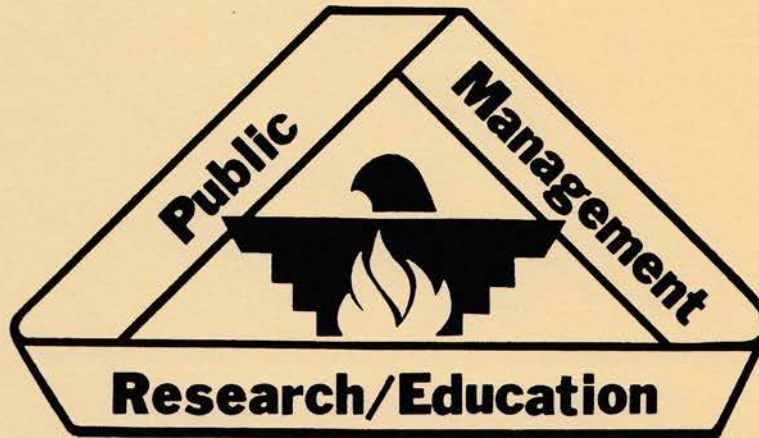


# Abstracts

## WILDLAND FIRE 2000



Stanford Sierra Camp  
Fallen Leaf Lake  
California  
April 27-30, 1987

**Sponsored by:**

**Bureau of Land Management  
California Department of Forestry  
and Fire Protection  
Forest Service, USDA  
IUFRO  
National Park Service  
Society of American Foresters  
University of California**

# ABSTRACTS

## SECTION 1



## Community Fragmentation: Implications for Future Wildfire Management

Robert G. Lee

### Abstract

Two meanings of human community compete for public attention: 1) community as a **sense of belonging** to a particular social group within a society, and 2) community as **global ideal** consisting of political expression, religious fulfillment, and/or harmony with the world at large. The latter meaning has become increasingly important as we approach the year 2000. The approach of the year 1000 stimulated a similar loosening of ties to primary social groups and pursuit of millennial ideals. Fragmentation of both a firm sense of belonging and group identification will have profound implications for wildfire management. Modern fire management is a very recent attempt to substitute rational and particularistic thought for fire suppression practices motivated by unrealistic ideals. There are already signs that rational fire management, as legitimated by responsiveness to particular social groups, is giving way to pursuit of an ideal of a self-regulating natural world--where a "natural harmony" is produced by cycles of disturbance uninfluenced by human volition. Such "millennial fire management" substitutes the aristocratic suffrage of fire scientists for legitimate social and political processes used to identify fire management objectives. Will the year 2000 bring the return of fire to the "Act of God"--even though it is a god whose design for natural eco-systems is revealed by scientists?

## Air Pollution Regulations and Smoke Management

Dennis Haddow

### Abstract

Present and future air quality regulations have the potential to severely impact the use of fire as a land management tool. Regulations developed by States and EPA to protect visibility and control ambient particulate concentrations will become increasingly constraining. Control of air toxics may become a major issue. The degree to which future air quality regulations will restrict the use of prescribed fire will depend largely on the action (or inaction) of the prescribed fire community.

## The Fire Regime of a Southwestern Ponderosa Pine Forest Before and After Anglo- American Settlement

Elaine Kennedy Sutherland, Tom W. Swetnam,  
& Steve Sutherland

### Abstract

Appropriate wildland fire management planning requires clear understanding of the factors affecting the fire regime. Southwestern ponderosa pine (*Pinus ponderosa* Laws.) forest ecology is closely tied to fire. In this study we characterize and quantify factors controlling the fire regimes of ponderosa pine forests of the Gila National Forest and Wilderness in west-central New Mexico.

Presettlement fire histories were developed using tree rings to date fire scars at three sites. Tree rings were proxy data for climate. Size of tree rings during years when fire occurred at none, one, two or all three sites were compared using a Kruskal-Wallis test. Fire size was inversely related to tree ring size.

The postsettlement fire regime was studied using Forest Service fire data (number, size). Linear regressions show that total area burned and number of large and small fires is increasing. Slope of the regressions for number of large and small fires are different. Number of small and large fires and tree growth were each compared to climate variables using a stepwise multiple regression, and significant variables included previous summer and fall precipitation and spring temperatures.

Presettlement fire size was inversely related to drought. Increased number of small fires and area burned is probably a result of better detection. However, large fires have increased despite better detection and suppression efforts. Steadily increasing fuel loading may be responsible for this phenomenon.

**Urban/Wildland Mangement  
Stratgy  
County of Los Angeles  
Captain Scott E. Franklin**

**Abstract**

The County of Los Angeles Fire Department, under the direction of Forester and Fire Warden and Fire Chief John W. Englund, has implemented a strategy to manage chaparral at the urban/wildland interface.

Critical interface conditions range from concentrated development to dispersed development; elevations from sea level to 5,000 feet with diverse ecosystems characterized by costal sage scrub, Chamise, sumac, Ceanothus, Toyon, oak woodlands, pine forests, and desert sage; air quality impacts; sediment production; public education; and resource allocation.

The stratgy encompasses historic wildfire frequency/history and Santa Ana wind corridors coupled with scientific validation. Key to implementing this program has been the establishment of a Coordinated Resource Management Program with the Los Angeles County Fire Department as lead agent.

Research requirements for the program are being addressed cooperatively by the Pacific Southwest Forest and Range Experiment Station - U.S.D.A. at Riverside, California. Participants in the "umbrella" agreement include, in addition to PSW, the United States Forest Service - Angeles National Forest, Los Angeles City Fire Department, Los Angeles County Department of Public Works (Flood Control), National Park Service, and the California Department of Parks and Recreation.

Of particular significance is the ongoing scientific research associated with the urban/wildland management strategy involving graduate students from various universities.

**What Will the Wildlands Be Like  
the in Year 2000**

*C.L. Rice*

**Abstract**

A major change has taken place in the forests and rangelands during the twentieth century which will have great impact on the forestry profession and on forest operations.

With the exception of oak woodlands, all vegetation types are more heavily stocked than before, and the shift in species is toward climax.

These changes result in (1) more nutrients tied up in the vegetation, (2) more water intercepted and taken out of the soil resulting in less run-off, (3) faster total biomass production; and (4) more devastation to the more fire-susceptible species when fire does run through an area. As a spin-off of these stresses to the plants from increased competition, we can expect more insect and fungal outbreaks.

The implications of the shift on (1) watershed management in an era of water shortages; (2) total and type of timber yield or other resources; (3) timber growth or other resource production; and (4) fire management operations and resources damages will be presented.

That fire suppression has created an accumulation of fuels is well documented. But other factors are contributing to the changes in the forest, chaparral and rangelands. These factors include widespread reduction of grazing, and wood cutting. Fuel management practices has had only a minor impact on this trend because of the small amount of acreages involved. The effect of urbanization of wildlands is just beginning to be felt. The extent of the species change and stand structure change has not been as well acknowledged in the literature. Maps of California in 1935 and 1980 will be compared to illustrate differences. These observations will be compared to forest change in other western states.

## **Visual Impacts of Prescribed Burning in Mixed Conifer and Giant Sequoia Forests**

*Lin Cotton and Joe R. McBride*

### **Abstract**

Prescribed burning programs have evolved with little concern for the visual impact of burning and the potential prescribed burning can have in managing the forest scene. Recent criticisms by the public of the prescribed burning program at Sequoia National Park resulted in an outside review of the National Park fire management programs in Sequoia, Kings Canyon, and Yosemite National Parks. This paper evaluates the visual impacts of burning and of not burning in the giant sequoia-mixed conifer forest type. Alternatives to current techniques are suggested which will reduce the negative visual impacts and incorporate scene management as a part of the prescribed burning program. The need for a new awareness of the visual impacts of prescribed burning is discussed.

## **Local Planning Considerations for the Wildland/Structural Intermix in the Year 2000**

*Bob Irwin*

California's Sierra foothill counties are the scene of increasingly rapid development. Commercial, industrial, and residential construction in former wildlands is creating an intermix of structures - wildland-structures that is different than the traditionally perceived "urban/wildland interface." The fire and structural environment for seven counties is described. Fire statistics are compared with growth patterns over the last sixteen years and potentials for the year 2000 are suggested based upon predictions of continued growth.

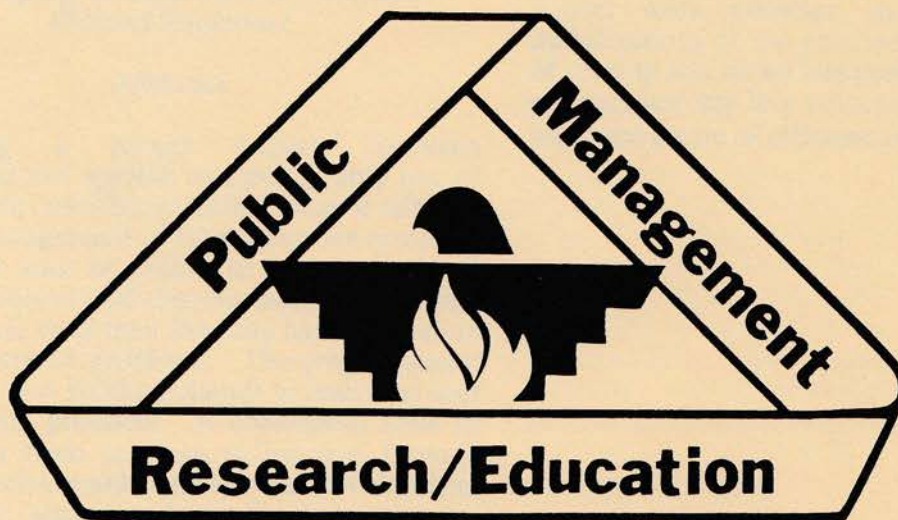
California planning law is overviewed in relation to development, and examples are given to show that local government and fire services have probably under-utilized existing authorities and capabilities. Productive ways of mitigating current and future impacts within current and possible legal frameworks are suggested. A stronger planning-related partnership between fire services and local government is called for.

Recommendations are made in the areas of (1) legislative improvements, (2) applied research, (3) strategic fire pre-planning, and (4) external relations efforts to increase public support and reduce overall costs of future programs.

The analysis is presented from the perspective of a retired fire management specialist, who is now a County Planning Commissioner.

# ABSTRACTS

## SECTION 2



**Wildland Fire 2000**

## **Wildland Fire Management 2025 How Did They Ever Do It in the Old Days?**

*Gary Tokle*

### **Abstract**

In the year 2025 wildland fire fighting practices have improved significantly over the methods employed during the late 1900's. Improved methods for predicting severe fire weather conditions, the establishment of the North American Fire Coordination Center, the utilization of foam products for both wildfire and structural fire control have significantly changed the methods of fire suppression.

An increased awareness of the dangers posed by wildfire has been accomplished through a concentrated effort to educate the public. Buildings are being constructed that afford greater protection and fuel modification surrounding structures is now required by most state and provincial governments.

With the accomplishments achieved during the past forty years (1985-2025) its hard to believe that wildland fire protection could become more efficient or effective, but I'm sure it will!

## **Managing Research for Success**

*Richard Rothermel*

### **Abstract**

Maintaining a proper balance between fundamental and applied research is only one of the important considerations that must be adhered to in the management of Forest Service research. The agency must be willing to support a critical mass of scientists with the necessary professional and technical staff over the long haul needed on difficult research problems. The project leader must know how he/she intends to reach the user with research products. A conceptual flow of information from problem delineation through basic research to model and systems development and, finally, testing and transfer to operational units must be understood by all project members. Each member must understand the role they are playing at any time during the process. Finally, the scientists and project leader must be constantly aware of the hidden manager, the research grade evaluation panel, and make certain that scientists do not become isolated in developmental and applications work without sufficient publications to maintain grade.

## **Shared Resources**

*David B. Butts*

### **Abstract**

One of the ways management responds to wildland fire needs today is through the sharing of critical firefighting resources. In the year 2000 and beyond there will be an even more intense need to share the resources we have available. All protection agencies will face increased pressures to cut expenditures and at the same time improve effectiveness.

Sharing does not just happen. To be effective, all of the partners must first have resources to share. There must be a concerted effort to establish a process by which the shared resources may be exchanged. There must also be common procedures by which they can operate those human and technological resources. The National Wildfire Coordinating Group (NWCG) and its associated management system, the National Interagency Incident Management System (NIIMS), fulfills many of those needs.

Ultimately this entire process comes down to people, and their willingness to share. This applies equally well to local fire management staffs, regional and national fire managers, and to the line managers at all levels to whom they report. A composite effort to "make it work" can almost work miracles, as indicated by the mobilizations of the past two years! The future of sharing will be no less dependent upon willing partners nor any less vulnerable than today. The preferred future of efficient sharing is possible.

## Very Portable Remote Automatic Weather Stations

*John R. Warren*

### Abstract

Portable Remote Automatic Weather Stations (RAWS) are now available in a single fiber glass carrying case which also serves as the base of the mast structure which supports the wind instruments and other sensors. The stations are helicopter transportable and may be carried by two people over distances of a quarter mile or so of relatively rough terrain. (The weight is about 120 lbs.) The units are especially useful for temporary operations in remote areas. They are usually used in the voice-synthesized mode, where a voice tells you what the weather at the station is over your own radio link any time you interrogate it. They can also transmit the weather data via the GOES satellite similar to their big brothers, the semi-permanent RAWS installations, or could have both types of transmissions available. They are especially applicable for monitoring weather at a planned prescribed burn site to determine from the comfort of an office when conditions are just right to initiate activities. They can be used in conjunction with repeaters to extend the range. They can also be used during wildfires to permit weather gathering from one or more pertinent sites, transmitting via radio right into the ICP area. They are also advantageous as replacements for the standard stations typically located near ranger stations, because they can be placed (within radio range) where you really want to know the weather as opposed to where it is most convenient for an observer to gather the data daily. In this application the weather is also as near as your radio even when all the people from the station are gone for fire activities or for other reasons.

## Wildland Fire Year 2000 In the Great Basin

*Jim Webb*

### Abstract

The future of Fire management on the wildlands of the Great Basin during the next 15-20 years is dependent on the course chosen by fire managers today. Our responsiveness to issues will determine how much we influence where we go. Economics in concert with a better appreciation of fires role in ecosystem dynamics will significantly alter fire management as we know it today. Public subsidies of homeowners that refuse to take prudent fire prevention actions will dwindle. It will become clear that we can not be all things to all people. Risk management will be more clearly understood. We will no longer spend more to protect a property than it is worth. Our work force will change both internally & externally. There will be many opportunities for initiative, creativity and ingenuity to blossom.



# Forest Fire Advanced System Technology (FFAST) Conceptual Design Study

*J. David Nichols & J. R. Warren*

## Abstract

The National Aeronautics and Space Administration's Jet Propulsion Laboratory (JPL) and the United States Department of Agriculture Forest Service completed a conceptual design study that defined an integrated forest fire detection and mapping system that will be based upon technology available in the 1990s. Potential system configuration options in emerging and advanced technologies related to the conceptual design were identified and recommended for inclusion as preferred system components. System component technologies identified for an end-to-end system include airborne mounted thermal infrared (IR) linear-array detectors, automatic onboard georeferencing and signal processing, geosynchronous satellite communications links, and advanced data integration and display. Potential system configuration options were developed and examined for possible inclusion in the preferred system configuration. The preferred system configuration will provide increased performance and be cost effective over the system currently in use. Forest fire management user requirements and the system component emerging technologies were the basis for the system configuration design. The conceptual design study defined the preferred system configuration that warrants continued refinement and development, examined economic aspects of the current and preferred system, and provided preliminary cost estimates for follow-on system prototype development.

## Prescribed Fire versus Air Quality; 2001

*David V. Sandberg*

### Abstract

In 1970, it was widely assumed in the Pacific Northwest that by 1980, prescribed fire would be a thing of the past. The Premier of the Province of British Columbia promised a cessation of slash burning by 1975. Smoke Management was a program that would preside over the phase-out of slash burning. The public demand for air quality would overshadow the forest industry's insistence that catastrophic wildfires would be the inevitable result of a cessation of burning. Other than the threat of wildfire, foresters perceived

little threat to productivity. We would have transformed to a second-growth harvest, with little slash to contend with. Private landowners had largely eschewed fire use; and only the federal land manager, with high-elevation decadent stands, had a compelling reason to burn for site preparation.

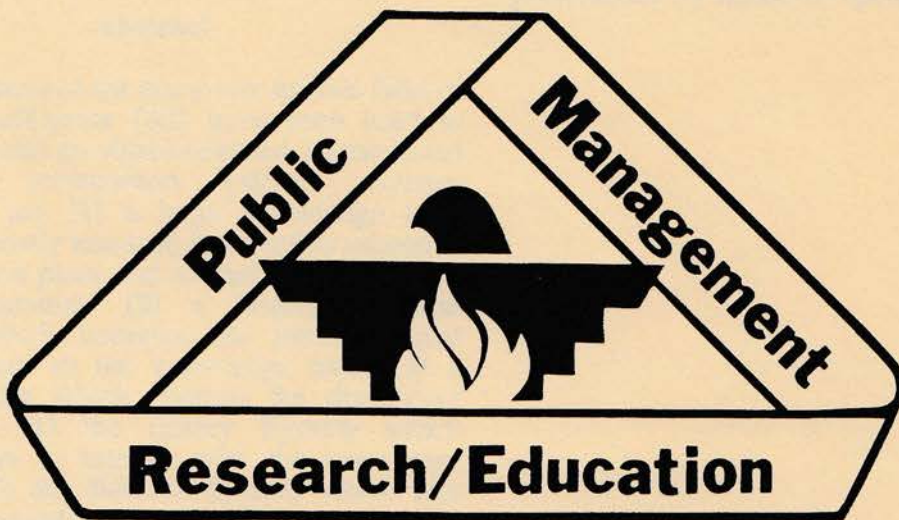
In 1985, half way to the end of the century, the area treated by fire has increased in the Northwest. Only a rudimentary smoke management program has been adopted in British Columbia, although the Programs in Washington and Oregon are complex and dominant. Hazard reduction has been discredited as a reason to treat residues, yet private landowners have dramatically increased fire use. Only the public sector has moderated the growth in the area treated, especially by discontinuing fire for high-elevation site preparation.

Now, the demise of forest burning is widely expected, for the same reasons, to occur by the year 2000. The National goal to correct visibility impairment in Wilderness; concern for air toxics; and the increasing relative contribution of fire to air quality problems has focused intense regulatory pressures on the practice. Can, and will, a compromise be found between the resurgence in appreciation for fire and the continuing public pressure for air quality?

The author sees the conflict as manageable, provided a cooperative attitude persists between forest and air resource managers. An even more critical proviso is continued innovation and investment by forest managers to solve the problems at the source. A 50% emission reduction by 2000 seems likely, and 70% seems possible. The health hazard already assumed may not be confirmed by serious research. Rational cost-benefit analysis of visibility protection will moderate regulatory emphasis on that resource. More pressing environmental concerns will overshadow the nuisance of prescribed fire, after we succeed at substantially eliminating pollution from the practice.

# **ABSTRACTS**

## **SECTION 3**



**Wildland Fire 2000**

## Forecasting Forecasting

*Michael Fosberg*

### Abstract

Future improvement in the meteorological forecasts used in fire management will come from three areas. These are improved observational systems, improved forecast techniques, and improved post-processing of forecasts and better integration of this information into the fire management process.

## Forest Fire Research - Hindsight and Foresight

*C.E. Van Wagner*

### Abstract

This paper first looks at the evolution of forest fire research in Canada through the works of Wright and Beall, then draws some lessons from the past that ought to bear on the future. Some opinions are delivered on the future course of research in fire danger rating, prescribed fire and the impacts of fire on the forest economy.

## A Fire Effects Information System

*William C. Fischer*

### Abstract

Recent advances in the computer science field of artificial intelligence (AI) have been used to design and build an object-oriented, frame-based fire effects information system. System components are (1) a large **knowledge base** containing mostly text-type information related to fire's effect on plant and animal species and on plant communities, (2) a **knowledge base interface** which contains the functions that provide access to the knowledge base, (3) a **print package** which controls the display of information, (4) the **Query System** which allows a user to interact with the knowledge base, and (5) the **Builder System** which acts as the knowledge base editor for adding information to the knowledge base.

The Fire Effects Information System provides fire managers and resource specialists with easy access to an "encyclopedia" of fire effects-related information useful for planning fire use and appraising fire damage. The AI structure of the knowledge base will facilitate planned future development of fire effects "expert systems".

## Artificial Intelligence and Expert Systems in Fire

*Don Latham*

### Abstract

Although the field of Artificial Intelligence has been with us for nearly three decades, it has been primarily a research effort and research working tool for psychologists interested in cognitive function. Recently, the techniques are applied in manufacturing, business, research in other fields, and the military.

There are several sub-categories of AI. Among these are:

- natural language understanding
- robotics, involving vision, movement, and control of machinery
- theorem-proving and other thinking (chess-playing)
- expert systems and/or rule-based computer programs

We will discuss these categories, with particular attention to Expert Systems, in the context of their future usefulness in wildfire management. We will also present working examples of expert systems for crown fire assessment. The working examples will be available as a "poster" presentation for hands-on operation.

## Fire Effects, Education, and Expert Systems

*Robert E. Martin*

### Abstract

Predicting the effects of fires in the year 2000 and beyond will be enhanced by the use of expert systems. Although our predictions may have broad confidence limits, expert systems should help us to improve on the predictions and to focus on the areas where improved knowledge is most needed.

The knowledge of experts can be incorporated into previously existing knowledge bases, and predictions of effects, or other fire phenomena, improved in an iterative process, using feedback from further observations. The process of extracting knowledge from experts will help the expert to make more astute observations and to examine the judgements made.

Expert systems also have potential in educational and training processes. By building a small expert system, the student will be aided in synthesizing facts into principles. The process should also acquaint the student with the reasoning processes of experts, thus contributing to the development of acute mental processes.

## Discussion of a Fire Behavior System Designed for the Full Range of Fire Management Needs

*Richard C. Rothermel and Patricia L. Andrews*

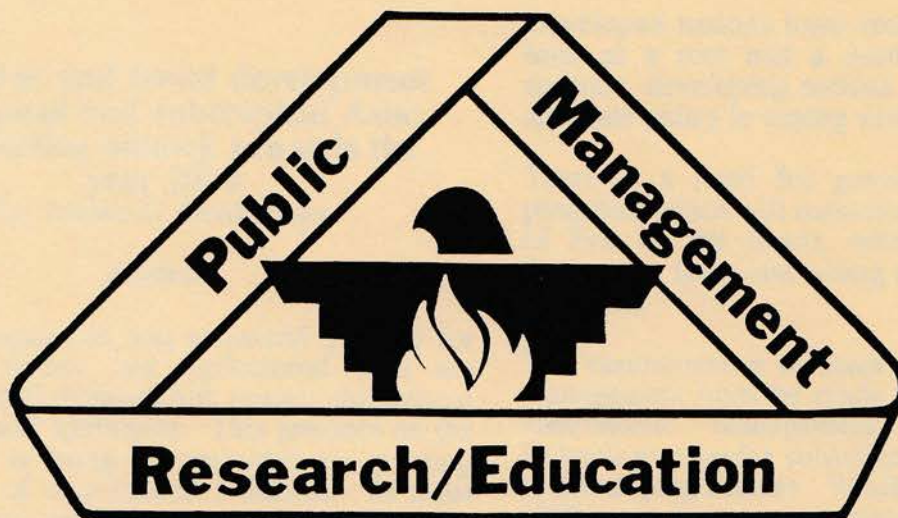
### Abstract

One of the nine research initiatives proposed by the director of Forest Fire and Atmospheric Sciences Research is an "INTEGRATED FIRE BEHAVIOR/FIRE DANGER RATING SYSTEM". The initiative states that "A single, integrated system that can accommodate the full continuum of spatial/temporal resolution requirements—from National, long-range fire severity forecasting to real-time suppression strategy decisions on actual fires—is needed to meet the varying fire behavior information needs of wildland managers. Availability of such a system would save considerable money, time equipment, and training."

A fundamental concept of the system is that it be "seamless", or integrated, to avoid requiring choices among alternate, independent systems. Descriptions of fuel moisture, fuels, and fire behavior should be standardized, permitting information to flow easily through the spectrum of fire management needs. The level of resolution depends on the application, but the same process models can be used.

# ABSTRACTS

## SECTION 5



**Wildland Fire 2000**

## **International Wildfire Emergencies: Management in the 21st Century**

*Julia V. Taft and Robert W. Mutch*

### **Abstract**

The U.S. Government, through the Agency for International Development's Office of U.S. Foreign Disaster Assistance (OFDA), responds to a wide variety of global natural disasters every year. These disasters range from "slow-moving" events like prolonged drought or plagues of grasshoppers and locusts to "fast-moving" threats to human populations resulting from fires, hurricanes, earthquakes and volcanoes. Although disaster types vary considerably, there is a recurring theme of disaster assistance elements that constitute a meaningful and effective response. Critically evaluating the "lessons learned" from recent responses to worldwide natural disasters will prepare the disaster management specialist to develop an improved international assistance program for the 21st century. Details of natural disasters, the response process and "lessons learned" are given and future developments that will strengthen disaster assistance are discussed. A case example of the 1987 wildfires in southern Argentina will be used to illustrate disaster management requirements and needs.

## **Wildfires and forest development in tropical and subtropical Asia: Prospective outlook towards the year 2000**

*Dr. Johann G. Goldammer*

### **Abstract**

Growing population and enhanced demand for fuelwood, timber and agricultural land are causing a rapid deforestation process throughout the tropics and subtropics. This pressure on the forest land is being accompanied by growing occurrence of man-caused wildfires. In most cases the fires are following in the wake of the exploitation of natural forests and the slash-and-burn shifting agriculture, or they are set deliberately by graziers, hunters and collectors of minor forest products. It is estimated that each year wildfires are affecting more than 50 million hectares of forested land and about 500 million hectares of savannah and bush land within the tropical and subtropical regions of the world. An increasing tendency of wildfire occurrence can be

expected during the next decades. The collective scenario in the remaining non-commercial forest land will therefore be characterized by degraded and open formations, and the overall development of many forest communities will lead to an extended transformation into highly flammable fire climax savannahs. Examples of this process are given by describing the development of the most prevailing forest types in tropical and subtropical Asia. Relevant concepts of future wildland fire management and research need to be oriented towards this future scenario.

## **An International Perspective of Wildland Fire 2000**

*R. L. Bjornsen*

### **Abstract**

By the year 2000 it is estimated the world's forest area will be 2 billion hectares, about one-fifth of the land surface. A steadily shrinking forest land base and the social demands of an expanding population will require utmost skill from land managers.

Developed nations have recognized fire's role, both as a tool and a destructive force. By contrast, developing nations have not instituted adequate policy in coping with wildland fire.

There is a need for government support of programs which will maximize the beneficial use of fire in the forest, while recognizing its destructive force and taking adequate protection measures.

The consequences of inadequate wildland fire management must be made known; options for cost/benefit management developed; and technology transfer subsidized by aid programs to developing nations. Wildland fire in the year 2000 must incorporate strategies which will be compatible with social forestry programs.