					Mechanical					Other				
	1	2	3	4	Total	1	2	3	4	Total	1	2	3	4	Total
Number of Plots by Level															
Avg. number of plots per treatment															
Avg. monitoring cost per treatment															

Distribution of Summary *(list individuals and offices who will receive a copy of this summary):*