

WILDLAND FIREFIGHTER SAFETY AWARENESS STUDY

*Phase III—Implementing Cultural
Changes for Safety*

March 1998



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Project Team

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EXECUTIVE SUMMARY

This Phase III report of the interagency "Wildland Firefighter Safety Awareness" project presents over 200 recommendations for improving the organizational culture, leadership, human factors and external influences that affect wildland firefighter safety. Together they are a set of detailed implementation strategies for meeting the 85 goals for improving firefighter safety that were developed in Phase II in response to the problems and solutions suggested by the 1,000 wildland firefighters surveyed in Phase I, plus one goal added in Phase m.

Background

The five Federal agencies most involved in wildland firefighting - the Forest Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and Fish and Wildlife Service - chartered a study in 1995 to identify and change aspects of the underlying organizational culture that negatively impact firefighter safety. The study was undertaken by an outside consulting firm, TriData Corporation of Arlington, Virginia. This report summarizes the results of the third phase of the study - implementation recommendations.

In the first phase of the study, over 1,000 wildland firefighters provided us with their personal observations on the factors that affect safety, and their recommendations for improvements. This was done through in-depth, one-on-one interviews or focus groups involving 300 firefighters, and from responses to a 25-page survey form from another 700 firefighters.

We also searched the literature on wildland firefighting safety and related safety fields for insights and ideas, and interviewed many experts in wildland firefighting and safety research.

The issues identified ranged from detailed problems such as the lack of adequate distribution of radios to some Type II crews, and the dangers of transporting crews in school buses driven recklessly on mountain roads, to broader organizational culture and leadership issues such as lack of adequate leadership training, lack of adequate two-way

dialogue in communications, a lack of incentives (and even disincentives) for experienced firefighters to return each year, inadequate training to compensate for the drop in experience, and many, many other factors. We heard comments like the following:

We understand the science of fighting fires, but we do not understand the science of people fighting fires.

Fatigue is a particular problem on campaign-type fires... It creates the walking dead

One in five division supervisors is really scary.

The Phase I report described in detail the wide range of problems found, and the weighting of their importance. ¹

The second phase of the study started with the problems and solutions identified in Phase I, and developed a set of 85 goals that taken together describe the desired wildland firefighter culture of the future. ²

The third phase of the study, described in this report, developed specific recommendations on how to move from the current situation to the desired future culture. Firefighting is an inherently dangerous undertaking that cannot be made risk-free. However, we are not doing a good enough job of managing the risks, and avoiding putting people into situations where entrapment or serious injury may occur. Together the recommendations here respond to virtually all of the safety concerns identified in Phase E. The results of this study provide the tools to make the culture of wildland firefighting a self-learning, self-correcting system.

In the following pages we first discuss an overall framework for change, and then summarize what were felt to be some of the most important areas and specific ideas for implementing change. The full list of goals and the recommended implementation strategies for each are provided at the end of the Executive Summary. We urge those

¹ *Wildland Firefighter Safety Awareness Study -Identifying the Organizational Culture, Leadership, Human Factors, and Other Issues Impacting Firefighter Safety*, October 1996.

² *Wildland Firefighter Safety Awareness Study - Setting New Goals for the Organizational Culture, Leadership, Human Factors, and Other Areas Impacting Firefighter Safety*, February 1997.

interested in safety to read the entire report because many of the findings are interrelated, and there are so many needed improvements across so many topics that it is difficult to summarize them without overgeneralizing. The old saying "the devil is in the details" applies here.

A Framework for Culture Change

The *culture change process* is a two-sided coin. On one side is the "bottom-up" phenomenon that many changes arise from those actually doing the work. On the other side is the "top-down" reality that changes in conducting business often get made by direction or sanction from top management. Both are essential. People at all organizational levels need to be on board since workers can resist change ordered from the top or management can stifle change started at the bottom. Changing the organizational culture as it relates to wildland firefighter safety will require commitment at every organizational level. Gaining that commitment will take a concerted, systematic effort to involve people from all levels in determining the details of the strategies to be pursued.

A second issue in determining cultural change is the role of *leadership*. Cultural change is not triggered by a magic bullet or a directive. Rather, culture is changed by a series of small steps taken by the leading members of the culture at all levels. Leadership is standing up and leading the way. It is behavior and it is demonstrable. It is showing, not telling. Both sides of the change process offer opportunities for leadership from management and from firefighters and supervisors. Changing the way business is conducted requires people at all levels to lead by personal example in demonstrating new approaches to achieve safer operations. Management must solicit and support suggestions on ways to improve operations; the process cannot be delegated to a committee. Management must demonstrate its willingness to make positive changes, whether they are initiated by management or by firefighters.

A third major issue in this cultural change process is *accountability*. One of the strongest cries heard during the Phase I interviews of this study was to strengthen accountability at all levels of the organization - firefighters, Crew Supervisors, fire managers, and up. The truly remarkable aspect of that cry was that it did not just point fingers at some vague group of "others," "them," or "management." Rather, five of the

six top safety issues identified by firefighters focused on personal firefighter actions. All ranks were represented on the survey, and there was excellent consensus that change required strong accountability throughout the wildland firefighting system to make it work well. Accountability is not just something to be applied to workers; managers must be held accountable for safety-related decisions, too.

How do the agencies accomplish this? Vigorously evaluate performance. Have ramifications for safety violations. Hold Agency Administrators and directors accountable for their budget, policy, human resource/personnel and programmatic decisions. Continue to address competency problems. Recognize the difference between competency problems and "safety violations" and handle them differently (but handle both quickly and affirmatively). Both "the system" and individuals must hold people accountable for safety requirements.

Wildland firefighting (and emergency response in general) occurs within a context of great uncertainty. There are many hazards to consider. One never is sure when the wind will suddenly shift, or when multiple fires will occur simultaneously, or a tree limb will fall. Fire behavior and fireline safety result from the interaction of many conditions and events. Outcomes of individual and collective actions then, are not evaluated against a single initial objective. They are evaluated against less precise criteria, such as how well individuals, crews, and teams expect the unexpected and prepare for the unanticipated.

The major cultural change needed is to foster a fireline safety culture that has situational awareness and risk management at its core. What does that look like? In the desired culture people maintain constant, updated awareness of their working environment; collect and synthesize information as a team, *and* rely on strong leadership to recognize danger, make decisions that are "primed" by their situational awareness, and mitigate risks rather than "working through them" or ignoring them.

At the operations level, people need to step forward and recognize' their own accountability for actions, whether accidents, near misses, or successes. Increased self-awareness and reporting of observed safety problems make safety learning possible.

At the management level, the accountability issue is slightly different. The management perspective focuses on performance of people as teams, as staff: in the aggregate. The willingness to review performance for outcomes must be demonstrable. They must look at accidents, near misses, and successes, and analyze why they happened. Then management must be willing to publicly recognize, correct, share, or (for successes) encourage what they uncovered.

Accountability in the sense it is described here cannot be delegated. The intent of taking such a perspective is to get all the players - workers concerned with outcomes from individual behaviors, and managers concerned with outcomes from collective behaviors - into a context of objective accountability.

As you finish this summary and read the report, review the various topics and recommendations through a filter of the principles discussed above. Consider each of the issues in terms of your place in the change process, in terms of your leadership role, whatever your position, and in terms of how you personally can practice accountability.

Highlights of Recommendations

Two most important ideas for changing the wildland firefighting culture in the United States in a way that would improve safety may be grouped into the following categories: leadership (including risk management), retention of experience, improved training and certification, human communications, human factors, professionalism and attitudes about safety, safety incident reporting, and external factors (especially prevention). For each category we identified a major principle or "pillar of wisdom," a set of goals, and specific recommendations for implementation.

The description of recommendations here and in the body of the report is necessarily sequential, though many of the recommendations would be implemented in parallel and are highly interrelated.³ As mentioned earlier, the full list of recommended

³ An attempt to diagram the complex interrelationships of the many areas needing improvement was provided in the Phase II report.

implementation strategies, with priority rankings, is at the end of this summary. Virtually every strategy will be a continuing process, not a unique, one-shot project.

The selection of priorities and development of an action plan to implement the recommendations here is the prerogative of the five agencies. We indicate below with asterisks the actions that our project team would start with by the next fire season. All of the following recommendations are important; it is less critical which to address first than to address all over the next few years.

Strengthen Leadership

Leadership of crews, divisions, Incident Management Teams and other resources is possibly the most critical factor in safety. Many people in leadership positions have not been trained in leadership skills and human relations, as opposed to the technical side of their jobs, and some are poorly suited to lead or supervise. There are some critical improvements needed in leadership selection and training to enhance safety.

<i>Principle #1 - Assure that people in leadership positions are qualified</i>
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- ***Screen potential leaders*** -. Some people should not be or cannot be firefighters or fire leaders. If they do not have both the competence and suitability they need -to be weeded out if they cannot be trained. There was a surprisingly strong call from all position levels surveyed in Phase I for screening potential supervisors and existing supervisors up for promotion as to their leadership ability as well as technical knowledge. This is widely done in the local career fire service using interviews, in-box exercises, multi-perspective assessments and psychological tests. Screening should be done at every level of supervisory positions.
- ***Require stronger fire qualifications for FMOs and other managers*** - Agencies must not assign employees to key fire management positions if they do not meet interagency and agency-specific competencies and qualifications. Training to competency while holding the job is not safe, and should not be permitted, We recommend development of minimum fire qualifications and competencies for people assigned, to be Fire Management Officers (and equivalent positions). There

are several tiers of FMO positions and it is a critical position at every level. The FMOs have duties that affect employee and public safety. They help plan the fire program and often have line or advisory roles at fires.⁴ Fire management courses also should be required for all fire management officials; specific courses are recommended in the text.⁵

- ***Train all Agency Administrators in fire management basics*** - Agency Administrators do not need to be expert in firefighting but must have some minimum knowledge and competencies in fire management - how it works, where the dangers are, the basics of strategy and tactics. There has been considerable progress in raising their awareness about fire management issues through the improved Agency Administrator courses taught at the National Advanced Resource Training Center at Marana, Arizona, and at the geographic area level. The courses should continue to be improved and should be given to all Agency Administrators because of their influence on strategy and budget allocation decisions, and hence on safety. Agency Administrators must understand where their desire to protect resources could lead to asking firefighters to do something that is not safe with the available resources.
- ***Train for decision-making under stress*** - Leaders must be explicitly trained to operate under a variety of stresses, such as noise, heat, time demands, potential for failure, and outside pressures. There are many proven techniques for conducting this training. Appendix C presents a package of techniques called "Decision Skills Training." It includes a decision requirements exercise, tactical decision games, decision critiques, "pre-mortem" exercises, uncertainty management, situational awareness calibration, and a "commander's intent" communication exercise. The good news is that training people under one type of stress tends to carry over to operating under other kinds of stresses.

⁴ These changes for FMO positions and equivalents are already planned for implementation, by about June 1998.

⁵ The Federal Fire and Aviation Leadership Council (FFACC) approved a revision of training requirements for fire management at various levels in February 1998, as this project phase was being completed.

- ***Increase situational awareness and prepare to handle the unexpected*** - Leaders need to be trained and encouraged not just to follow a long list of rules by rote, but to maintain situational awareness, use a risk management approach, and to be prepared to handle the unexpected. Having to deal with the unexpected should be expected. The skills to do this can be developed in part through the decision training noted above, but there also needs to be an expectation levied by managers that people will use their judgment effectively. There needs to be situational awareness at the strategic and management levels as well as at the firefighter/Crew Supervisor level. Better, well-screened information should be provided through new technology to improve situational awareness (e.g., better aerial imagery of the fire situation, better tracking of where each crew is.) Leadership training needs to make clear how a series of small oversights, errors or lack of information can build into a disaster. There are many examples, e.g. the Dude and South Canyon fires.

Principle #2 - Promote accountability for safety at all levels.

- ***6 Promote accountability through appropriate penalties and performance evaluations*** - As noted earlier, there was a very strong feeling from all ranks surveyed that those who make serious errors in judgment or disregard safety should be held accountable. Managers as well as firefighters must be held accountable. Certainly there should be "due process," when safety incidents occur, but in the meantime, individuals should be put on administrative leave or returned to a non-fire job while a casualty, entrapment, or near miss is investigated. (This is similar to what happens when a police officer discharges a weapon, or a pilot has an accident.) If a serious safety violation was committed, the accountability might include remedial training, being required to work under a "coach" on one's next assignment, being demobilized, having one's qualification level reduced, suspending or revoking one's red card, or even suspension from firefighting for a week, a season, or permanently, depending on the severity of the offense. Sending

⁶As noted above, asterisked items are those the project team felt should be implemented or at least started by the next fire season.

someone home From a fire for a safety violation and then immediately reassigning him or her to another fire should never be done. Accountability also can be promoted by routine performance measurement, using elements of the Position Task Books and people's success in managing risk as part of fireline performance evaluations.

- ***Set objectives, strategy and tactics for fires commensurate with available resources*** - Practice risk management at the highest levels. Don't pressure firefighters to make up for shortage of resources. Rather, be flexible and revise strategy and tactics to fit the available resources. Policy calls for this to be done, but it is not always observed in practice under a variety of pressures.
- ***Resist political pressures*** - Agency Administrators sometimes receive political pressure to fight fires in ways that may not be consistent with the resources available or with safety principles. The Agency Administrators must be backed by senior agency officials in resisting these pressures, and must not sacrifice safety for expediency. Agency Administrators must know their jobs are secure if they resist such pressures, and if they think safety, not politics. That can be achieved in part by having clear policy statements that they follow, and by disseminating examples of instances where resistance had positive rather than adverse consequences.
- ***Gain Agency Administrator support for changes in the culture*** - Most firefighters are willing to try to achieve goals in the face of adversity, sometimes beyond what is safe with available resources. Agency Administrators can send the wrong message by requiring an Incident Management Team to stick with an untenable strategy (e.g., ordering that a fireline must be held to protect resources, or that a particular strategy must be used that is not reasonable with the available resources). The Agency Administrators not only have to be on board the safety program, but must help remind firefighters to operate prudently and professionally, and to exercise accountability. Support From Agency Administrators is critical for implementing the recommendations here; it would be difficult to proceed with changing the culture without these key leaders lending a sense of urgency to the process.

- ***Make safety a year-round, day-in/day-out practice in the workplace*** - How one thinks and acts about safety on one's non-fire job and one's life outside of firefighting may well influence attitudes during firefighting (and vice versa). For people who fight fires as collateral duty as well as for dedicated full-time firefighters, leadership should give attention to safety on-the-job year-round, adhere to OSHA regulations, and promote safety in other ways, day in and day out, not just in an emergency.

Retain Experienced Personnel

A major negative factor in the wildland firefighting culture has been the loss of much firefighting experience through retirements, employee cutbacks across all disciplines, loss of motivation, and disincentives to continue in fire duty, especially in supervisory and management team positions. Collateral duty firefighters who return to a desk overflowing with backed up work are less willing to repeat the experience. The reduced numbers of experienced firefighters and fire managers has led to assigning some people two or three jobs, substituting with unqualified people, or leaving some tasks undone. Experience relates to safety in many ways, most directly through providing a wealth of knowledge and expertise for making decisions in the field under stress, being able to deal with uncertainty, and recognizing when events don't follow expected patterns.

<i>Principle #3- Rebuild the level of firefighting and fire management experience.</i>

- ***Improve retention incentives and reduce disincentives*** - The overall societal culture has changed. Working for what is perceived as unfair pay is no longer accepted. Retention of experienced firefighters (especially Crew Supervisors) and those in decision-making fire management positions must be encouraged, with appropriate pay incentives and promotion possibilities; giving them adequate recognition (e.g., certificates, pats on the back, feature articles, their pictures in the media); removing disincentives (e.g., pressures from their home supervisor); and treating firefighters as professionals. People in key positions (e.g., FMOs) should be dissuaded from becoming "early outs".

- **Tap the unused experienced talent pool-** Some experienced fire management talent has been lost because people stopped wanting to be involved in the fire program. Get some of this talent back into play by restoring the idea that fire is an agency mission, not just the fire program's mission. Virtually everyone can contribute somehow.
- **Develop a strategic human resources plan and fill the pipeline with new talent- -** The pipeline of people in development for higher positions needs to be kept filled with apprenticeship programs and other means to replace the experience being lost. To do this there must be a human resource plan with long-term and short-term goals. The number of qualified, experienced people available for each position needs to be tracked. There needs to be a nested system of staffing targets for various units and geographic areas/regions that are coordinated in an interagency national plan.

Improve Training

Another major strategy for filling the experience gap is to improve the realism and field-relevancy of training through a variety of training approaches: on-the-job training, simulations, field exercises, and more visual, more hands-on training.

This study also identified a wide variety of problems in the existing training programs, as good as they are. In part, the problems are omissions: lack of adequate training for seasonals, lack of training in human relations skills and leadership; and lack of adequate decision training. There also are quality control problems, especially the variation in quality and training of instructors.

Principle #4: Realistic, high quality training must be used to compensate for lack of experience. Proper training also is critical for safety by teaching safe practices and developing proper attitudes.

- **Foster on-the-job training** -A critical, required change in the culture is to foster mentoring of younger firefighters and Incident Management Team members by the more experienced members. This can be done by teaching the mentors how best to

do on-the-job training (OJT), and adjusting how work is done to provide the opportunity to deliver OJT. Recent research has proven that mentors can be trained to improve their delivery of on-the-job training. There is a set of about 50 skills to significantly speed up the process of transferring knowledge. For example, rather than telling the crew members what to do, a Crew Supervisor experienced in OJT finds the "teachable moment" to ask the crew how they would do it, then discusses the chosen rationale (when there is time to do so, of course). This mini-drill often can be done quickly, and speeds the overall learning process. It also presents an opportunity for someone on the crew to point out to the Crew Supervisor a dangerous situation that might not have been realized by the supervisor. OJT can be used at every level in the organization. Appendix B amplifies the discussion in the body of the report on implementation of an OJT program.

- ***Make training more realistic*** - Realistic training can in part substitute for experience. In some cases it can provide knowledge through simulated experience that is not possible in the real world (such as a flight simulator can train pilots for violent maneuvers). Realistic training may involve virtual reality using sophisticated computer simulations, but training realism can also be increased by lower level computer simulations, by taking some training outside, and by appropriate paper and pencil exercises conducted under stress in real time (all of which are already being done to some extent.) Among the most critical areas needing more realistic training are size-up, situation awareness, decision making, and management of risk exposure. Deployment of fire shelters also needs to be taught under realistic conditions (wind, rough terrain); it is being done by some but not all trainers.
- ***Provide more refresher training, especially for seasonals*** - Although policy requires that annual refreshers be given, budgetary pressures and other tasks often cause the "season" for seasonal firefighters to be shortened at the front end, which may eliminate part or all of their fire training. Mandatory non-fire training also reduces time for fire training for various personnel. It is critical to refresh all crews with safety information at the beginning of each season, and at other opportunities. To make refresher training most effective requires analysis of the most important skills or procedures that get forgotten the most from season to

season, and then targeting the training to these greatest needs. Priority should be given to training those most likely to be on the fire line (including managers and supervisors). More broadly, there is a need for refresher training to be conducted for all operational personnel. This can be done with a combination of on-the-job training and mini-training sessions.

- ***Use more case studies, interactive exercises, and visual materials; critique actions and disseminate "lessons learned"*** - A better job is needed in undertaking reviews and debriefings after action. Most importantly, a place needs to be established to send good, positive lessons and then disseminate them. The U. S. Army has developed a "Center for Lessons Learned" that collects case studies, screens and digests them, and quickly disseminates key lessons and edited case studies. Harvard Business School professors think it is a superior and transferable approach to ensure that both positive and negative lessons learned from field experience and training exercises get saved, processed, and promptly disseminated to the field. It is credited with providing feedback to make a first-rate organization even better, and not rest on its laurels as times change. Appendix A discusses how to establish a Safety Center for Lessons Learned that can be a source of case studies and other realistic training materials.
- ***Use a newsletter and other means to spread positive and negative lessons*** - Storytelling is an intrinsic part of the wildland firefighter culture. Advantage should be taken of that in promoting success stories as well as examples of failures. The "story" of the tragedy at Storm King Mountain in which 14 wildland firefighters lost their lives helped stimulate a great deal of positive safety behavior.

In aviation safety circles, there are brief newsletters that circulate to all levels of the organization, and provide anecdotes about safety issues, humorous stories, and good lessons from operations or simulations. Something similar is needed for the wildland firefighter, especially during the fire season to reach the maximum numbers. The newsletter can be developed by an editor using desktop publishing software, which makes it inexpensive to do. This newsletter might be a product of the proposed Center for Lessons Learned, or an offshoot of existing publications.

Its dissemination must be very wide at the firefighter level. ⁷ Dissemination can be by a variety of means, including distribution directly to camps and incident bases and by Internet.

Selected stories (case studies on lessons learned) need to spread verbally as well as by newsletter, as part of on-the-job training and informality, since some firefighters will not have access to newsletters or may not read them.

One of the key tasks of the stories is to make the inconceivable conceivable. It is hard for people to imagine that there can be a series of small steps, or a confluence of unfortunate events, that will lead to an entrapment or a fatality, yet those situations occurred repeatedly in the past.

Ensure Adequacy of Certifications and Qualifications

The red card qualification system must have integrity and must be an inviolate symbol of the culture. Between grandfathering-in some people not qualified, and signing off on others whose experience is not adequate, the red-card has deteriorated as the symbol of competence and integrity. There also is wide concern about the qualifications of a small fraction of leaders and fire managers who do not have adequate fire background and who can profoundly affect safety; this was addressed under leadership training.

<p><i>Principle #5 - Ensure the integrity of the red card qualifications system.</i></p>

- ***Enforce the requirements of the certification system*** - The present red card system can work if properly enforced and if the requirements at each level are properly interpreted. Improperly signing off on a red-card qualification, or

⁷Emergency Firefighters (EFFs), a special hiring category, will be more difficult to reach for this approach and a number of other recommendations in this report. Special attention needs to be given to how the various ideas here can be adapted to the needs of the EFFs, who comprise a significant portion of the basic firefighter workforce.

falsely representing your qualifications or those of the people you supervise must be a grave offense with serious consequences.

Improve the Human Side of Communications

Communications are critical to safety. A common finding in firefighter fatality and serious injury incidents is a failure to provide adequate warnings, or lack of clarity about desired operations. One of the most important changes needed in the culture is to promote two-way communications - a dialogue - rather than one-way communication in which information is sent down the line or requests sent up the line, with no guarantee they "get through," let alone are understood.

<i>Principle #6 - Communications must be clear and understood</i>
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- * ***Use acknowledgments to close the loop*** - Whenever information is transmitted, especially by radio but also face-to-face, there should be an acknowledgment with varying amounts of feedback from the receiver to the sender. Both have responsibility to see that the loop is closed, with understanding. The basic idea is to follow a crew resource management (CRM)-like approach and related concepts in aviation communications, where, for example, changes in altitude directed from control tower to pilot are confirmed by the pilot, and where crew member-to-pilot, or pilot-to-crew member instructions get repeated.

For firefighting, acknowledgments can run from:

- Simply saying "Copied" to respond to a straightforward, non-safety related piece of information, to
- Repeating key elements of a message (such as saying, "Understood, dig line from the creek east"), to
- Repeating part of a complex instruction ("We are to continue digging line unless the wind shifts in our direction, and if that happens, will immediately retreat on the escape route to the east.")

A command and control organization tends to encourage "telling people" or "giving orders," with the assumption that the receiver understands. The key change recommended is to require confirmation of what is understood. This should be done for all non-trivial messages, with confirmations being terse so as not to overload radio channels. Training courses will have to be revised to reflect this and the other changes recommended for improving communications. Examples of good communication should be given explicitly or implicitly throughout the curriculum.

- * ***Legitimize and encourage asking questions*** - In addition to feedback, another key change needed in the culture is making it easier for a subordinate to ask a supervisor or colleague about what one is supposed to do, or how one, is to interpret information received. The acknowledgment process discussed above will help provide opportunities for people to ask questions about an assignment if it is unclear. But going further, it must be the *sender's* professional responsibility to ensure that a communication that could affect safety is received and understood. It must be the *receiver's* professional responsibility to ask questions about a communication that was not clearly heard or understood, or if implications of what to do are unclear. Specific techniques should be taught to supervisors on how to encourage querying, especially for supervisors of crews or teams that have not been together for long. It can be as simple as the supervisor saying something like this when the crew first meets: "We haven't worked together before, but once you get to know me you'll see that I appreciate being asked questions." Giving praise for good questions also encourages queries.
- ***Legitimize pointing out safety problems (and solutions)*** - It must be not only a right but an obligation for everyone from the newest member of a crew up through incident commanders to point out safety problems to their supervisors, and to report injuries, entrapments, and near misses. It should also be a responsibility to point out safer ways to accomplish a mission where possible. (This, too, is part of the Crew Resource Management concept used in aviation.) The culture should encourage raising safety issues and solutions in a "respectful interaction," in which one raises the issues politely with one's supervisor, and, if need be, with the next level up the line. Supervisors must not be allowed to punish someone for raising a

safety issue in a proper manner. Performance ratings should consider how well supervisors promote an open environment for addressing safety issues.

- **Improve briefings** - The content and orderliness of briefings in the field need to be improved. Special efforts also are needed to get adequate debriefings from crews or other units going off duty, and get the information to the units on duty. Checklists of things to cover in briefings should be provided (see examples in text). Here, too, the principal of two-way communications should apply: those receiving briefings who do not understand the situation or its implications need to take the initiative to ask questions.
- **Ensure all crews have radios** - There must be an adequate number of radios provided to each crew and a radio for each resource such as dozers. It is critical for safety to be able to keep in touch and coordinate all units. Some crews and other units have had too few radios or even none at all.

Human Factors

Many of the desired goals here deal with human factors - psychological, mental, and physical. In addition to the human factors inherent in the issues discussed above, more attention must be given to fatigue, crew dynamics and crew cohesion, and to accurately representing crew capability levels. Crews have been misused at times from lack of awareness of their fatigue level, their lack of training or lack of equipment. (Similar concerns apply to engine crews, single resources⁸, and management teams.) Safety experts also believe that the degree of crew or team cohesion makes a significant difference in team decision making, response to leadership, and their ability to react appropriately in an emergency.

Principle # 7 - Individuals and crews must not be used or pushed beyond their capability.

⁸ "Single resources" are individuals such as division supervisors or dozer operators who are ordered up individually, as opposed to a crew or team, who are ordered up as unit.

- * ***Prevent fatigue*** - Fatigue is a critical factor that can lead to illness directly, and to injuries through carelessness or bad decisions by people who are fatigued. It is one of the highest priorities to address. The agencies must deal directly with reducing fatigue levels. The Bureau of Indian Affairs (BIA) has found that 80 percent of injuries occur during the third week in the field; similar research should be done for all agencies, and the results communicated to all firefighters. Crews and teamwork/rest guidelines need to be revisited. The length of tours in the field should be reduced, perhaps to two weeks instead of three. Research should be undertaken on how work/rest cycles, including cumulative fatigue over a season, the number of consecutive days in the field, and the length of operational periods, affect the safety of wildland firefighters. Whatever work/rest guidelines are chosen, they must be enforced. Also, the quality of rest must be improved - reducing exposure to noise, light, heat, etc. - for people who are sleeping, especially those resting during the daytime after night operations. Lack of adequate rest should be considered at least as serious a safety problem as not having a hard hat or shelter.

- ***Accurately report fatigue, health, and equipment status*** - The condition of crews, Incident Management Teams, and single resources - including their fatigue, injury status, health, and equipment deficiencies - must be accurately and honestly communicated to whomever has to decide on their use. This is usually done but not always. It should be a grave offense for a Crew Supervisor, team leader, or single resource to misreport the condition of their unit when checking in. (Some well-publicized suspensions of violators may help make the point.) It is understandable that people want more work to earn more money, but it must not be at the expense of themselves or the people they lead. Pay systems should be revised so as not to be a factor in promoting fatigue. Candor in reporting status must also be encouraged among state and local career or volunteer firefighters who work on a Federal fire. Criteria need to be developed that describe crew status in a concise and useful way to those assigning them.

- **Recognize differing capability among Type II crews** - The competency as well as condition of resources must be considered in making assignments. In particular, there was a high level of concern among firefighters in every region about misuse of Type II crews. The training and experience of Type II crews vary widely. Some have equipment problems (e.g., a shortage of radios). Typing of crews must reflect performance that can be expected. It may be desirable to categorize crews using three types, as once was done, to facilitate making an appropriate assignment. Whatever categorization is used, the capability and status of a crew must be considered in giving them an assignment, because it affects their safety as well as their performance. The same holds true for assigning State and local fire agency crews, contract crews, and military crews.

Principle #8 - Unit cohesion should be fostered, and attention given to developing good crew dynamics.

- **Explicitly build crew/team cohesion** - Usually Type II crews (and occasionally some Incident Management Teams) are brought together for the first time at fires. Crew Supervisors, team leaders, and other managers/leaders should directly address the fact that they may be at times dealing with a group of strangers, or several clusters of people who know each other within their cluster but not the people in the other clusters. The leaders should, systematically, purposefully build a team. One recommended approach is to explicitly raise this issue with the team, frankly discussing the need to get to know each other quickly. This will break down some of the communications barriers that make people reticent when they don't know other people in a group. Also helpful is to quickly establish a specific, identifiable role for each person on the crew, or squad, such as is done on Hotshot 'crews. New Incident Management Team members already have an identity by virtue of their specific, named position (e.g., finance section chief, operations section chief), but they, too, need explicit direction to quickly establish contact with those with whom they most interact. Beyond the very first meeting, there are many ways to promote team cohesion, and not just wait for time to solve the problem (as discussed in Chapter 5).

Promoting Safety as Part of Professionalism

It is difficult to promote safety directly without the effort sounding like "sloganeering" or lip, service. A successful approach used in other dangerous occupations such as urban firefighting, race car driving, and aviation is to make the very concept of being a professional include being properly equipped with safety gear and exhibiting certain safety-related behaviors. The agencies need to define a core professional ethic – the behaviors that define professional conduct for all Federal wildland firefighters, regardless of whether they are full-time, seasonal, collateral duty, or EFF. They also need to expand the professional corps of firefighters around which to improve the program, and to improve the professionalism of collateral duty employees (the "militia"). The central corps of firefighters in Type I crews should set the example for the others by "doing it smart. "

There is another link between the concept of professionalism and safety: recognizing firefighters as professionals contributes to their feeling appreciated, and will help in retention, which in turn builds experience and thereby increases safety.

Principle #9 - Develop an attitude and ethic of professionalism that encourages retention and promotes safety behaviors.

- ***Depict safety as the skill exercised by professionals*** - People engaged in firefighting or Incident Management Teams should be considered as professional firefighters in the field, regardless of their job title. Make safe behavior, taking precautions, wearing the proper protective clothing, using tools safely, maintaining situational awareness and communicating safety problems all part of what it means to be considered a professional. Professionals are obliged to report injuries and near-misses, point out safety problems, and suggest safer approaches. The idea is to change the culture to incorporate safe behavior as part of the essence of being professional- you can't get the job done if you get hurt.

Firefighting must be viewed both by the agencies and by firefighters as a profession requiring skill, and fortitude, not just guts and risk taking. The Federal firefighters

of the future shall be proud that they made a smart assessment of their situation and that their assessment drove decisions along the way to success.

To help change the culture, spread stories that illustrate skill and risk management. Tell stories about real incidents to help people picture the inconceivable. Illustrate how a series of small, incremental problems can accumulate to a disaster. Reward ideas that contribute to safety without denigrating courage.

Two or three decades ago, urban firefighters were considered macho and professional if they went into burning buildings to rescue people without using breathing apparatus and wearing protective clothing. Today they would be considered foolish and unprofessional, unable to do their job effectively unless properly attired and equipped. Similarly, wildland firefighters need to have certain equipment and practice certain skills to be considered a professional. This theme needs to be included in training and all aspects of the culture.

Safety Incident Reporting

Adequate information on the causes of safety incidents is critical for targeting safety and measuring progress. It must be collected and widely disseminated. However, there does not yet exist reliable, comprehensive data on wildland firefighter injuries, near-misses, entrapments and shelter deployments. The number of fatalities ~ accurately reported, but investigations of them are not done consistently, nor are the underlying factors for safety incidents always identified. There is no consistency in reporting across all agencies.

Principle #10 - Collect reliable safety data, and use it to target, prioritize, and evaluate programs.

- * ***Develop a comprehensive, multi-agency injury/near-miss reporting system-*** All injuries, entrapments, near misses and safety problems must be reported. It is almost inconceivable that a comprehensive data collection system is not yet available for accident, injury, or near-miss events across the agencies. There have been many false starts, and nothing brought to fruition. Definitions, reporting forms, and a system for collecting and analyzing injury data and near-

miss data need to be implemented consistently across all agencies. The resulting data must be analyzed-and the results fed back into the appropriate training courses, on-the-job awareness, and elsewhere. An important component of the reporting system must be the ability for anonymous reporting of specific incidents, safety problems and information on near misses, as is done in aviation. We recommend that a new safety incident reporting system be one of the first tasks worked on, because it is critical for targeting and evaluating many of the other recommended strategies for improving safety. The data system should routinely publish summary reports of the findings, at least annually. The data system should also be a source for special reports on safety issues.

- ***Standardized interagency investigations*** - The investigation protocol for the more serious incidents needs to be standardized, and more importantly, broadened to capture key information needed for improvement of safety - especially the human factors. A draft protocol now exists. The investigations must include interviews of various people who were at the scene as to what took place and how the problem could have been avoided. Why the incident occurred needs to be explored as well as what happened. Lessons need to be drawn for the future, and the results disseminated through the newsletter mentioned earlier and/or by other means. The National Institute of Occupational Safety and Health in 1998 was given new responsibility and funding for investigating all types of firefighter fatalities, and there needs to be agreement on how the various agencies will coordinate undertaking fatality investigations.

External Factors

The safety of firefighters is affected by many factors beyond their control. On the Phase I survey more firefighters identified reducing the accumulated fuels in wildlands as high priority for improving their safety than any other factor. Accumulated fuels increase fire severity and complexity.

A second key external factor is the degree to which property Owners safeguard their property. That affects fire incidence and the strategies needed for urban interface

fires, and thus can affect firefighter safety. A third external factor was inadequate fire program budgets, which reduce the level of resources available to fight fires, and increased pressures to do more with less.

Principle #11 - Promote prevention and fuel treatment programs for their impact on firefighter safety as well as for their land management results.

- ***Implement expanded fuel treatment and public education programs*** - The wildland firefighting culture must continue to promote and expand fuel treatment programs (both prescribed fire and mechanical approaches.) It must also increase public fire safety education. Both programs help prevent and mitigate the severity of wildland fires. They not only reduce losses, but also help prevent firefighter casualties. Wildland firefighters themselves need to be educated on the merits of fuel treatment and public education, and armed with arguments to help others understand the importance of these programs. Prevention programs are especially important for mitigating interface fires.

The public must be educated not only on what they can do to mitigate losses, but also on the limitation of firefighters - and specifically that firefighters cannot be expected to sacrifice their own safety to protect homes in environments that are virtually indefensible if they lack certain design and landscaping features. Anew, intense national public education program is needed to get these messages across. This might include taking more advantage of the "teachable moments" during large, nationally publicized fires.

Starting Actions on Implementation

To change the wildland firefighting culture will require more than an edict that comes out saying, "Do all this stuff." The driving moral force for these recommendations comes from the 1,000 firefighters who participated in Phase I, from numerous meetings with various safety and mid-management working teams and knowing that we can do better. The operational levels of the workforce - the firefighters, Crew Supervisors, Floss, District Rangers, and others - must be kept involved in the implementation process.

However, the senior fire management officials and Agency Administrators must be the ones to get the changes started.

The first step needed to move forward is for the five agency fire directors or their designees to develop an assignment matrix, with milestones and an individual or unit responsible for each implementation strategy. The report and implementation plan need widespread dissemination. Specific steps for moving forward with implementation are recommended in Chapter 7.

The fire directors, their immediate subordinates, and others on down the chain of leadership also must practice a series of small, incremental actions that demonstrate they care about safety, and that help guide the changes. This includes asking questions about safety implications of various programs as they are discussed, giving praise for steps taken in the right direction, spreading examples of serious problems or innovative solutions to problems, correcting memos, reports, and policies that further the status quo, pointing out changes in the way information is acknowledged, seeing that the needed training takes place, and doing their own on-the-job training with subordinates. In other words, show in a variety of ways that the multi-agency wildland firefighting establishment means business about changing the culture. As one firefighter who reviewed this report put it, "Higher level folks need to ... show by where their feet take them what is truly important."

Each reader of this report and the rank and file firefighters shoulder responsibility to change the culture of safety in wildland firefighting. Each person must consider the recommendations, and their own part in the change process, leadership, and accountability for actions taken.

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The following table lists all of the goals and recommended implementation strategies. They are grouped under the relevant safety principle they addressed (18 principles in all, including three not discussed above.) Each goal and implementation strategy is discussed in the body of the report. Some goals apply to more than one principle, and some implementation strategies to more than one goal, but to avoid redundancy each is listed only once here; the text provides cross-referencing.

TABLE 1-1. SUMMARY OF PRINCIPLES, GOALS AND THEIR PRIORITY RATINGS AND IMPLEMENTATION STRATEGIES

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
ORGANIZATIONAL-CULTURE		
<i>Principle - Preserve strength of current system.</i>		
<p>Goal 1. The existing strengths of the Federal wildland firefighting system should be preserved and built upon.</p> <p>IS 1 - "Physician Do No Harm." Evaluate proposed strategies and changes to avoid unintentional negative side effects.</p> <p>IS 2 - Disseminate information on what is perceived to work well.</p> <p>IS 3 - Fix the existing system first.</p>	2	2 2 3
<i>Principle - Collect reliable safety data and use it.</i>		
<p>Goal 2. A "Code of Conduct" should be established in which employees should have both the right and obligation to report safety problems, and to contribute ideas on their safety to supervisors. The supervisors are expected to give the concerns and ideas serious consideration.</p> <p>IS 1 - Disseminate directives - and otherwise spread the word - that each person is expected to report safety problems and to contribute potential solutions.</p> <p>IS 2 - Train new firefighters to speak up about safety.</p> <p>IS 3 - Train supervisors to listen.</p> <p>IS 4 - Include the raising and handling of safety comments in performance ratings and accountability systems.</p> <p>IS 5 - Involve employees in developing ways to get these ideas implemented in the field.</p> <p>IS 6 - Promote a single code of conduct (including the reporting of safety incidents) across agencies.</p>	1	1 2 2 1 2
<p>Goal 3. Every employee is expected to report a) injuries (and of course fatalities), b) entrapments/shelter deployments/burnovers, and c) near misses.</p> <p>IS 1- Develop a common interagency reporting system.</p> <p>IS 2 - Incorporate basics on safety reporting in training courses.</p>	1	1 2

1 Priority ratings are given in terms of the importance for change from the current situation, not the absolute importance of the goal or strategy. The ratings are: 1 - Critical to change or improve, 2 - Highly important to change or improve, 3 - Important or desirable to change or improve. Some very important subjects (e.g. transport of injured firefighters, or the need to be sober) were given lower than "1" ratings because of having less of a need to change from where they stand today than was the case for other issues.

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 4. The five agencies should strive to obtain a clear, quantitative picture of the pattern of safety incidents, their causes, trends, and the lessons learned; and to identify potential problems at the earliest time possible.</p> <p>IS 1 - Analyze and publish safety data.</p> <p>IS 2 - Establish a safety-oriented Center for Lessons Learned.</p>	1	1 1
<p>Goal 5. All wildland firefighter fatalities should be investigated in a consistent manner to glean lessons for averting future fatalities.</p> <p>IS 1 - Develop interagency protocols for the process and substance of investigations.</p>	1	2
<p>Principle: Promote accountability for safety at all levels</p>		
<p>Goal 6. Individuals at all levels should be held accountable for safety violations.</p> <p>IS 1 - Start policy of removing safety violators from the job.</p> <p>IS 2 - Follow-up on reported safety infractions.</p> <p>IS 3 - Consider safety performance in performance reviews and promotions.</p> <p>IS 4 - Add training in accountability.</p> <p>IS 5 - Include accountability in operational guidelines.</p> <p>IS 6 - Provide guidelines for accountability.</p>	1	1 2 1 2 2 2
<p>Goal 7. An individual or Crew Supervisor should have the right of refusal to pull themselves or their crew out of what they perceive as undue danger.</p> <p>IS 1 - Train firefighters on the process to use, not just the right.</p> <p>IS 2 - Monitor frequency of refusals.</p> <p>IS 3 - Head off situations in which refusals are necessary.</p>	2	1 3 1
<p>Goal 8. Foster a sense of individual responsibility for safety actions.</p> <p>IS 1 - Include in the 'code of conduct' that all employees are responsible for adhering to safe practices and correcting violations.</p> <p>IS 2 - Discuss the issue of responsibility in initial training and in refresher training.</p> <p>IS 3 - Disseminate examples and stories of successful individual initiatives.</p>	2	1 2 2

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<i>Principle - Promote safety for all who work at Federal fires</i>		
<p>Goal 9. The safety goals and rules should apply to all firefighters working at a wildland fire which is a Federal worksite. IS 1 - Require, encourage, and assist non-Federal agencies to comply with safety precautions. IS 2 - Provide (or facilitate obtaining) training and equipment for non-Federal firefighters who assist.</p>	1	1 3
<p>Goal 10. The rights and responsibilities of wildland firefighters should apply to all, regardless of race, gender, ethnic affiliation, or employment status. IS 1 - Ensure that all of the recommendations here are applied uniformly for all types of firefighters. IS 2 - Ensure equitable equipping and treatment of Type II crews. IS 3 - Provide opportunities for verbal communications training.</p>	1	1 3
<i>Principle - Rebuild the level of experience.</i>		
<p>Goal 11. Adequate experience levels are needed for Crew Supervisors and higher positions. There is a minimum cadre of experienced personnel needed for each supervisory level of the fire program. IS 1 - Periodically develop strategic assessments of personnel needs. IS 2 - Track experience levels. IS 3 - Establish an apprenticeship program. IS 4 - Revise requirement for currency of certification. IS 5 - Increase the use of special assignments to build experience. IS 6 - Encourage more participation from non-fire personnel.</p>	1	1 2 2 2 3 3
<p>Goal 12. Encourage the retention of permanent employees on fire duty. IS 1 - Remove pay caps for overtime on fires. IS 2 - Consider expanding use of special pay and retirement incentives for collateral duty personnel. IS 3 - Increase expectations for employee participation in fire programs. IS 4 - Evaluate employees' willingness to participate in fire programs.</p>	2	2 3 2 2
<p>Goal 13. Encourage retention of seasonals on fire duty. IS 1 - Re-examine personnel policies that inhibit retention of seasonals.</p>	1	2

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 14. Develop ways to use training of various types to compensate for lack of experience.</p> <p>IS 1 - Expand use of on-the-job training; train people how to do it. IS 2 - Enhance course training in strategy and tactics. IS 3 - Develop family of simulators and other instructional technology. IS 4 - Develop a family of simulations. IS 5 - Use more visual, interactive multimedia training. IS 6 - Prepare for out-of-region experience.</p>	1	1 1 2 2 2 3
<p>Goal 15. Ensure that individuals and crews in low fire incidence areas have the opportunities for experience in other areas, and/or have adequate oversight when sent to different or complex situations.</p> <p>IS 1 - Provide opportunities to work in high incidence areas.</p>	3	3
<p>Principle - Ensure the integrity of the certification and qualification system.</p>		
<p>Goal 16. Certifications (e.g., Red Cards) should be meaningful indications that a person is ready to take on the requirements of the job they are certified for.</p> <p>IS 1 - Better explain the intent of the system and its requirements. IS 2 - Train managers better on implementing performance - based certification. IS 3 - Revise Position Task Books if necessary. IS 4 - Use key .tasks from the Position Task Books in performance evaluations. IS 5 - Toughen currency requirements. IS 6 - Make training required (versus "suggested") to achieve qualifications.</p>	1	1 2 2 2 2 2
<p>Goal 17. Signing off on Red Card credentials without reasonable evidence that the person has met all of the requirements should be a punishable offense.</p> <p>IS 1 - Educate and build confidence about the system. IS 2 - Utilize disciplinary actions when appropriate.</p>	2	2 1

<p align="center">GOALS AND IMPLEMENTATION STRATEGIES</p>	<p align="center">PRIORITY RATING 1</p>	
<p>Goal 18. Credentials should be reviewed for all resources before the resources are utilized.</p> <ul style="list-style-type: none"> IS 1 - Revise ICS training materials regarding check-in. IS 2 - Motivate the check-in recorders concerning the importance of their role. IS 3 - Develop "smart" Red Cards that allow quicker, more accurate check-in of individuals. IS 4 - Ensure that IMT training stresses the need to consider and share information on the status and certification of crews at check-in. IS 5 - Ensure equality of review across positions. IS 6 - Evaluate acceptance level for insignia. 		<p align="center">2 2 2 3 3 3</p>
<p>Principle - Communications must be clear and understood.</p>		
<p>Goal 19. One-way communication should be replaced by two-way dialog. People at each level of the fire hierarchy should be comfortable with requesting clarification of information, or requesting additional information. There should be no stigma attached to requesting clarification; it should be considered professional to do so.</p> <ul style="list-style-type: none"> IS 1 - Start training in interpersonal communications with the very first firefighting training, and expand the training to include the new concepts presented here. IS 2 - Require formal acknowledgments, especially in radio communication. IS 3 - Legitimize and encourage the asking of questions. IS 4 - Use multiple means to convey the cultural change. IS 5 - Establish communications protocols for tactical operations. IS 6 - Use Crew Resource Management (CRM)-like training. IS 7 Change the dialogue on the fireline through on-the-job training and examples provided by supervision. IS 8 - Provide instruction on use of radios and radio discipline. 	<p align="center">1</p>	<p align="center">1 1 2 2 1 1 1</p>
<p>Goal 20. Information needed for safe operations and warnings should be transmitted up, down, and laterally within the organization at an incident, (with positive feedback that the information is received and understood, as discussed in . Goal 19.)</p> <ul style="list-style-type: none"> IS 1 - Improve the quality of briefings at incidents. IS 4 - Develop and use checklists for transmission of information. 	<p align="center">1</p>	<p align="center">1 3</p>

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING I	
<p>Goal 21.)Dispatchers are key nodes in the communication system and must be well-trained, well-informed during the incident, and must not exceed their authority.</p> <p>IS 1 - Train dispatchers in the new approach to communications dialogue and in their role as change agents.</p> <p>IS 2 - Improve recruiting and initial training of dispatchers.</p>	2	2 3
<p>Principle - Provide firefighters with safe and adequate protective gear, tools, equipment and transportation.</p>		
<p>Goal 22. All firefighters (on Federal fires) must be equipped with the personal protective equipment needed for their job (and the training to use it).</p> <p>IS 1 - Broadcast and enforce minimum standard for radios and personal protective equipment.</p> <p>IS 2 - Prepare for equipping non-Federal firefighters at incidents.</p> <p>IS 3 - Support funding for state and local fire units.</p> <p>IS 4 - Reinforce policy on carrying shelters.</p>	1	1 2 3 2
<p>Goal 23. Every crew should have a continuous communications link to incident management and to nearby ,crews; this means having at least two radios in good working condition per crew.</p> <p>IS 1 - Improve distribution of radios, batteries, and other communication equipment.</p> <p>IS 2 - Establish new caches if necessary.</p> <p>IS 3 - Mandate radios for each squad.</p> <p>IS 4 - Assure adequacy of radios for mobile resources.</p>	1	1 3 1 1
<p>Goal 24. The communications system used at fires needs to provide adequate channels, adequate clarity, and adequate reliability for communicating with all fire personnel, aircraft, and IMTs.</p> <p>IS 1 - Periodically re-evaluate and improve communication channel capacity and reliability.</p> <p>IS 2 - "Move some of the communications load off the radio.</p>	2	2 3
<p>Goal 25. There should be accountability for keeping equipment well-maintained.</p> <p>IS 1 - Describe equipment maintenance responsibility in basic courses.</p> <p>IS 2 - Review and revise if necessary the qualifications of equipment specialists.</p> <p>IS 3. - Hold users and cache operators responsible.</p>	3	3 3 3

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 26. Situational awareness should be improved by improving the ability of Crew Supervisors, Incident Management Team, Incident Commanders and above to obtain overhead views of the fire, including data from infrared and possibly other sensors.</p> <p>IS 1 - Use satellite imagery. IS 2 - Use real time air-to-ground and ground-to-air video. IS 3 - Use aerial drones.</p>	1	2 1 2
<p>Goal 27. Crews, teams, and individuals should be transported where needed with attention to net risk reduction and with consideration of reducing fatigue.</p> <p>IS 1 - Give more weight to risk reduction, especially reduction of fatigue. IS 2 - Explore use of safer ground transportation. IS 3 - Use computerized transportation scheduling.</p>	1	1 2 3
<p>Goal 28. All transportation drivers should have adequate experience and training.</p> <p>IS 1 - Increase requirements and realism for training of bus drivers and other drivers. IS 2 - Hold drivers accountable.</p>	2	2 2
<p>Principle - Provide quick, high quality care for the injured.</p>		
<p>Goal 29. Injured firefighters should be speedily rescued.</p> <p>IS 1 - Appoint a task group to review evacuation procedures and associated paperwork, and consider a model evacuation plan. IS 2 - Reduce evacuation needs by improving on-site care.</p>	1	3 2

* To repeat a previous note: this is a highly important goal but not rated "1" because it is largely being done and in less need of improvement than other goals.

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
LEADERSHIP AND FIRE MANAGEMENT		
<i>Principle - Assure leadership is qualified and well-trained.</i>		
<p>Goal 30. Set firefighting goals commensurate with available resources.</p> <p>IS 1 -Use the "Wildland Fire Situation Analysis" approach or others to evaluate fire control strategies and select the best commensurate with available resources.</p> <p>IS 2 - Encourage regional and national fire managers to be more flexible and to revise priorities in real time during a season, when necessary.</p> <p>IS 3 - Provide adequate fire management training to Agency Administrators, and encourage them to exercise more discretion to enhance safety.</p>	1	2 1 1
<p>Goal 31. Do not fight fires in a way that will endanger firefighters, regardless of the values to be protected.</p> <p>IS 1 - Ensure that this goal is emphasized in strategic and tactical fire courses.</p> <p>IS 2 - Do not allow constraints on fire fighting approach due to ecological considerations to interfere with safe protocols.</p> <p>IS 3 - Do not permit structural firefighting by firefighters not trained for it.</p>		2 1 2
<p>Goal 32. The strategy and tactics of fighting a fire must be flexible and periodically reconsider the available resources and the changing situation.</p> <p>IS 1 - Train and evaluate fire managers in being flexible and readjusting strategy and tactics as needed.</p>	1	2
<p>Goal 33. Long-term fire growth assessment models should be used in making decisions on fire management strategy.</p> <p>IS 1 - Prepare ahead of time for use of models.</p> <p>IS 2 - Use fire growth models in real time to establish priorities.</p>	2	2 3
<p>Goal 34. Define adequacy of safety zones by terrain type, fuel type, and fuel condition.</p> <p>IS 1 - Publish a "job aid" (concise notes) on sizing safety zones.</p>	2	2

• Also related are goals on situational awareness.

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 35. Assure that safety is adequately considered as transitions are made from initial attack to extended attack, from extended attack to Type II IMT, from Type II to Type IIMT, and back from IMT to local unit.</p> <p>IS 1 - Emphasize the safety aspects of handling transitions in various command courses.</p> <p>IS 2 - Develop checklists for each of four levels of transition.</p>	1	1 2
<p>Goal 36. Where appropriate, in areas designated for aggressive attack, more fires should have a rapid initial response when they are small, if resources are available (and when the potential for spread and the values to be protected are a concern).</p> <p>IS 1 - Get employee buy-in at all levels for use of more vigorous initial and extended attack.</p>	2	2
<p>Goal 37. To prevent information overload and allow flexibility, the fire orders should periodically be screened to identify the minimum essential set, and that should be rigorously enforced.</p> <p>IS 1 - Conduct a content analysis of the various guidelines and produce a reduced set.</p> <p>IS 2 - Re-define which are truly orders and which are guidelines that can be modified under special circumstances.</p>	2	2 2
<p>Goal 38. Fire safety practices should be driven by a systematic risk assessment that gets updated periodically.</p> <p>IS 1 - Adopt a comprehensive risk management approach to firefighter' safety.</p> <p>IS 2 - Establish and cultivate a culture that encourages people to think, make effective decisions, and place a priority on firefighter safety.</p> <p>IS 3 - Incorporate the risk management concept in training.</p>	1	1 1 1
<p>Goal 39. The list of Watch Outs needs to be integrated into training and decision-making, and their role as warnings emphasized.</p> <p>IS 1 - Clarify the use of the Watch Outs in training.</p>	3	3
<p>Goal 40. Workable spans of control should not be exceeded at any level of management, especially not by Division and Group Supervisors.</p> <p>IS 1 - Encourage flexibility in establishing and subdividing divisions when appropriate.</p> <p>IS 2 - Reaffirm ideal span of control.</p>	2	2 3

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p><i>Goal 41. Develop and use criteria for determining when night operations would be safe and effective. Acknowledge that, depending on circumstances, night operations are a tool that may enhance safety or may increase risk.</i> IS 1 - Develop a job aid or set of criteria for deciding when to use night operations, and when not to.</p>	2	2
<p><i>Goal 42. Fire experience and competency should be considered as critical selection factors for fire leadership and fire management positions.</i> <i>Goal 43. All personnel in a given position must meet the performance requirements of that position.</i> <i>Goal 44. Fire management officers (FMOs) must be selected from among those with fire backgrounds.</i> IS 1 - Set and enforce minimum requirements for key leadership positions. IS 2 Require fire experience for the FMO position. IS 3 - Review incumbents who do not measure up, and reassign or retrain if appropriate. IS 4 - Require Fire Management course for PMOs or their equivalent. IS 5 - Give fire management training to all Agency Administrators with fire program responsibilities.</p>	1 2 1	1 1 2 2 2
<p><i>Goal 45. Those in sensitive command functions should have relatively fresh or updated experience.</i> IS J - Require more recent experience (or equivalent training exercise).</p>	2	2

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 46. Crew Supervisors should be selected not only for technical knowledge and experience, but also for their leadership skills, interpersonal communications, and ability to conduct on-the-job training.</p> <p>IS 1 - Develop a "multi-source assessment" center approach to selecting supervisors.</p> <p>IS 2 - Stiffen other requirements for Crew Supervisor.</p> <p>IS 3 - Train supervisors and/or candidates for supervision on how to conduct on-the-job training.</p>	2	2 3 2
<p>Goal 47. No one should be allowed to set fire strategy or tactics for a fire or give any operational orders without having adequate fire experience, or training considered reasonably equivalent.</p> <p>Goal 48. Agency Administrators should have fire background, or strategic fire training (or delegate fire responsibilities to a subordinate with those qualifications.)</p> <p>Goal 49. The "tone and substance of briefings by Agency Administrators should be conducive to and emphasize safety.</p> <p>IS 1 - Revise the fire-related competency requirements for Agency Administrators.</p> <p>IS 2 - Give examples to Agency Administrators of critical safety problems they can affect in meeting with Incident Management Team.</p> <p>IS 3 - Develop refreshers or quick-help approaches for Agency Administrators.</p> <p>IS 4 - Develop an attitude and ethic of professionalism that encourages retention and promotes safety behaviors.</p>	2 2 2	2 2 3
<p>Goal 50. Incident Commanders at all levels must be selected on the basis of leadership ability as well as technical competence.</p> <p>IS 1 - Develop criteria for Incident Commanders, especially Type 3-5.</p>	1	1
<p>Goal 51. The Safety Officer position responsibilities, priorities, and independence should be more clearly defined.</p> <p>IS 1 - Reexamine and clarify the role and organizational placement of Safety Officers.</p> <p>IS 2 - Set higher selection standards for Safety Officers.</p>	3	3 3

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 52. For extended attack (and larger) fires, someone needs to monitor operations to ensure compliance with established safety requirements, procedures, policies, and standards.</p> <p>IS 1 - Re-enforce the concept that everyone is responsible for monitoring safety.</p> <p>IS 2 - Assign someone ad hoc to monitor safety during transitions when no Safety Officer is present.</p>	1	1 1
<p>Principle „- Crews must not be pushed beyond their capabilities. 2</p>		
<p>Goal 53. A 111:ethod is needed to rate the capability (competency and condition) of "a crew.</p> <p>IS 1 - Use a crew classification system of three or more levels.</p> <p>IS2 - Consider sub-types within a type of crew, especially for Type n crews.</p> <p>IS 3 - Consider developing a smart "resource card" for fast check-ins.</p>	2	2 3 2
<p>Goal 54. The condition and competency of crews needs to be considered when making assignments.</p> <p>IS 1 - Require those who make crew assignments to consider the status as well as "type of each crew (and other resources.)</p>	1	1
<p>Goal 55. Crew Supervisors must accurately report the status and competency of their crews.</p> <p>Goal 56. The equipment of crews should be reviewed and taken into consideration when giving them assignments.3.</p> <p>IS 1 - Require Crew Supervisors to accurately describe the status of their crew at check-in. (The same applies to other resources.)</p> <p>IS 2 - Require Crew Supervisors to describe any equipment problems at check-in. (The same applies to other resources.)</p>	1 1	1 1

2 See also Goal 6-17, on fatigue.

3 In a few places, such as here, two or three related goals are grouped together, with one set of joint strategies for implementing them.

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p><i>Principle - Continue development of integrated, intergovernmental, interagency system.</i></p>		
<p>Goal 57. Further improve Federal-state-Local interagency coordination. IS 1 - Expand official or ex -officio representation of local fire agencies on NWCG. IS 2 - Further develop coordination with "GACGs." IS 3 - Ultimately develop a nested set of interagency organizations.</p>	<p>2</p>	<p>2 3 3</p>
<p><i>Principle – Develop an attitude and ethic of professionalism that includes safety and encourages retention.</i></p> <p>Goal 58. Firefighters need to maintain an appropriate psychological balance, avoiding the extremes of paralyzing fear of the danger, unawareness of the danger, or overconfidence/complacency/denial. IS 1 - Promote the image of a well-balanced professional firefighter as a role model.</p> <p>Goal 59. Recognize and promote the image of the professionalism of wildland firefighters. IS 1 - Define the concept of being a professional firefighter. IS 2 - Refer to firefighters as firefighters, regardless of their job series. IS 3 - Expand firefighter duties to include prescribed fires. IS 4 - Expand other job duties and cross-training among lower-level firefighters. IS 5 - Increase the autonomy of firefighters to adapt to conditions. IS 6 - Develop a larger corps of professional firefighters. IS 7 - Expand cross-training of a core group of firefighters. IS 8 - Promote the concept of a professional "attitude of wisdom."</p> <p>Goal 60. Maintain a zero tolerance policy for substance abuse at fires (including bases and camps). IS 1 - Enforce the existing policy. IS 2 - Provide education on the policy and the need for zero tolerance. IS 3 - Include alcohol and drug testing for fatalities and serious injuries. IS 4 - Include being sober and drug-free as part of professionalism.</p>	<p>1</p> <p>1</p> <p>1</p>	<p>1</p> <p>1</p> <p>1 2 1 2 3 3 2 1</p> <p>1 2 2 3</p>

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<i>Principle - Maintain situational awareness. 4</i>		
<p>Goal 61. Do what it takes to achieve and maintain situational awareness at each organizational level. IS 1 - Teach techniques for maintaining situational awareness in training courses from firefighter to Incident Commander.</p>	1	1
<p>Goal 62. ,Good communication is needed between crews working in proximity, especially one above the other. IS 1 - Mandate that crews and division supervisors be informed of the location of crews near each other. IS 2 - Keep crews working at different elevations near each other in radio contact and informed of each other's plans.</p>	2	2 2
<p>Goal 63. Take extra safety measures in drought years. IS 1 - Activate regional interagency Fire Behavior Service Centers during drought years to increase available information and raise awareness. IS 2 - Use other, less formal ways to keep firefighters informed about conditions.</p>	2	2 2
<i>Principle -- Realistic, high quality training must be used to compensate for lack of experience.</i>		
<p>Goal 64. Training should be available, high quality, and consistent. IS 1 - Develop a needs-based strategy for training across agencies (i.e., matching training availability to the quality and quantity of training needed). IS 2 - Develop a common approach to certifying instructors.</p>	1	1 2
<p>Goal 65. Accelerate learning by emphasizing the positive lessons from successful incidents, not just the negatives from failures. IS 1 - Identify positive case studies for use in training. IS 2 - Reward and publicize people involved in making exemplary decisions.</p>	2	2 2

4 This also is related to well-trained leadership.

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 66. Training needs to be made more realistic.</p> <ul style="list-style-type: none"> IS 1 - Increase use of realistic field training and exercises. IS 2 - Develop more case studies and simulations based on real fires. IS 3 - Increase the use of simulations and interactive exercises. IS 4 - Conduct skills training "in context" of realistic scenarios. IS 5 - Provide realistic shelter training to all wildland firefighters. IS 6 - Make use of live fires and prescribed fires for training. IS 7 - Improve quality of instruction. 	1	1 1 1 2 1 2
<p>Goal 67. Provide an adequate level of training to seasonals.</p> <ul style="list-style-type: none"> IS 1 - Analyze seasonals training needs (quantity as well as content). IS 2 - Improve content and consistency of refresher training. IS 3 - Lengthen "pre-season" for at least first time seasonals and certain specialties. IS 4 - Provide more off-season training for seasonals. IS 5 - Include in the Red Card system seasonals with ICT 5 or higher level certification. IS 6 - Strengthen Smokejumper and Hot Shot refresher training with respect to safety. IS 7 - Take advantage of down-time for training. IS 8 - Provide incentives for seasonals to return. 	1	2 1 2 3 3 2 3 2
<p>Goal 68. Develop training priorities to make the most efficient use of the limited training resources.</p> <ul style="list-style-type: none"> IS 1 - Use overall training needs analysis to set priorities. IS 2 - Target certain individuals. 	2	2 2
<p>Goal 69. Provide supervisors with training in leadership and supervisory skills.</p> <ul style="list-style-type: none"> IS 1 - Train supervisors, IMT members, PMOs, and dispatchers in key "human" skills. 	1	1
<p>Goal 70. Teach wildland firefighters the basics on hazards faced in the urban/wildland interface.</p> <ul style="list-style-type: none"> IS 1 - Train on the interface hazards to expect, and how to deal with them. 	2	2
<p>Goal 71. Maintain skills and safety awareness with on-the-job (and refresher) training. (Also accelerate the build-up of experience.)</p> <ul style="list-style-type: none"> IS 1 - Develop a formal OJT training program, including teaching supervisors how best to provide OJT. 	1	1

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<p>Goal 72. Provide training to crews on the reaction skills needed in dire emergencies that endanger them.</p> <p>Goal 73. Instill in each firefighter the necessity to switch modes and take extraordinary action in extraordinary emergency situations.</p> <p>IS 1 - Train on emergency skills at the individual level.</p> <p>IS 2 - Train on communicating in emergencies.</p> <p>IS 3 - Emphasize "stress-resistant" training.</p>	<p>1</p> <p>2</p>	<p></p> <p></p> <p>1</p> <p>1</p> <p>2</p>
<p>Goal 74. Prepare leaders for decision-making under stress.</p> <p>Goal 75. Prepare the entire workforce, not just leadership, for working under conditions of stress.</p> <p>IS 1 - Develop a Decision Skills Training program.</p> <p>IS 2 - Increase emphasis on "naturalistic" and "recognition-primed" decision-making.</p> <p>IS 3 - Search for ways to reduce workload and stresses in the field.</p> <p>IS 4 - Encourage self-development of ways to cope with stress.</p> <p>IS 5 - Develop a catalog of visual indicators or cues of situational change.</p> <p>IS 6 - Talk about stresses and raise awareness.</p>	<p>1</p> <p>2</p>	<p></p> <p></p> <p>1</p> <p>2</p> <p>3</p> <p>2</p> <p>2</p> <p>3</p>
<p>Principle - People must not be pushed beyond their capability.</p>		
<p>Goal 76. Monitor and reduce fatigue levels to safe limits.</p> <p>IS 1 - Limit the duration of field assignment to two weeks.</p> <p>IS 2 - Assure comfortable, quiet sleeping conditions.</p> <p>IS 3 - Improve dissemination of information on the need for adequate hydration and nutrition.</p> <p>IS 4 - Conduct further study of sleep deprivation and other factors affecting fatigue of firefighters.</p> <p>IS 5 - Use transportation or spike camps to reduce fatigue.</p>	<p>1</p>	<p></p> <p>1</p> <p>1</p> <p>1</p> <p>3</p> <p>2</p>
<p>Goal 77. Crew Supervisors Division Supervisors and Incident Management Teams must get the information they need, but also be shielded from a flood of unnecessary information, and the risk of information overload.</p> <p>IS 1 - Be selective on what is broadcast and what is requested.</p>	<p>2</p>	<p></p> <p>2</p>

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1	
<i>Principle - Foster physical fitness for the job *</i>		
<i>Goal 78. Develop a widely accepted physical fitness test for wildland firefighters.</i>	1	
<i>Goal 79. Physical testing must be conducted honestly and for all.</i>	1	
<i>Goal 80. Minimize wildland firefighter fatalities from health or physical conditioning factors.</i> IS 1 - Finish validation and acceptance testing of the Pack Test series or another new physical fitness test, and rigorously enforce the new test. IS 2 - Require contractors and encourage all others at Federal fires to meet the new physical fitness test. IS 3 - Educate the workforce about the new test. IS 4 - Hold testers accountable.	1	1 2 3 1
<i>Principle - Foster unit cohesion.</i>		
<i>Goal 81. Foster better crew cohesion, especially among Type II crews.</i> IS 1 - Adapt and adopt CRM-type training and attitudes. IS 2 - Develop assessment instrument to periodically refine CRM-type training. IS 3 - Infuse CRM principles throughout training. IS 4 - Employ team building technologies when teams first meet. IS 5 - Consider use of outside vendor for CRM development and training. IS 6 - Develop work climate of trust through changes in the culture.	2	1 2 2 2 3 2
<i>Principle - Practice safety day to-day.</i>		
<i>Goal 82. Develop a safety culture that encourages people to think in the context of safe practices, standards, and procedures.</i> IS 1 - In addition to all of the above, get firefighters and managers to raise safety consciousness in day-to-day activities.	2	2

* Reducing fatigue is a key aspect of human factors considerations, but could also be grouped under leadership issues.

GOALS AND IMPLEMENTATION STRATEGIES	PRIORITY RATING 1
EXTERNAL INFUENCES	
<i>Principle -Promote prevention and fuel treatment programs.</i>	
<p>Goal 83. Educate the public on the limitations and dangers of wildland firefighting.</p> <p>Goal 84. Educate the public on the specific mitigating factors that may influence wildland fires and reduce damage from them.</p> <p>IS 1 - Promote public education on the limitations of firefighting and practical mitigation efforts through a variety of venues.</p> <p>IS 2 - Broaden the efforts of the Wildland/Urban Interface Group, and link them to others.</p> <p>IS 3 - Use the Internet.</p> <p>IS 4 - Distribute catalog of public education materials.</p>	<p>2</p> <p>2</p> <p>1</p> <p>2</p> <p>3</p> <p>2</p>
<p>Goal 85. Fire budgets and their allocation need to be set with an eye toward their implication for firefighter safety.</p> <p>IS 1 - Fund the new safety initiatives.</p> <p>IS 2 - Get budgeters to clarify the potential impacts of different budget levels, including the shift to do more prevention and hazard reduction.</p> <p>IS 3 - Inform firefighters and fire managers about the budget decision.</p> <p>IS 4 - Modify the Fire Management Leadership course to reflect impacts of alternative budget strategies.</p> <p>IS 5 - Develop an interagency fire prevention strategy as input to budget.</p>	<p>2</p> <p>1</p> <p>2</p> <p>3</p> <p>2</p> <p>2</p>
<p>Goal 86. Improving forest health and removing accumulated fuels should be pursued to reduce the intensity of fires.</p> <p>IS 1 - Consolidate diverse strategies into a cohesive plan.</p> <p>IS 2 - Consider using multiple funding options.</p> <p>IS 3 - Amend the National Environmental Protection Act to require consideration of firefighter safety.</p>	<p>1</p> <p>2</p> <p>2</p> <p>3</p>