Tactics and Appropriate Management Response

Tips on Selecting Suppression Tactics for National Forests And Grasslands

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Appropriate Management Response – AMR (From Review and Update of the 1995 Federal Fire Management Policy – 2001)

> **The response to a wildfire based on an evaluation of risks to firefighter and public safety, the circumstances under which a fire occurs, including weather and fuel conditions, natural and cultural resource management objectives, protection priorities, and values to be protected**

Purpose of Document

The term "appropriate management response" or AMR has been around for over a decade, yet it remains misunderstood by managers and fire personnel at all levels. Separate interagency efforts are underway to review and change, if needed, the 1995 Federal Wildland Fire Management Policy, the 2001 Review and Update of that policy, and the 2003 Implementation Strategy for that policy. Any change in policy will take a considerable length of time. This document is not intended to display where policy changes may be headed or even to try and clarify existing policy. It is merely intended as a quick reference of the full spectrum of tactics which are available under current policy, and a few suggestions on when they should be considered.

This document is not a pick-list nor is it a decision tree. Every wildland fire is different and managers need to evaluate the situation while being cognizant of the doctrine and principles of the agency.

Users should understand that appropriate management response covers the full spectrum of response to wildland fire, with Full Suppression being on one end of the spectrum and Wildland Fire Use (WFU) being on the other end.

Wildland Fire Use may be the appropriate management response for an unplanned lightning ignition; however we will not go into detail on WFU in this document. For additional information on WFU, See the Interagency WFU Implementation Procedures Reference Guide, May 2005. Recognize however, that the tactics discussed in this document may be equally applicable to WFU as well as suppression.

Target Audience

This document is intended to help on the ground users, both line officers and fire management personnel, recognize the full range of alternative tactics available to them. It will be most helpful to personnel with limited experience or those from units that do not have a high fire load or history of large fires, but it can also be a refresher for experienced line officers and incident management teams.

Federal Fire Policy

Current interagency wildland fire policy requires administrators to select one management objective or strategy for any unplanned ignition. This objective is either Wildland Fire Use (WFU) or suppression. Once suppression is selected the fire may not move to WFU. A WFU fire can move to a suppression objective, but may not return. Regardless of which objective is selected, a range of strategies are available to meet that objective. Strategies such as confinement, containment, control with direct attack, and control with indirect attack are all acceptable under either objective. Similarly, a full spectrum of tactics is available under the various strategies and the two objectives.

AMR Discussion from the Interagency Standards for Fire and Fire Aviation Operations (the "Red Book")

Definition

The appropriate management response is any specific action suitable to meet Fire Management Unit (FMU) objectives. Typically, the AMR ranges across a spectrum of tactical options (from monitoring to intensive management actions). The AMR is developed by using FMU strategies and objectives identified in the Fire Management plan.

Developing Appropriate Management Response Evaluation Criteria

- Risks to firefighters and public health and safety
- Land and Resource Management objectives
- Weather
- Fuel conditions
- Threats and values to be protected
- Cost efficiencies

Appropriate Management Response Options

- Monitoring from a distance
- Monitoring on-site
- Confinement
- Monitoring plus contingency actions
- Monitoring plus mitigation actions
- Initial attack
- Wildfire suppression with multiple strategies
- Control and extinguishment

Federal Wildland Fire Principles

The nine guiding principles for the Federal Wildland Fire management are:

1. Firefighter safety is the first priority in every fire management activity.

2. The role of wildland fire is an essential ecological process and a natural change agent that will be incorporated into the planning process.

3. Fire management plans, programs, and activities support land and resource management plans and their implementation.

4. Sound risk management is a foundation for all fire management activities.

5. Fire Management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.

6. Fire management plans and activities are based upon the best available science.

7. Fire management plans and activities incorporate public health and environmental quality considerations.

8. Federal, State, Tribal and local interagency coordination and cooperation are essential.

9. Standardization of policies and procedures among Federal agencies is an ongoing objective.

Operational Principles of AMR

As the US Forest Service and federal wildland fire community moves toward a more principle based management, it's important to understand that appropriate management response and fire suppression doctrine go hand in hand. Some of the key doctrinal principles that set the stage for AMR are listed below (From Foundational Doctrine Guiding Fire Suppression in the U.S. Forest Service):

- No resources or facility is worth the loss of human life, however the wildland fire suppression environment is complex and possesses inherent hazards that can---even with reasonable mitigation---result in harm to fire fighters engaged in fire suppression operations. In recognition of this fact, we are committed to the aggressive management of risk.
- Successful fire suppression is essential to support the Forest Service mission.
- The intent of wildfire suppression is to protect human life, property, and at risk lands and resources.
- Employees are expected and empowered to be creative and decisive, to exercise initiative and accept responsibility, and to use their training, experience, and judgment in decision-making to carry out their leader's intent.
- Employees are expected and empowered to make reasonable and prudent decisions to accomplish the agency mission while minimizing exposure to hazards.
- Every suppression operation is directed toward clearly-defined, decisive, and obtainable objectives.
- Rapid deployment and concentration of fire suppression resources at the decisive time and place is essential to successful fire suppression actions.
- We practice risk management to minimize the exposure and affects of the inherent hazards in fire suppression while maximizing the opportunities to achieve leader intent.

Leader's Intent

The Secretaries of Agriculture and Interior, in testimony before Congress, have stated the intention to implement management efficiencies throughout all aspects of fire suppression activities. Employment of an appropriate management response to every wildland fire is a key to becoming more efficient. Local line officers and fire managers are expected to actively practice risk management in making decisions on strategies and tactics for managing both wildland fire use and suppression fires. Suppression expenditures are expected to be commensurate with the values at risk. The full spectrum of wildland fire response should be utilized by managers on units with Wildland Fire Use authority. Units without WFU authority should utilize the full spectrum up to the point of WFU. All the tactics described in this guide are available for use unless specifically prohibited in the unit land management plan. Managers are expected to select alternatives that contribute to meeting national and regional as well as local needs.

Common AMR Tactics

The following tactics are all acceptable appropriate management responses based on various situations and scenarios. This list may not be all inclusive. A very unique situation could result in the use of totally non-traditional tactics that could still be the appropriate response. Federal Fire Policy requires that each wildland fire have only one objective, either suppression or wildland fire use. However, we are not limited to a single tactic on any given fire. Any combination of tactics may be appropriate may be utilized, and any tactic may be changed during the course of an incident. Unlike the objective which cannot change back to fire use from suppression, any tactic may be applied and stopped several times during an incident.

The tactics described on the next several pages are commonly used throughout the country. Some considerations are listed for review by line officers and fire managers, but the guide should not be looked at as a decision making tool. Local experience and conditions must drive the decision on which tactic(s) is appropriate and has the optimum chance for success.

Full Perimeter Control

Full Perimeter Control – This is the most commonly used tactic on wildland fires. Control lines, whether hand lines, dozer lines, plow lines, water or foam lines, are constructed around the entire perimeter of the fire. Roads, rivers and other barriers can be used in conjunction with constructed lines. In the end a physical barrier exists completely around the fire.

Consider Using This Tactic When:

- Immediate suppression would reduce cost and exposure;
- Political/Social/Resource considerations preclude other options; AND
- Probabilities of success as established in initial assessments or WFSA are moderate or better;
- Conditions are projected to worsen.

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Generally accepted and non-controversial • Well understood by firefighters and public • May keep the fire to a smallest size	• Can be more expensive than alternative strategies • Extensive resources may be needed for success • Can result in increased exposure risk to firefighters • Missed future protection opportunities

Specific Considerations for Agency Administrators

Most wildland fires in the lower 48 states are suppressed with full perimeter control, which is establishing some type of fire line around the entire fire edge. This strategy provides the basis for most of our suppression efforts, but there are some considerations for line officers before defaulting to this strategy. At times of significant competition for resources (such as at PL 4 and 5), a unit may be unable to obtain the necessary resources to effectively continue this strategy as the fire continues to grow. In addition as priorities within a geographic area or even nationally change, resources may be re-allocated to other fires with higher needs. Continuing to use "typical" firefighting tactics, particularly in areas where large fires are expected, can be a significant drain on the national suppression budget. Agency administrators (AA) need to consider the national picture and the drain on budget and opportunity costs of tying up resources.

One of the toughest decisions agency administrators make on large fires is when to back off from full perimeter control based on analysis of the fire. AA's should have continual dialogue with assigned Incident Management teams and local and Regional Fire managers when faced with a fire that continues to exceed expected containment progress. Decision support tools are becoming more available for fires turning into long duration events. Regional fire managers can assist in determining when and where these tools may be effective.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

At times of significant competition for resources (such as at PL 4 and 5), a unit may be unable to obtain the necessary resources to effectively continue this strategy as the fire continues to grow. Tactical aircraft may be in short supply. In addition as priorities within a geographic area or even nationally change, resources may be re-allocated to other fires with higher needs.

Increasing fire suppression costs are a significant issue for the wildland fire agencies, for Congress and for the President's Office of Management and Budget. Suppression personnel at all levels must be cognizant of the impacts their selection of tactics has on overall fire costs.

Point Protection

Point Protection – This strategy involves protecting specific points from the fire while not actively trying to line the entire fire edge. Points being protected may be communities, individual homes, areas of high resource value, etc. Normally, suppression actions will attempt to stop the fire from entering the high value timber stand, community or so on. The specific actions used to protect the point can vary from fire lines to burnout to structure protection with engines, etc.

Consider Using This Tactic When:

- Fuels situation/weather/topography indicate high likelihood that most tactics will be unsuccessful;
- Forecasted weather or seasonal trends indicate an improving fire environment;
- Resources to be protected are distinct and offer high probability of successful protection; protecting these resources provides management efficiencies and improved safety;
- Resource availability is limited; PL 4 or 5;
- Protection objectives cannot be met with full perimeter control;
- Low values at risk on the whole fire.

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Significant cost savings • Reduce the number of resources committed • Reduces firefighter exposure • Concentrates effort to priority areas. • Long term protection objectives met	• Misperception of action not taken • Potential for additional resource damage • Longer term public health and business impacts • Impacts on a larger area

Specific Considerations for Agency Administrators

Agency administrators should be aware that a point protection tactic may be unpopular with local cooperators and within nearby communities. Line officer involvement with community leaders and line officers from other agencies is the key to successful use of this management plan. Support of the tactic from all local unit employees when they are out in the community is critical.

The success of this tactic is often predicated on pre-season dialogue with community leaders and adjacent landowners. Point protection actions around a community can open opportunities for development of a Firewise program or Community Wildfire Protection Plan. Agency Administrators and local fire managers should ensure that discussion of these topics occurs and that the appropriate state and local fire agencies are involved.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

Working around homes or communities presents potential exposure to hazards not normal in wildlands. In addition, suppression forces will almost surely have increased interaction with the public. It is important that key local messages, such as need for defensible space or need for prescribed fire, be conveyed to firefighters at all levels.

The potential for claims by private landowners against the government increases as activities move onto or closer to private lands. Documentation of all activities and damage must be stressed to all firefighters.

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Community Treatments

Community Treatments – A variant of point protection, community treatments may be considered to be actions within a sub-division or community to protect homes without actually building lines or conducting hose-lays. Actions such as trimming brush from around homes, moving wood piles away from decks and clearing around outdoor propane tanks may be examples of actions taken as part of this tactic. In many cases these types of treatments may be as effective as and much cheaper than constructing and holding lines outside a community.

Consider Using This Tactic When:

- Minimal risk to community or individual homes;
- Limited availability of structure protection equipment;
- Appropriate labor force available;
- Firewise features already exist in community;
- Community Wildfire Protection Plan (CWPP) exists or is under development;
- Community concern is at a high level and visible suppression action is needed;
- Costs of these actions are less than constructing and holding a line around perimeter of the community or "point".

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Potential to improve community relations • Long term impacts through community education • Can begin implementation of CWPP or Firewise program	• Potential increased exposure to unknown materials and hazards • Potential for claims • Firefighters are working on private property, often close to homes • Actions may not be as effective as other tactics

Specific Considerations for Agency Administrators

Taking direct action within a community to improve the defensible space around structures can be a very positive and obvious action. This often opens up opportunities for follow-up work within communities such as establishment of a Firewise program or development of a Community Wildfire Protection Plan. Local units need to take advantage of such opportunities. Local advice from AA's to IMT's is critical if strained relations exist with communities or individuals.

Actions that are appropriate to charge to fire suppression codes when the fire is three miles away, may not be appropriate if a large fire is 30 miles away. Ensure that the actions are necessary and part of the overall strategy.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

Unfamiliar safety hazards can exist around homes and within communities. Consider using crews that have WUI experience. Crews to be used around homes should be carefully selected and closely supervised. The community perception of the local agency, the fire suppression personnel and fighters in general can be shaped by a single negative event. It is important that key local messages, such as need for defensible space or need for prescribed fire, be conveyed to firefighters at all levels. Advance work is required for this tactic to be successful.

The potential for claims by private landowners against the government increases as activities move onto or closer to private lands. Documentation of all activities and damage must be stressed to all firefighters.

Increasing fire suppression costs are a significant issue for the wildland fire agencies, for Congress and for the President's Office of Management and Budget. Suppression personnel at all levels must be cognizant of the impacts their selection of tactics has on overall fire costs.

Large Scale Burnout

Large Scale Burnout – This tactic involves selecting line locations or barriers that offer the best likelihood of successfully holding a fire, and then burning out the fuels in between the original fire and the planned control line. The burnout can be conducted in a single day or in a series of days. There are no policy limitations on the size of a burnout. If the ignition will be done aerially by helitorch or plastic sphere machine, a local aerial ignition plan will be needed if it does not already exist.

Consider Using This Tactic When:

- Terrain and/or natural barriers in front of fire offers better chances for success;
- Remote country or limited access;
- Weather window is available but may disappear in the future;
- Long range community protection goals can be acheived;
- Suppression cost and impacts will be greatly reduced;
- Increases firefighter safety by limiting exposure;
- Smoke can be mitigated;
- Resource availability is limited;
- Ignitions can be managed to meet acceptable fire effects from firing patterns.

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Potential cost savings; • Often offers the better chance for successfully holding a segment of line • Reduces total duration of the fire event, reducing size and type of overhead organization sooner • Enhanced protection for communities • Reduces the amount of constructed line • Takes advantage of infrastructure investments, roads, fuel treatments, etc	• Negative perception from cooperators and local communities • Increased smoke impacts • Perception of increased liability • Risk of escape • Negative impacts on natural resources • Increased BAER • Increased potential for floods and debris flows • Requires advanced firefighter skills and experience • May disrupt public use and natural resource dependant businesses

Specific Considerations for Agency Administrators

Utilizing burnouts, even on a very large scale, is an effective tactic for suppressing wildfires and agency administrators should strive to understand the tactic and keep it within the toolbox available to incident management teams. Burnouts can bring about significant socio/political concerns, especially if other ownership is involved. Agency administrators will need to be prepared to discuss and explain the tactic to cooperators, the public and the press. Fires burning under extreme conditions offer few viable options for suppression, but a well planned and executed burnout is almost always one of them. Fear of lighting additional

fire and holding it is a real concern for managers, however if you cannot hold a burnout line, you almost certainly will not hold it when the main fire arrives. Large scale ignitions change active fire locations and interactions with terrain, winds, and fuel types. Considerations should be given to these elements during the planning of the burn.

If a burnout is planned using aerial ignition, the AA should ensure that his or her staff is involved and that the local unit provides the IMT with such items as the forest aerial ignition plan, aviation hazard maps, etc. If burnouts are conducted on private lands, the AA should be prepared for questions and possibly claims that can come up well after the fire. A burnout that is conducted successfully and protects a community can open provide for long term fire protection planning that can and should be incorporated into the Community Wildfire Protection Plan.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

Many suppression resources are not skilled at large scale burnout. Personnel must be carefully selected for such operations. Almost every crew will claim to have burnout experience, but the understanding of speed and timing of burnouts is lacking in many. Do not be reluctant to order resources with additional specialized skills if needed and if cost effective.

If a large burnout involves aerial ignition, several additional items need to be considered. Carded aircraft and personnel are needed as well as the aerial ignition equipment and supplies (plastic spheres, glycol, etc.). A local aerial ignition plan will be needed if one does not exist. Depending on the size of the burnout and local requirements, a burn plan specific to the fire may need to be developed. Additional support aircraft may be required to successfully control spot fires.

Local flight hazard maps should be obtained. Local smoke management targets also need to be identified and mitigated. Be sure the local unit has key messages on fire in ecosystems and community protection.

Increasing fire suppression costs are a significant issue for the wildland fire agencies, for Congress and for the President's Office of Management and Budget. Suppression personnel at all levels must be cognizant of the impacts their selection of tactics has on overall fire costs.

Private citizen perceptions that their property was damaged by a burnout instead of a wildfire have generated several claims and lawsuits against state and federal agencies. Recent case law in these cases is very supportive of the government's actions. However, all personnel involved in large burnout should thoroughly document their actions within the incident records.

Monitoring

Monitoring – This strategy may be used for many reasons. Depending on the conditions within the fire environment, the Line Officer and incident commander may determine that no action needs to be taken other than observing the fire spread on a regular basis. The projected conditions will determine how often and what method (Ground, air, satellite photos, etc) is used to monitor the spread of the fire. Normally when a fire is placed in a monitoring status, the IC or fire manager will establish geographic trigger points that will initiate addition evaluation or management action when reached by the fire.

Consider Using This Tactic When:

- Values at risk are minimal;
- Fire behavior is not expected to become an issue or is consistent with a WFU Implementation Plan;
- Fire spread is not expected to become an issue:
- Effective monitoring personnel or equipment are available;
- Resource availability is limited;
- Remote areas.

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Greatly reduced exposure • Significant cost savings • Reduces resource commitment • Reduces firefighter exposure • Returns fire to the landscape	• Increased acreage burned • Can increase total duration of fire • Smoke impacts • Perception of action not taken • Potential additional natural resource damage

Specific Considerations for Agency Administrators

Using the strategy/tactic of monitoring offers several challenges. First and foremost may be overcoming the perception that we are just "letting the fire burn". The AA, local Fire staff and IMT need to work together on a plan with appropriate specificity to identify areas of concern and establish trigger points which will bring about additional evaluation or management action. The AA, and often community leaders, needs to be comfortable with the trigger points and patient enough to allow a well developed plan that includes a range of tactics to run its course. All the cost savings generated by a monitoring strategy can be lost if the IMT or AA panics and reverts to full suppression due to surprise or lack of preparation when it may not be needed. A long duration fire may require a long duration plan to ensure adequate planning and preparation for potential actions. A long term risk assessment also can be used to take some of the uncertainty out of a long duration event.

Monitoring can be conducted by ground based resources, from aerial platforms, or even by web-cameras at fixed points. Terrain, weather, fuel conditions and potential spread all help determine the appropriate level of monitoring. If very specific information on burn effects is desired, the AA or IMT or FUMA can utilize the specialized position of Fire Effects Monitor.

Placing a remote or wilderness fire into monitoring status can be one of the most cost effective management responses.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

All personnel on the fire and on the local unit need to be briefed and understand the strategy and tactics being used. Communication with community leaders and the public may be critical.

The focus on safety cannot be lessened just because the fire is in a "monitoring" status. A seemingly benign wildfire or WFU can exhibit unexpected fire behavior and movement just like any other fire. Anticipate the fire environment and resulting fire behavior well before it occurs. Focus on what can go wrong, and address these issues.

Loss of aircraft, if essential for monitoring, may result in the need to evaluate a change in tactics.

Increasing fire suppression costs are a significant issue for the wildland fire agencies, for Congress and for the President's Office of Management and Budget. Suppression personnel at all levels must be cognizant of the impacts their selection of tactics has on overall fire costs.

Fuel Breaks

Fuel Breaks – Fuel breaks may be totally devoid of vegetation or may be shaded, in which some large overstory trees remain. Fuel breaks are often established prior to a fire season or fire event. The presence of a fuel break may serve as a control line, as part of point protection or as a trigger point in monitoring. If fire behavior allows, a fuel break may be established as part of a suppression action in lieu of or in compliment to a traditional dozer line or similar control line.

Consider Using This Tactic When:

- Effective fuel breaks already exist;
- Terrain and fuels lend themselves to effective fuels breaks;
- An approved Community Wildfire Protection plan calls for construction of breaks;
- Fires recur frequently in a wildland urban interface setting.

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Provide long term fire protection and cost reduction • Generally accepted by local communities • Could be incorporated into a CWPP • Provides firefighters a safer environment • Builds good community relations • Reduces potential for community evacuations • Provides a return on previous investment(s)	• Requires periodic maintenance • Requires specialized equipment • Pre-established breaks may not be adequate for fire conditions due to long range spotting • Needs to be used in conjunction with a burnout, rarely will "stop a fire" by itself

Specific Considerations for Agency Administrators

Fuel breaks can be a tool or component of several strategies and tactics including point protection, community treatments and utilizing natural or artificial barriers. Utilizing pre-existing fuel breaks can be very cost effective and reduce exposure to firefighters. Local units should provide initial attack incident commanders and any incoming IMT's with locations and standards of all pre-existing fuel breaks and should encourage teams to use these in their strategy.

New fuel breaks can be established as part of a management or suppression strategy if the fire presents a reasonable risk. If there is not a reasonable risk from the going fire, fuel treatment funding may be more appropriate. Agency administrators should ensure adequate coordination with the local community and cooperators. AA's should also be aware that some publics may equate this to an attempt to harvest timber and should attempt to diffuse such perceptions.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

A rush to create fuel breaks without adequate preplanning during an incident may compromise existing safety procedures and guidelines. Personnel may be working around heavy equipment they are not familiar with. Community relations will be critical because action is visible and local contractors are typically used. Additional information resources may be necessary.

Specialized equipment (logging type) may be needed. Local unit timber management personnel, particularly timber sale administrators can be very helpful in identifying various types of equipment available locally and their capabilities. In addition, most Forest Service regional offices have access to a dedicated or shared logging engineer that has considerable expertise in equipment capabilities.

Some Forest Plans limit the use of heavy equipment on slopes in excess of a set steepness while others do not. Fire management personnel should be aware that in parts of the country tracked, self-leveling equipment is available that can safely work on slopes up to 70%. Such sophisticated equipment has not been routinely used in past fire suppression efforts, but it is available and can often be very cost effective and also meet natural resource protection objectives. (See the section on non-traditional equipment at the end of this document for additional information and potential reference documents).

Increasing fire suppression costs are a significant issue for the wildland fire agencies, for Congress and for the President's Office of Management and Budget. Suppression personnel at all levels must be cognizant of the impacts their selection of tactics has on overall fire costs.

Use of Natural or Artificial Barriers

Use of Natural or Artificial Barriers - Any type natural (rivers, streams, cliff lines, rock slides, etc.) or artificial (roads, dams agricultural fields, etc) barriers may be used in conjunction with any other tactic and within multiple strategies

Consider Using This Tactic When:

- Appropriate barriers exist, i.e. they are adequate when compared against expected fire behavior;
- Barriers are accessible and safely defendable if necessary;
- Resource availability is limited;
- Use results in management efficiencies.

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Can result in significant management efficiencies • Often offers the best chance for success • Often reduces the amount of constructed line • Can lessen suppression rehab • Some barriers may provide easier access and reduce need for mop-up • Enhanced long term protection	• Can makes fire impacts more visible to public (i.e. roads as barriers) • Potential impacts if use of barriers brings smoke closer to roads or residences • Determination of barrier effectiveness may be difficult in some situations (i.e. heavily vegetated rivers and streams) • May disrupt public use and natural resource dependant businesses • Potential negative impacts on natural resources by increased acreage

Specific Considerations for Agency Administrators

The use of natural and/or artificial barriers can be very effective in reducing line construction needs and a reduction of exposure, both of which will contribute to management efficiencies. When heavily traveled or scenic roads are used as barriers, visual quality may be a concern with the public. In addition, utilizing roads or utility rights-of-way may lead to damage to utility poles, telephone boxes, etc. When rivers or lakes are used as barriers, IMT's and agency administrators need to consider watershed concerns and evaluate fire impacts versus line construction impacts. Using barriers may increase the final size of a fire and resultant loss of natural resources.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

Any use of roads or traveled waterways presents the potential for safety issues with the general public. Be prepared to coordinate with the proper authorities to close roads to public traffic and keep closed until threat is over. Be prepared to burnout from existing barriers as part of this tactic. Have resources on hand for such operations.

When using barriers that can be intermittent in nature (streams, rock outcroppings or cliff lines, etc) on the ground evaluation by experienced personnel may be required before use or burnout.

Increasing fire suppression costs are a significant issue for the wildland fire agencies, for Congress and for the President's Office of Management and Budget. Suppression personnel at all levels must be cognizant of the impacts their selection of tactics has on overall fire costs.

Slowing/Delaying Fire Spread

Slowing/Delaying Fire Spread – This involves using any of a variety of actions to slow a fire spread and buy additional time in anticipation of a weather change, arrival of resources or other reasons.

Consider Using This Tactic When:

- Beneficial weather change is predicted;
- High values at risk in future;
- Resources not currently available;
- Future options are expanded.

*Potential Pros and Cons of This Tactic: (*Note – There are no absolutes in this arena. The same issue that is considered a "pro" on one fire may be considered a "con" on the next. Line officers and fire managers must know and evaluate their specific situation.)*

Pros	Cons
• Public perception of action • Can buy time until conditions are right for other tactics • Can buy time so that more expensive, resource dependent actions are less likely to be needed later	• Can be costly • No control lines • Low probability of control • Potential increased exposure to risk with little reward (i.e. airtanker drops with no ground follow-up)

Specific Considerations for Agency Administrators

Agency administrators need to understand that tactics to slow or delay a fire spread may be necessary on some occasions. Most of the time, however, these type tactics are ineffective and costly. Although the public is usually calmed by seeing airtankers and helicopters dropping retardant on a fire, the actions are very expensive and need on-the-ground follow-up. Agency administrators should be cautious about pushing IMT's to use aerial resources in a delaying mode. A better choice may be working with local PIO and IMT personnel to educate political leaders and the local public on when these expensive tools are effective and when they are not.

Specific Considerations for Suppression Personnel (Initial Attack Forces, Extended Attack Forces and/or Incident Management Teams

Thorough risk management is critical when considering the use of delaying tactics, particularly with aviation assets. Managers must evaluate the effectiveness of this tactic in relation to overall strategy.

Delaying tactics can be ground based as well as air based. Ridgeline firing is commonly used to slow a fire spread until other actions can be taken.

Increasing fire suppression costs are a significant issue for the wildland fire agencies, for Congress and for the President's Office of Management and Budget. Suppression personnel at all levels must be cognizant of the impacts their selection of tactics has on overall fire costs.

Minimum Impact Suppression Tactics (MIST)

Although not a "tactic" in terms of those previously discussed, Minimum Impact Suppression Tactics (MIST), can become a part of any appropriate management response.

M.I.S.T. – Any of a wide range of actions to minimize the impact and appearance of suppression tactics. Includes such actions as flush cutting stumps, camouflaging stumps and bucked logs, dragging brush out of sight of trails, coldtrailing, etc. Appendix T of the Interagency Standards for Fire and Fire Aviation Operations (Red book) contains Useful guidelines and considerations for MIST.

Non-Traditional Equipment

Advances in logging equipment over recent years have opened the door for some less labor intensive fire suppression efforts. With the shortage of type 1 and type 2 crews during even a "normal" fire season, a fresh look at options for mechanized attack is warranted.

While many forests and or IMT's will order a feller-buncher or other piece of logging machinery for a single task (such as felling snags), most do not consider a more organized, big picture approach. Task forces of equipment may be assembled that can be very effective in line construction, fuelbreak construction and other tactics discussed in this guide. Feller-bunchers, working in conjunction with skidders and prehauler or forwarders can pioneer fuelbreaks in very short order and in very steep terrain. Managers should consider these options, not only when fallers and handcrew resources are in short supply, but also whenever a more permanent fire break is desired or when this option is the most cost-effective.

Timber sales foresters and timber sales administrators can be valuable resources in analyzing when logging equipment can be efficiently used in a suppression operation.

Among some of the equipment available in parts of the country are:

- Mechanized felling machines (feller-bunchers)
    - Hot saws
    - Shears
    - Bar Saw
- Delimbers – Strip limbs from cut trees
- Processors – These machines can strip limbs and cut the tree to specified lengths
- Rubber-tired Skidders
- Pre-haulers or Forwarders – Tracked or rubber-tired machines to move processed logs off the fireline or fuelbreak
- Excavators – Excellent for building line in very steep terrain and for rehab of mechanical control lines
    - Fixed
    - Self-leveling
- Dozers
- FMC/KMC – Tracker skidding machine that exerts extremely low ground pressures. Beginning to see some available with water-hauling capability
- Skidgines – Skidding machines mounted with water tanks. Some also have blade and/or felling head attachments

- Mowers – Posi-Tracks for light duty fuel reduction and Gyro-Tracks are effective at creating fire lines in swamps and for fuel reduction in dry areas.
- Others:
    - Rollagon (floats in swamps)
    - Bombardier (is a specialized low ground pressure track vehicle used for wildfire protection with water and foam pumping capabilities. The vehicle is used in very wet, boggy terrain and is capable of operating in areas that are inaccessible to standard wildfire suppression equipment.)
    - Soft Track (has low ground pressure and is used in swamps and marsh).
    - Air Boats (are used to push grasses underwater creating fire lines).

Decision Management

The Forest Service's beginnings as a decentralized decision making organization was born of necessity. The limited nature of communication one hundred years ago left few choices. This model continues today and still serves the agency well most of the time. It is much more effective in situations outside of emergency response. However, this model has limited provisions for local decisions that would reflect national priorities when these priorities are in competition which is common in wild land fire operations.

In the worst cases this decentralized model encourages resource hoarding which may lead to impacts on the national resource need.

Agency administrators are often, in the case of wildland fire operations forced into situations outside their experience. The demands on their time and attention to continue the normal flow of business does not stop simply because of fire situation on their unit. These two factors can often lead to poor decisions.

In order to provide a paradigm shift, agency leaders and line officers must evaluate other decision support tools to empower the agency with the necessary situational awareness to make the right decisions. The Planning, Decision, Execution, and Assessment (PDEA) Cycle, is a decision tool used by the military that could assist agency administrators in their efforts to improve decisions. This system drives decision makers to better assimilate and evaluate information in order to make sound decisions. The PDEA cycle describes the process the commander and staff use to plan operations, make accurate and timely decisions, direct effective execution of operations, and assess the results of those operations. It is a framework that supports the commander's efforts to assimilate information in a chaotic environment to increase tempo through timely and decisive actions. Decisions are made throughout each phase of the PDE&A cycle.

The web site below provides much more detail of the process:

www.aiai.ed.ac.uk/project/coax/demo/2002/mpat/SOP/C8%20IM.DOC

Wildland Fire Situation Analysis

The Wildland Fire Situation Analysis is an analysis process for the Line Officer and their staff to develop and prioritize objectives for the management of a wildfire. They are the ones, who know best what the important objectives in the surrounding area are, and how a fire may influence them; or how a fire may be influenced by them. It is not uncommon in emergencies to have competing and conflicting objectives that must be resolved. Often to achieve success in one area something else may have to be traded off or put at a greater risk than one might desire.

Objectives should be developed from where the fire is and were it might possibly end up given the information provided in the current and forecasted weather assessment along with fuels information which then fed the fire behavior all of which was developed in the Situation section of the WFSA.

The establishment of a clear and concise set of objectives is critical in the communication process with the IMT and external partners. More is not better here. Work towards keeping

the list short and to the point. There often can be many issues, and depending on the makeup of the analysis team and their experience, the tendency may be to over do this section. It is not intended to be a derivation of a NEPA cumulative effects analysis. List only those significant items that will be keys to guiding the analysis and the IMT's actions on a fire.

Relevant items in the Resource Management Plan, FMP, or other supporting documents should guide the selection of included objectives. It is important that the Agency Administrator help with setting the objectives – they are likely the only one who has a complete picture of the essential items, particularly any involving social and political aspects.

It is important to consider the objectives *prior* to setting a strategy. Strategies should be developed based on elements developed previously in the WFSA

During the strategy section consider some of the strategies that have been mentioned in this guide. It is advisable however to be as flexible as possible, given the decision space and knowledge of available resources. Describe what a range of "success" alternatives look like from the eyes of the Line Officer. Remembering that it is likely there are competing and conflicting objectives - with a good degree of uncertainty (particularly in the early stages of an emerging large fire) influencing the entire process, and this needs to be addressed when assessing probabilities.

The Comparison section is where the alternatives are compared against how well the strategies meet the objectives (Leader's intent) balanced by all the influences bearing on the problem.

Make a decision with what is and can be known at the time. Revisit the decision routinely and validate it, be willing to adjust it when the situation suggests a review of current or new strategies is warranted. Revising a WFSA is not failure only an indication that it is time to review the course and possibly change it. Revisions can be minimized by avoiding building alternatives "based on hope" with little likelihood of success because information developed in the Situation Section was not properly considered in the analysis. Try to avoid the trap of the "WFSA chasing the fire" think out ahead. Consider the PDEA discussion above.

Wildland Fire implementation Plan - WFIP (see Implementation Guidebook)

Delegation of Authority

Delegations of Authority are one of the documents that IMT's and IC's base incident objectives on. These objectives in turn are the basis for the strategies and tactics. Delegations rarely if ever mention Appropriate Management Response (AMR) outright. There is no reason or policy that prohibits AMR discussion in the delegation. Certainly if AMR became part of the delegation then expectations could be clearly defined and addressed, leaving no doubt as to intent, for the IMT or IC.

Delegations should not limit the full range of AMR's unless specifically needed to protect certain areas, comply with FMP/LMP's or satisfy the needs of cooperators. Large fires may have multiple tactics covering different areas of the fire. The appropriate response could be described in the delegation to further clarify expectations in various stages or areas of the fire.

Recognizing that many variables affect AMR and therefore the delegation of authority, it can be extremely difficult for the Line Officer to balance the needs of all parties concerned. It is recommended that agency administrators discuss the development of the delegation with the incoming Incident Commander. Coordination with the next level of the organization before preparing the delegation may help clarify intent, simplify political considerations, open options and lessen the burden on the locally.

The Interagency Incident Operations Handbook (Red Book) Chapters 1,10 and 11 offer assistance to agency administrators regarding delegations, AMR and cost containment.

Risk Management

Risk management as a science is not routinely applied to wild land fire operations at the local level. Risk management involves an assessment of the probability of an event occurring and the consequences if it does occur. Managers quantify risk in terms of fire fighter safety, public safety, structures, natural resources and fire escape. The risk is often characterized or measured in the expected fire behavior. Frequently the analysis of expected fire behavior produces very accurate forecasts, especially in the short run. However, the accurate forecast does not always translate in to appropriate resource allocation.

Accumulating resources beyond the need, intensive and extensive mop-up, constructing line in areas with little threat, installing sprinklers around structures facing minimal threat and flying aviation assets to prevent their reassignment are all behaviors of a risk adverse organization.

The unspecified threat (probability) of the fire escaping and burning homes (consequences) fuels a risk adverse mindset based on scant evidence. Not all circumstances, given the pace of unfolding events, lend themselves to detailed analysis. In those situations, preplanning should have occurred which can inform decision makers until the pace of events and available support provides opportunities for additional analysis. Even when the fire behavior forecasts are favorable there is always some chance something will not go as expected. A minimal chance, if not quantified as to probabilities and consequences, can contribute to a decision that is more readily questioned later.

In assessing risk it is imperative to accurately determine all the risk components and firefighter exposure when attempting to mitigate risk. Too frequently decision makers assess the risk of escape, the risk to structures but not the risk to fire fighters building line that most likely won't hold or to aviation staff dropping retardant at ineffective times or places.

Line Officers often feel all the jeopardy is upon their shoulders, if anything goes bad they will receive all the blame. This view is not supported historically. Line Officers, agency administrators and incident commanders have been completely supported in their fire management decisions as long as their decision was inside the applicable policy.

Fire operations are a high consequence, low frequency activity. It is also an inherently dangerous business. Organizationally there is tremendous need to improve risk evaluation and eliminate the high cost, low return behaviors routinely employed in the name of risk management.

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