

During the established fire season, fires near Pryor are dispatched from the Pryor Station. Either Pryor or Crow can regularly support a Type 3 extended attack organization. All extended attack fires will be ordered through Crow Dispatch (CRA) to Billings Dispatch Center, using ROSS. Resource orders from an incident commander to an agency dispatcher will be placed up to BDC to fill resources. When orders are filled by BDC, resources will be mobilized to the incident by BDC's direction.

Agencies that report to the BIA Rocky Mountain Regional Office function within an eastern Montana zone MACC group that was last active in 2006. In 2008, three Crow Agency BIA personnel were assigned members of regional or national incident management teams.

Crow has committed to engaging with current technological **decision support** tools and protocols, which in 2009 include the Wildland Fire Decision Support System (WFDSS), FARSITE (indicator of potential fire spread), and the Rapid Assessment of Values at Risk (RAVAR) programs. The FMO and AFMO were trained and capable in 2009 to process emerging incidents in WFDSS. 2009 fire reports were being entered in WFDSS after the conclusion of the fire season, but the expectation is that fires will be processed in WFDSS as they emerge in 2010.

Regulatory reporting requirements for Crow Agency are less than for some other agencies. The Crow Tribe is notified of all fires, in 2009 usually through the Prevention program. Coordination of large fire management concerns with the Tribe remains an important objective. Smoke management concerns are coordinated with the Montana Department of Environmental Quality air program in Helena at (406) 444-3490. The primary potential impact is to communities of the Crow or Northern Cheyenne Reservations. The BIA Regional Archeologist in Billings, Jo'Etta Buckhouse, coordinates interactions with the state Historic Preservation Office.

Fire reporting requirements are through the Wildland Fire Management Information (WFMI) system. In 2009, fires larger than 100 acres, or with complicated potential, are required to be reported daily by 1700 on an ICS-209 through FAMWEB. Large fires where suppression is not the immediate objective receive less frequent 209's.

Processes for immediately addressing **effects of suppression operations** are handled on a case-by-case basis. Repairing fireline with waterbars or scarification, camp area clean-up, fence repair and other issues are handled to a golden but unspecified standard.

4.1.3 Emergency Stabilization

The Department of the Interior Department Manual 620 DM 3 and Indian Affairs Manual Part 90 provides for policy for managing emergency stabilization, rehabilitation, and restoration on Bureau lands and Indian trust lands following wildland fire.

Immediate actions to mitigate damage done by fire suppression procedures can be designed and financed using fire suppression funding. It is a product of careful review and planning by BIA and/or Tribal biologists and the responsible fire team. All efforts will be directly linked to the suppression effort and documented in a formal rehabilitation plan. Examples of actions qualifying for suppression funding during site rehabilitation are: repair of existing fence destroyed during fireline construction, water diversion construction of fireline, ripping and grass seeding of camp and/or helibase locations, or repair to private property damaged during urban interface tactics (damaged roof from installing sprinklers).

Key personnel involved with this effort are Agency and Tribal biologists, Resource Advisor, Fire Management Officer, Director of Tribal Natural Resources, Planning Section Chief, and Incident or Agency Information Officer. The responsible incident management team will write the formal plan based on written contributions by each technical specialist. The plan will identify what suppression action created the damage, what short and long term results could be, what mitigations are planned, how and when it will be completed, what the standards for completion are, how and who will provide management oversight, and the schedules for each rehabilitation action.

4.2 Burned Area Rehabilitation

All fires on the Crow Reservation will be evaluated for emergency stabilization and long term rehabilitation needs. Stabilization of suppression impacts is normally performed by the suppression organization, and funded under the suppression account (fire code). If the impacts from the fire are severe enough, a Burned Area Emergency Response (BAER) Plan will be prepared. This BAER Plan is for emergency stabilization needs and covers the period one year after control of the fire. Dependent on size of the Incident, the BAER Plan will either be prepared by a local agency team, a Regional BAER Team, or a National Interagency BAER Team. The Agency Superintendent can approve BAER Plans up to \$250,000 in cost. The Regional Director has approval authority up to \$500,000. The Fire Director at the National Interagency Fire Center (NIFC) in Boise, Idaho has approval authority above \$500,000.

If longer term rehabilitation is needed, a Burned Area Rehabilitation (BAR) Plan will be prepared. This Plan will cover rehabilitation needs up to three years after control of the fire. While not as tightly constrained as the BAER Plan, the BAR Plan may continue projects begun under BAER. Funding for the BAR program is allocated each year in a fixed account for the Department of Interior Agencies, and subject to competition. The Interior BAER Coordinators prioritize expenditure of this funding on a yearly basis, so project funding is not guaranteed.

If restoration projects still exist or are needed after the three year period expires. Then agencies must find local funding to complete or continue the projects.

The process for requesting a Burned Area Emergency Rehabilitation Team (BAER) is a coordinated exchange of information between the Incident Management Team (IMT) and the Tribe and Agency. The Fire Management Officer or Tribal Department of Natural Resources

will contact the Rocky Mountain Regional Office BAER Coordinator to request a BAER Team. All rehabilitation plans and activities will be written and executed in concert with the Crow Indian Reservation Forest Management Plan, and any other natural resources plan that provides management direction for Tribal lands.

4.3 Management of Planned Fuels Treatments

From 2000-2009, the fuels program at Crow Agency has successfully prepared and carried out treatment plans for hazardous fuels reduction and wildland-urban interface treatments.

Fuels treatment areas are prioritized by several factors: first by the alleviation of risk to human health or safety, followed by restoration of ecological land management principles that increase forest diversity and long-term health of desired plant and animal communities.

The following fire use / fuels management objectives will apply;

1. Use prescribed fire to treat 100 - 200 acres per year in Wildland Urban Interface areas to reduce fuel accumulations around or near structures.
2. Use prescribed fire, fire use, mechanical treatment, and/or a wildland fire to treat 200 - 500 acres per year in the Wolf Mountains to control Hawthorn *Crataegus* spp., increase natural regeneration, increase forage, and reduce fuel loadings.
3. Assist the range management staff in burning 100-500 acres of rangeland per year for range improvement, and noxious weed control.

The fuels program started in 2000. The year 2001 saw WUI mechanical treatments and burns, and extensive training for staff in the implementation of prescribed fire. In 2002, the Crow fuels program implemented HFR projects in the Wolf Mountains and completed the program's first timber burn. The fuels program goal is to eventually complete 5000 acres each year, while continually monitoring accomplishments for long-term fulfillment of treatment objectives.

As of 2009, accomplishments include creating 40 planning compartments Reservation-wide, so that pre-formatted plans can be created for each compartment, and long-term planning can predict the amount of treatments required to bring ecologically appropriate areas of each compartment to Condition Class 2 or down to 1. Initially, compartments were created following the timber sale program in the Wolf Mountains, then prepared Reservation-wide based on RAMS (risk assessment and mitigation analysis) based on the WUI and HFR risk of each compartment. Compartments are shown in map section Appendix A. Risk analysis was completed in spring 2009 for Crow using Landfire data and Flammap, which may help in making RAMS planning most effective in HFR (non-WUI) areas.

As of 2009, fuels program projects to fulfill management objectives for annual treatment acres have been identified and approved through 2014. Burns and mechanical treatments each year since 2001 have exceeded program goals for the fuels program acreage accomplishments, rising from about 1000 acres per year in 2005 to more than 5000 acres per year in 2008 and 2009.

Different FMUs have seen and will see differing treatment planning and patterns. Most of the WUI treatment is in FMU 007, Fire Alley, and FMU 005, Rangeland. Most prescribed burning and mechanical treatment in these community- and homesite-filled FMUs is smaller acreages with more values at risk. FMU 008, the Wolf Mountains South and North, has seen more broadcast burning. An aerial ignition of a previously treated timber (maintenance) burn was completed in 2008. As of 2009, FMU 011 Pryor Mountains has seen mostly pile burning, but future planning includes broadcast burning, and mechanical treatment. FMU 012 Bighorns East and West have seen only limited fuels management in a WUI zone around the Black Canyon Youth Camp; however, future planning includes broadcast burning, and more mechanical treatments.

In FMU 008, FMU 011, and FMU 012, fire use, or analyzed management response, is a valid option for meeting fuels and forest management objectives in certain timbered areas. Firefighter and public safety remains the overarching objective of all Crow Reservation fire management, which requires that some fires in difficult or inaccessible landscapes will receive less aggressive suppression. Naturally occurring fires in remote or inaccessible areas with low values at risk, when best available analysis confirms that fire effects will not become severe, and have ecosystem benefits, will remain actively managed. In other words, the agency will actively manage (not immediately extinguish) some remote fires which fall into prescribed burn prescriptions. If these fires remain in prescription, crew actions will include monitoring and holding rather than full suppression.

Fuels program staffing consists of a Fuels Specialist, and whenever possible, available fire personnel, either Crow BIA fire and forestry employees, AD-hire, Tribally hired, or contractors. Project activity requires ramping up assigned personnel. To enhance social and economic benefits locally, and remove some workload from suppression staff during the summer, the fuels program can use temporary-hire qualified firefighters during a slow fire season.

In 2009, ARRA funding allowed the fuels program to hire local people in two projects to clear WUI hazards, and bring firewood to local residents while removing hazardous fuel accumulations from planned prescribed burn areas. From June through November 2009, the two projects employed up to 105 people short-term, and surpassed biomass and acreage objectives for each funded project.

The fuels program follows identified goals and treats specific hazard areas according to the Crow Reservation Prevention Plan, in order to mitigate WUI hazards and assist in meeting Prevention objectives.

4.4 Prevention, Mitigation and Education

From 1988-2009, the Reservation experienced a twenty two-year average of 129 fires annually, of which more than 80% were human-caused (2,280 in twenty two years). Although most human-caused fires were caught at 1/10 acre, several large fires upped the average human-caused acreage to 30 acres over the twenty two years, or a total of more than 120,000 acres as recorded in the WFMI. A Risk Assessment and Mitigation Strategies analysis from 2004 estimated that the active prevention program funded that year would produce 11% effectiveness in preventing unplanned human-caused ignitions.

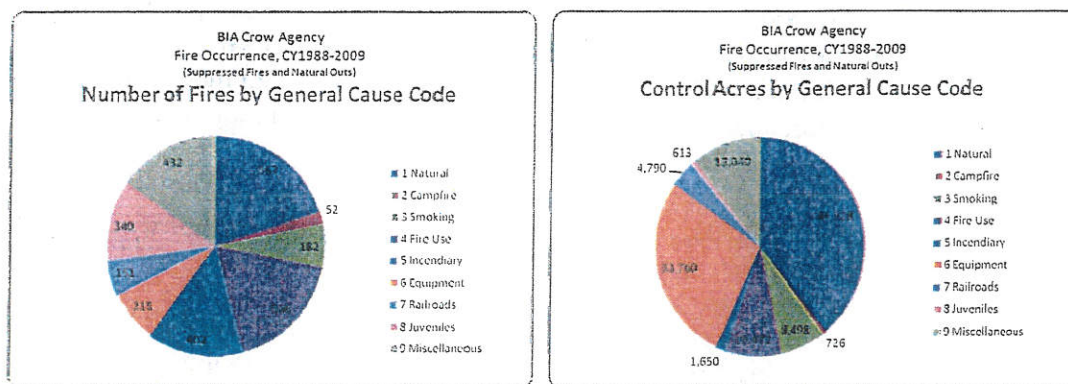


Figure 10 – Number of fires, and number of acres, compared by general cause code, 1988-2009

From 2004 to 2009 the Crow prevention program has been contracted to the Crow Tribe as a 638 program. Actions taken in the last five years have not fully met the objectives listed below from the 2004 Wildfire Prevention Plan.

- Provide for firefighter and public safety by implementing an aggressive fire prevention/ignition reduction program (source: National Fire Policy). Firefighters are widely respected in the community, as so many families have had firefighters in the family. However, juveniles are not careful with fire. Many have had no contact with firefighters other than seeing initial attack on fireworks fires, or seeing Smokey Bear at Crow Fair. No injuries have been reported due to human-caused fires in recent years, but the threat is obvious.
- Continue (make a public expectation of) the fire burn permit system during the established fire season (source: Wildland Fire and Aviation Program Management and Operations Guide 2004). Forms are available. Some residents call before burning; most do not. The permit process is currently somewhat informally conducted; standardizing community and agency expectations will require design of and publicity for standardized permit practices. Also, reference Appendix K, Tribal Burn Permit in the Forest Management Plan.
- Reduce the wildfire threat within WUI communities and increase public awareness of WUI risks (source: Crow Fire Prevention Plan). The agency fuels program aggressively manages WUI fuels with mechanical treatments and prescribed

burning. Each Reservation community experiences prescribed burns each year conducted by

- BIA Fire & Aviation. The Fuels Specialist has presented WUI risks and documentation to the Tribal Council, most recently in summer 2009. The Tribe has conducted a few school visits in the last five years.
- Develop a system for investigating and documenting all human-caused fires. The Tribe has not pursued fire investigation in the last five years. However, all wildland fire causes are documented in the Wildland Fire Information System.
- Form a coalition of persons interested in fire prevention within reservation communities, as a coalition can reach more people, address more complex problems, and be more credible than any single one person (source: Crow Nation Dept of Forestry).
- Reduce the number of human-caused fires in all categories (source: Crow Fire Prevention Plan).
- Provide technical assistance to the Crow Tribal Housing Authority in conducting fire safety inspections in WUI communities (source: Crow Fire Prevention Plan).
- Ensure fire prevention material and information is distributed to local citizens, Reservation visitors, and forest and rangeland users (source: Crow Fire Prevention Plan).

The 2004 RAMS analysis estimated that savings of suppression costs due to an actively planned and executed prevention program would total more than \$900,000. The FMO who conducted the analysis wrote that "Even if this amount is off by a factor of ten, the prevention program would more than pay for itself."

Continued prevention funding depends on the following factors: the completion of the 2009 FMP, a fire permitting system functional during the established fire season, documented program support by the Tribe and local government, a functional system in place for investigating and documenting all human-caused fires, and an agreement operating with law enforcement to deal with violations and assist with investigations.

A prevention program operates within the broad categories of education, engineering, enforcement, and administration.

Education: One or two school visits a year can be expanded to many more schools, sharing more focused curriculum, and with visits to community groups and agencies. Visits to community groups, media, and governmental agencies (from the Tribal Executive Branch and Legislature, to BIA Law Enforcement, to the Indian Health Service) should coordinate common messages and approaches to publicizing the benefits of preventing unplanned fires. A coalition interested in wildland fire issues already exists informally on the Reservation,

with many households having some experience with wildland firefighting, but working groups have not developed. An active prevention program would keep public attention on preventing unplanned fires' effects on the neighborhood, while more fully sharing topics of fire's role in the ecosystem on the Reservation. Signage exists but is not coordinated Reservation-wide.

Engineering: A RAMS analysis of 2004 found the following risks to FMUs and communities from human-caused unplanned fires. Since 2004, fuels compositions, settlement patterns, weather, and unplanned ignitions have not stayed constant, so a fresh evaluation of hazards is in order.

FMU or community	Fuel hazard	Protection capability / difficulty	Ignition risk	Fire history	Values at risk	Catastrophic fire potential	Total
005 Rangeland	High	Low	High	High	Mod	Mod	High
007 Fire Alley	High	Low	High	High	High	High	High
008 Wolf Mtns	Mod	High	Mod	Mod	Mod	Low	Low
011 Pryor Mtns	Mod	High	Mod	Low	Mod	Mod	Mod
012 Bighorn Mtns	Mod	Mod	Low	Mod	High	Mod	Mod
-100 Crow Agency	High	Mod	High	High	High	Mod	High
-400 Pryor	High	Mod	Mod	High	High	Mod	High
-200 Lodge Grass	High	Mod	High	High	Mod	Mod	High
-300 Wyola	Mod	Mod	High	Mod	Mod	Mod	Mod
-800 Dunmore	Mod	Mod	Low	Mod	Mod	Mod	Mod
-700 Garryowen	Mod	Mod	Mod	Low	Mod	Mod	Low
-500 St Xavier	Mod	Mod	Low	Mod	Mod	Mod	Mod
-600 Fort Smith	Low	Low	Mod	Low	Mod	Mod	Low
From 2004 Crow Prevention Plan	Based on fuels present, flame lengths produced, crowning potential, elevation, percent slope, and topography	Based on response times for engine IA plus suppression complexity. Cooperators not factored in.	Based on WUI factors present in community	Number of fires	Natural, cultural, commercial and aesthetic resources	If community is threatened by potential fires within compartment	

Table 3 - 2004 RAMS analysis comparison of hazards

Enforcement: No arson wildland fires have been prosecuted on the Reservation in many years. The last qualified fire investigators to work on the Reservation came in the busy fire year of 2006.

To simplify analysis of fire causes and recognize trends that can be modified by appropriate action, the current Wildland Fire Management Information (WFMI) system of documenting fire reports should be merged with WFDSS within a few years. As of 2009, many fires are still reported as "undetermined human origin." Managers have created maps of human-caused fires and recognized clusters of negligent or intentional arson by both juveniles and adults, but no cases have been pursued to indictment.

A solution depends partly on cooperative work and commitment to joint responsibilities by fire personnel and BIA law enforcement, pursuant to the 2005 Memorandum of Understanding between national BIA Fire Management and Office of Law Enforcement Services. Goals include promoting the development of Standard Operating Procedures (SOPs) at Agency and Tribal levels, enhancing understanding of wildland fire investigation policies and procedures by both fire personnel and law enforcement in order to facilitate sharing of information and technical staff and skills, initiating investigation of trespass and coordinating prosecution of trespass action with law enforcement and the Tribe when concurrent jurisdiction has been exercised, and working more meaningfully with affected groups and individuals to prevent unauthorized ignitions.

Administration: The prevention program at Crow Agency BIA has progressed de facto by fuels program actions since 2004. Homeowners seeking fuels reduction have been served by the fuels program. While the Crow Tribe has operated a prevention program, advances in preventing large unplanned fires have come from actively reducing fuels around WUI areas, and from publicizing the dangers to WUI neighborhoods from wildland fire. Hazard fuels reduction treatment plans exist for all WUI areas of the Reservation for the next five years.

Also, initial attack fire crews represent the fire program in the spring before green-up and again in the hottest days of summer, as they patrol and as they respond to negligent arson from trash burns or juveniles with fireworks. Engine personnel act as spokespeople for fire prevention and as first-line investigators.

CHAPTER 5 – MONITORING AND EVALUATION

5.1 Severity Monitoring

Evaluation of monitoring data helps to assess progress toward strategic goals and objectives, and also toward specific projects' goals and objectives. At the strategic level, monitoring helps determine how the program is contributing to the objectives of the Crow Reservation Forest and Fire Management Plans. For fuels treatments, "monitoring is the new black" (--Karrie Stevens, Northwest Region BIA Fire Ecologist): progress toward objectives is measured not by acreages but by monitoring of treatment effects, which have been planned to cumulatively support the Fire and Forest Management Plans.

At the incident or project level, monitoring of fire effects helps to define tactical objectives. James Steele has written, "The key to effective management is going to involve fire damage risk assessments and mitigations to keep fire intensities manageable and fire effects within policy limits." In other words, evaluation of monitoring data is prerequisite to making effective tactical and management decisions for emerging incidents.

Monitoring supports individual fuels programs in hazard and wildland urban interface fuels reduction, and prescribed fire for silvicultural objectives. Active consideration of data also aids professional development of effective personnel, through after-action reviews, fire effects monitoring, and other reflective exercises in doing one's job more effectively.

Study of indicators for the coming fire season becomes the earliest clue to how conditions have carried over from the previous season, and how fuels are influenced by current and predicted environmental conditions.

Measurements recorded locally include 1000-hour **fuel moistures**, green-up or curing rates, and weather impacts. Low 1000-hour fuel moistures, if represented by actual oven-dried measurements of cross sections, represent potential for high-intensity fires or for long term residency of fire, which can degrade soils. Early or late **green-up or curing** (brown-up) strongly affects fire intensities in microclimates (small areas with specific weather and curing rates). **Weather's** changes in environmental conditions can quickly contribute significant available fuels. Examples include low winter snow depths, frost kill of shrub fuels, large areas of windthrow, or thermal belts of low relative humidity and high air temperatures throughout the night.

Many remotely operated measurements of fire danger are studied by agency managers at least daily during fire season, including RAWS (Remote Access Weather Station) data from five units on the Reservation, and NFDRS (National Fire Danger Rating System) and WIMS (Weather Information Management System) data available to fire managers on the Internet (see bibliography). Analysis of weather patterns from prior years' and weather systems' RAWS observations on the Crow Reservation provide good perspective on potential expected weather. Predictive indices useful on the Reservation include ERC's

(Energy Release Components), BI's (Burning Indices), and compilations of fuels moisture measurements.

5.2 Project Level Monitoring

Each fire management project is driven by at least one specific reason that can be defined in a measurable objective. To be useful, an objective must be easily measurable, easily understood, mutually agreed upon, and attainable. If someone writes an objective to justify existing planning, that is a rogue objective: objectives come first, and management is undertaken to best meet them.

The BIA Fuels Management Handbook requires Level 1, Level 2, and Level 3 monitoring of all prescribed burns. Level 4 monitoring will occur with Continuous Forest Inventory (CFI) re-measurements (see Appendix A for CFI Plots). This Fire Management Plan has expressed specific intent to replicate pre-European contact forest structure by species and presence, though possibly with greater stem densities and less frequent fire than pre-settlement. Based on this direction, fuels and fire management will be targeting these same objectives, regulating amounts of downed woody debris, and life stages of surface vegetation. Resource extraction objectives for these lands also influence desired stand conditions.

A map of FIREMON plots on the Crow Reservation is located in Appendix A, Map Section. They were initiated in 2008. Project monitoring describes current conditions, and after treatments, it will describe effects of the treatment and how the new conditions compare to the desired conditions. Ultimately the monitoring results should help demonstrate how effective or ineffective the management actions were in moving the management area toward the desired future conditions.

Wildland Urban Interface

Areas meeting the definition of WUI high hazard areas receive special funding to support projects that reduce the hazards of intense fire potential. Monitoring in these areas must compare existing to desired hazard level. Monitoring in these areas will demonstrate a reduction in fire behavior when comparing pre-treatment to post-treatment.

Database and Inventory Data

Following the principles of High Reliability Organizations, a redundant system would allow access to inventory data by anyone, while a second system would provide the basis for fuels management activities. This one is easily manipulated until displayed data is in the form that is usable for site analysis and reporting. The final product should then be cached in a database for public access, so that management of operations is transparent as well as effective.

5.2.1 Project Evaluation

Project evaluation follows a specific definition of what the results should be. Project objectives define what will be treated and why, the prescription will define how it will occur, and monitoring provides the data and analysis to examine how successful we were. Evaluation depends on timely collection of data that describes the desired fire effects, e.g. fuels reduction, shrub age class change, fire caused sapling mortality, or duff reduction. Contrasting results to treatment conditions and progression will begin to define when specific program activities should occur. Project evaluation:

1. begins with activity planning by acquiring pretreatment data to validate all objectives; their funding sources, and risk management,
2. is an ongoing evaluation of preparation through the initial project inbriefing with management and workforce,
3. Requires on-site monitoring of environmental conditions as they are described by the project prescription, changes, and risk management.
4. Has an evaluation (after action review) immediately following the project, of operations, expectations, successes, and failures. These should be based on on-the-ground reality vs. the pre-written project plans.
5. Then includes manager's analysis, through the use of the Firemon Analysis Tool and Forest Vegetation Simulation results, for comparison of post treatment data compared to objectives, and recommendations for changes, to increase program effectiveness before similar actions are re-planned.

5.3 Fire Plan Strategic Monitoring & Evaluation

This fire plan is an operational overview of how Crow Agency Fire and Aviation Management will operate to meet the emergency need for wildland fire suppression as described by the National Fire Plan, Department of Interior and Bureau of Indian Affairs Manuals, Operating Plans and Cooperative Agreements, and other plans or special requests that originate from the BIA, Tribe, or cooperators. Fuels management strategic monitoring will be done using CFI analysis and Flammap runs during CFI re-measurements. The following activities serve to monitor and evaluate the fire program in accordance with official and approved direction:

- Reviews and updates of existing agreements and plans.
- Annual preparedness reviews by an independent party.
- Annual performance evaluations of specific position responsibilities.
- Requesting Aviation Safety and Technical Assistance Teams for aircraft operations.
- Fire Aviation and Safety Team reviews as part of a geographic area effort or agency request.
- Results of a Serious Accident Investigation Team review following a serious accident.

- Approval of the annual Fire Management Operating Plan.
- Results of program or individual fire reviews.

The integration of Fire Plan direction and requirements into daily routine provides daily direction for programs to meet the intent of the Plan. After-action reviews are one example of continuous quality improvement efforts that help to focus personnel on meeting objectives in effective ways. Measuring accomplishments in finding work-level improvements to practice is a product of daily, weekly, and monthly staff meetings, and will be documented to provide an additional source to monitor for program success.

GLOSSARY

Apsaalooke: Members of the Crow Tribe.

After Action Review (AAR): A term adopted from the military: a facilitated and guided review of any action or event that may suggest changes in existing protocols, decision making, human factors, or understanding of technical data.

Anchor Point: A safe and advantageous location, usually a barrier to fire spread, from which to start constructing a fireline. Using an anchor point minimizes the chance of being flanked by the fire while the line is being constructed.

Billings Dispatch (BDC): The local zone dispatch, East Zone Northern Rockies Interagency Dispatch Center.

Biomass: All dead and live burnable vegetation on a site.

Blacklining: Burning all material between the constructed fireline and the expected edge of the fire. Burnout, in contrast, uses fire to strengthen a pre-existing control line.

Fire Behavior: Description of how a fire is burning, figured out using some form of mathematical model based on numerical descriptions of environmental conditions and available fuels. Calculated fire behavior is expressed as numbers, and must be interpreted in order to represent reality and potential changes in a fire.

Complexity: A relative term that measures the increase or increasing value of a situation and associated resource values, based on the number of internal and external influences that have created it, or may influence it in the future. As complexity increases, analytical decision-making becomes more difficult due to the need for more information, and the need to use current and predictable information.

Condition Class: Fire Regime Condition Class (FRCC) is an interagency, standardized tool for determining the degree of departure from reference condition vegetation, fuels and disturbance regimes. Usually it measures how different a landscape is from its characteristics before European settlement. Assessing FRCC oversimplifies ecological condition but is a useful guide for management objectives and treatment priorities, especially in the frequent-fire ponderosa forests of the Reservation:

Condition Class 1: - For the most part, fire regimes in this Fire Condition Class are within historical ranges. Vegetation composition and diversity are intact. Thus, the risk of losing key ecosystem components from the occurrence of fire remains relatively low.

Condition Class 2: - Fire regimes on these lands have been moderately altered from their historical range by either increased or decreased fire frequency. A moderate risk of losing key ecosystem components has been identified on these lands.

Condition Class 3 - Fire regimes on these lands have been significantly altered from their historical return interval. The risk of losing key ecosystem components from fire is high. Fire frequencies have departed from historical ranges by multiple return intervals. Vegetation composition, structure and diversity have been significantly altered, so these lands verge on the greatest risk of losing their diversity and adaptability.

Contingency Plan: Plans for actions to reduce harm from possible changes that would drastically affect the predicted outcome based on current actions. Contingency Plans are a result of gaming an on-going fire, or are designed to meet and alleviate a "what if" situation.

Dry Cold Front: The leading edge of a cooler air mass, which pushes warmer air to rise. If the lifted warm air does not contain enough moisture, cloudiness may occur, but precipitation does not. As a front moves across a region, the winds gust and shift in direction. Ahead of an approaching cold front in the Northern Hemisphere, winds usually shift gradually from southeast to south, and on to southwest. As the cold front passes, winds shift rapidly to west, then northwest. Typical cold front winds range between 15 and 30 mph but can be much higher.

Duty Officer: A designated employee of tenure and experience that can direct normal and emergency operations with delegated authorities from a supervisor. This allows a rotation of responsibility to assure a competent manager is available, to rest employees, or to help develop employees toward a management position.

Ecosystem: Patterns of habitation by all species, their location, growth characteristics, and presence, all caused by their influences on each other, combined with environmental influences such as weather and soils, in a particular location or area with unique environment.

Energy Release Component – ERC: How intense a fire would be, based on current weather and fuel moistures: the computed total heat release per unit area (British thermal units per square foot) calculated to exist within the flaming front at the head of a moving fire at a certain time of the day.

Extended Attack: A wildland fire that has not been contained or controlled within the first two days and for which more firefighting resources are ordered by the initial attack incident commander. Extended attack implies that the complexity level of the incident requires some support to initial attack forces.

Fire Dependent Ecosystems: Ecosystems develop and evolve over time due to the interaction amongst plants, animals, soil, and weather to produce current plant and animal neighborhoods. Plant characteristics often display either fire-resistant or fire-kill-prone vegetation, such as thick bark or resprouting from the roots, because their ancestors were used to fire occurrence on the site. All of the Crow Reservation has co-existed with fires immemorially. Several Reservation ecosystems are entirely fire-dependent, such as the Wolfs' ponderosa pine forests, the Pryors' lodgepole pine forests, and the rangeland's native short-grass prairies.

Fire Management Planning Analysis: A formal process by which the BIA fire management program identifies its average annual workload, the optimal program configuration for recurring program elements, and the estimated budget required to support the program.

Fire Program Analysis: FPA is a performance-based, landscape scale interagency fire program planning and budgeting system. The system is comprised of: 1) a preparedness module focused on the planning and budgeting of the initial response to unplanned ignitions and program management; this module also includes use of wildland fire; 2) a set of modules including extended response, large fires, fuels management, prevention program and emergency stabilization and rehabilitation.

FIREMON: Fire Effects Monitoring and Inventory System is a plot level sampling system designed to characterize changes in ecosystem attributes over time. In other words, people make a detailed count of biomass on the ground at particular times and places, then store and update that data. The system consists of a sampling strategy manual, standardized sampling methods, field forms, Access database, and a data analysis program. In 2009 the name became FFI (Feat-Firemon Integrated).

Fire Regime: The long-term occurrences and patterns of fires in a particular ecosystem or specific neighborhood. A neighborhood's fire regime is characterized by fire frequency, predictability, seasonality, intensity, duration, scale (patch size), as well as regularity or variability. Five combinations of fire frequency, expressed as fire return interval in fire severity, are defined:

Groups I and II - include fire return intervals in the 0 - 35 year range. Group I includes ponderosa pine, other long needle pine species, and dry site Douglas-fir. Group II includes drier grassland types. Groups III and IV include fire return intervals in the 35 - 100+ year range. Group III includes interior dry site shrub communities such as sagebrush. Group IV includes lodgepole pine. Group V is the long interval (infrequent), stand replacement fire regime and includes high elevation conifer species.

Forest Health: An arguable concept of the dynamic (constantly changing) state of defined forest ecosystems. Some say that forest health is a measure of how forest disease and insect activity can affect forest growth and management risk. Others say that forest health is a measure of how successful the appropriate fire regimes are in affecting the perceived condition classes of a forest, which include disease and insects.

Hazardous Fuels Reduction (HFR): The removal of biomass from an area, or changing fuels' flammability (for example, by chipping brush), to reduce the intensity of a future fire in that neighborhood. Also, a funding category for projects that remove burnable materials, or reduce hazards of unplanned fires to values at risk.

Incident Command System: A standardized on-scene emergency management concept since the 1970's, that allows participants to quickly function in an integrated organizational structure equal to the complexity and demands of an incident, without being hindered by jurisdictional

boundaries. Participants are pre-certified (with “red cards,” in wildland fire) to fill standardized positions.

Incident Command Team: Type 1 and 2 teams are nationally-rostered interagency teams brought to an incident at an agency administrator’s request. A Type 3 team is usually local and non-local resources assembled to meet the management needs of an ongoing incident. A Type 4 team is usually several local resources working for several operational periods on an incident, without specific management support. A Type 5 incident is initial attack.

Initial Attack: The actions taken by the first resources to arrive at a wildfire to protect lives and property, and to prevent further extension of the fire.

Long Term: “Long term” refers 1) to conditions created and naturally developed over a period of time exceeding the management period, before regulation or active management, or 2) to a plan for active management, with defined objectives, strategies, and potential future tactics laid out, but open to change.

Management Action Points (MAP): Physical locations identified on maps and on the ground by fire managers. If fire reaches these locations, managers evaluate existing and future conditions to make significant decisions.

Minimum Impact Suppression Tactics (MIST): Light-on-the-land suppression tactics that include use of hand crews rather than mechanical ground equipment, and rehabilitation of most constructed fireline. MIST is a ‘do least damage’ philosophy, not a special kind of firefighting tactics but rather a mind set: how to suppress a wildfire while minimizing the long-term effects of the action, MIST is using the minimum tool to safely and effectively accomplish the task.

National Fire Danger Rating System: A uniform fire danger rating system that focuses on environmental factors that control the moisture content of fuels. NFDRS indices represent a general condition that would induce fire starts and associated fire behavior based on current and predicted conditions.

National Incident Management System (NIMS): In 2009, the Department of Homeland Security’s cross-jurisdictional version of the incident command system (see).

National Wildfire Coordinating Group: Local, state, tribal and federal agencies that have legally pledged to keep common standards for fire professional training and management.

Pre-settlement Conditions: Forest conditions that relate to vegetation species, stocking, size classes, and relative health prior to the late 1800’s. The landscapes were then influenced by fires set by native peoples, as well as by naturally occurring fires, within climates and ecosystem dynamics that cannot remain unchanging.

Preparedness Levels: Condition or degree of being ready to cope with a potential fire situation. The PLs are different stages of required response readiness, based on the anticipated complexity of potential incidents.

Prepositioning: Locating suppression resources before a fire starts, based on the likelihood of fires in certain areas, in order to reduce response time and increase initial attack effectiveness.

Prescribed Fire: Any planned ignition intended to meet specific objectives. Prescribed fires are conducted in accordance with prescribed fire plans. A non-agency "controlled burn" may not have a prescribed fire plan.

Prescribed Fire ("Burn") Plan: A plan for each prescribed fire. Plans are documents prepared by qualified personnel, approved by the agency administrator, and include burn prescriptions and analyses of fire potential.

Prescription: Measurable conditions under which a prescribed fire will be ignited, that guide selection of management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, and environmental, geographic, administrative, social, or legal considerations, as well as weather.

Rehabilitation: Attempting to prevent future problems from damage caused by suppressing a wildland fire. Under special circumstances, a Burned Emergency Area Rehab (BAER) team may take mitigation measures to lessen potential damage caused by the fire.

Restoration: Managing a site to create a more diverse and stable condition in a neighborhood that currently exhibits significant departure from the desired ecological structure. See Condition Class.

Risk Assessment and Mitigation Strategies: This is a wildland fire prevention planning model for the use in the preparation of wildland fire prevention plans. It addresses the causes of fires and strategies that will reduce them.

Risk Management: An organizational approach to managing risk through a systematic risk assessment and mitigation process, identifying ways to reduce the likelihood of an unwanted event occurring, or sustaining maximum loss to values at risk.

Scott's 40 Fuel Models are standardized models of fuel types (describing burnable material on a local area) used to mathematically model fire behavior and fire spread. Richard Rothermel defined 13 original fuel types in 1972. Describing fuel types helps in fire behavior analysis: the mathematical prediction of current and predicted fire intensity, self-propelling fire growth, rates of spread, effects, and so on. The Crow Reservation's fuels encompass several of the major subdivisions of Scott's types: (NB) Nonburnable areas in badlands, (GR) Grass, (SH) Shrub, (TU) Timber-Understory, (TL) Timber Litter, and areas of (SB) Slash-Blowdown in the Pryors.

Single Engine Air Tanker: An agricultural fixed wing smaller than a heavy air tanker, capable of landing and takeoff on smaller airstrips, capable of hauling and dropping 400-1000 gallons of mixed chemical retardant.

Smoke Production: Smoke created by combustible material considering fuel size, fuel moisture, and ignition type and sequence. Smoke includes gasses, moisture, and solid particles both large and microscopic, produced during combustion (smoldering and/or flaming).

Tactically Defensible: An effective location from which to control a wildland fire, yet that also meets all safety needs of the firefighters.

Unplanned Ignitions: Unapproved and unauthorized fire starts that occur in unwanted places.

Values at Risk: Natural resources, improvements, or other values that may be harmed if a fire occurs; also, the estimated damages and benefits that may result from fires in a particular presuppression or suppression situation.

Volunteer Fire Department (VFD): A non-paid organization of local community members, occasionally but not necessarily trained using NWCG standards. VFDs can be first on scene to rural range fires. Members have variable training for either wildland or structural firefighting. Wildland training and equipment may be supported by grants from counties and/or by coordination with Montana Department of Natural Resources and Conservation.

Wildland Fire Decision Support System (WFDSS): A process which examines the full range of responses to a wildland fire and becomes the documentation support system for the management strategies taken. Managers update the WFDSS throughout the course of a wildland fire. Replaces the Wildland Fire Situational Analysis (WFSA) and WFIP process.

Wildland Urban Interface (WUI): Places where people live, that are at risk from wildland fire: where human structures and values at risk have been developed in an area with a fire regime that is prone to wildland fire. Also, a funding category for projects that reduce hazards to humans' values at risk in developed areas.

PREPARERS

Dale Glenmore, team lead, Fire Management Officer, Crow Agency BIA Fire & Aviation

Jon Kohn, Public Information Officer, Crow Agency BIA Fire & Aviation

Randy Pretty On Top, Fire / Fuels Specialist, Crow Agency BIA Fire & Aviation

Fred Wayne Taylor, Regional NEPA Officer, BIA Rocky Mountain Regional Office

REFERENCES CITED

Aviation Management. 2009. Departmental Manual Parts 350-354, US Department of the Interior. http://elips.doi.gov/app_dm/index.cfm?fuseaction=home (accessed January 1, 2010).

Brown, James K.; Smith, Jane Kapler, eds. 2000. **Wildland fire in ecosystems: effects of fire on flora.** Gen. Tech. Rep. RMRS-GTR-42-vol. 2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Crow Indian Agency, Forest Management Plan. 2009. U.S. Department of the Interior Bureau of Indian Affairs, Rocky Mountain Regional Office.

Crow Reservation Study Area. 2009. Montana Digital Atlas, Natural Resource Information System (NRIS), State of Montana.
<http://maps2.nris.mt.gov/mapper/ThemeList.asp?Profile=800457&qLayer1=INDIANRES&qField1=ResName&qValue1=CROW&Oper1=&Buffer1=0&TabName=Land%20Information>
(accessed July 17, 2009)

Fire Management Measures. 2009. Code of Federal Regulations, CFR 25, § 163.28. Electronic Code of Federal Regulations, <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=5bbb0966d56c3b5a468ee23008db10e6&rgn=div8&view=text&node=25:1.0.1.8.71.2.91.19&idno=25> (accessed January 1, 2010).

Federal Wildland Fire Management, Policy and Program Review, Final Report - December 18, 1995. (1995). U. S. Department of the Interior, U. S. Department of Agriculture.
http://www.nifc.gov/policies/1995_fire_policy.htm (accessed January 1, 2010).

Flathead Indian Reservation Fire Management Plan 2006. 2006. comp. James Steele. Ronan, MT: Confederated Salish and Kootenai Tribes, Branch of Forestry, Division of Fire Management.

Healthy Forests Initiative, website.
<http://web.archive.org/web/20070427094410/www.healthyforests.gov/> (archived copy of website of April 2007, accessed January 1, 2010).

Introduction to Fire Effects. 2008. Course Materials for NWCG RX-340 class, Introduction to Fire Effects, Northern Rockies Training Center, Missoula, Montana, March 2008.

National Fire Plan. <http://www.forestsandrangelands.gov/overview/index.shtml> (accessed January 1, 2010).

Scott, Joe H.; Burgan, Robert E. 2005. **Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model.** Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72 p.

Smith, Jane Kapler, ed. 2000. **Wildland fire in ecosystems: effects of fire on fauna**. Gen. Tech. Rep. RMRS-GTR-42-vol. 1. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Vegetation: Resources. 2002. Crow Indian Tribe. Crow Natural, Socio-economic and Cultural Resources Assessment and Conditions Report.
http://www.blm.gov/pgdata/etc/medialib/blm/mt/field_offices/miles_city/og_eis/crow.Par.85585.File.dat/vegetation.pdf (accessed July 17, 2009).

Wildland Fire and Aviation Program Management and Operations Guide 2009. 2009. Bureau of Indian Affairs (BIA), Indian Affairs Manual (IAM), Part 90.
http://www.nifc.gov/policies/blue_book.htm (accessed January 1, 2010).

Wildland Fire Management. 2009. Departmental Manual Part 620, US Department of the Interior. http://elips.doi.gov/app_dm/index.cfm?fuseaction=home (accessed January 1, 2010).

Wildlife: Resources. 2002. Crow Indian Tribe. Crow Natural, Socio-economic and cultural resources assessment and conditions report.
http://www.blm.gov/pgdata/etc/medialib/blm/mt/field_offices/miles_city/og_eis/crow.Par.65918.File.dat/wildlife.pdf (accessed July 17, 2009).

Zouhar, Kristin; Smith, Jane Kapler; Sutherland, Steve; Brooks, Matthew L. (2008). **Wildland fire in ecosystems: fire and nonnative invasive plants**. Gen. Tech. Rep. RMRS-GTR-42-vol. 6. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A

MAP SECTION