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An International Survey of Wildland Fire:

Global Problem, Local Solutions

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Preface

In May of 2003 I graduated from Whitman College with a degree in Bioethics. Later that summer, I left at the beginning of a Watson Fellowship that took me through nine countries in twelve months studying wildland fire. In that year, I drew on my experience as a wildland firefighter; time on a Hotshot crew and as a Smokejumper and a Fire Department Firefighter/EMT to learn everything I could about wildland fire. I looked at the written record as well as the visual consequences of fire, reading management plans, attending courses and conferences and talking to hundreds of men and women involved in fire in nine countries. Doing so, I became convinced we are at a unique juncture for a shift in fire policy. But with an issue whose problems are both complex and numerous, how can we best seek the most fruitful solutions? This paper is an attempt to synthesize my experiences over the past year, dealing with some of the most pressing issues in fire management, and presenting some of my thoughts for the future of fire management. I hope to be part of that future, and am actively looking for a job that would allow me to be involved in creatively looking for local solutions to global problems in fire.

Introduction

Wildland fire has received intense public scrutiny in the past decade. In 2003 alone, major incidents such as the February burns that threatened Australia's capitol city, the fires that devastated southern Europe in July and August, and the thirteen fires that made up Firestorm 2003 in southern California have increased awareness of fire on a global scale. In terms of extinguishment, property damage, and human lives, the costs have been high. In recent years these figures have increased exponentially, resulting in annual losses that are not sustainable,

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even on an economic level. Fire has become an issue with significant political currency all over the world, prompting considerable discussion on the topic.

Fire and the Media

On television, the flames seem redder than I remembered, shooting high above the towering ponderosa pines in a shot that the cameraman must have been ecstatic to record. Smoke billowed high into the sky, and the setting sun, silhouetted beyond the smoldering forest turned the sky a bloody, ashen red. Watching the media coverage of the same fire my Hotshot crew had been on for the past week, I felt like protesting, *It wasn't like that. I was there!* The increased attention and coverage of wildland fire in the past decades is a mixed blessing. An increasingly sensational treatment of fire by the media has resulted in an extreme perception of wildland fire. Some fires, certainly, are perceived to be "good" fires, but by and large, fires are treated as cataclysmic events destroying lives and property. In part by the media's focus on rarely experienced extreme fire behavior, the image of fire has been changed from a natural resource to be valued to an event to be guarded against at all costs.

Fire prevention agencies have mounted massive public information campaigns, which have had some effect in changing the public's ideas about fire. Wildland fire is now seen as having two incarnations, a modern Dr. Jekyll and Mr. Hyde. There are the beneficial fires that annually revitalize the forests, and the uncontrolled, dangerous fires that consume the wilderness, threaten property and endanger lives. This dualistic perception of fire is valid, but dangerously simplistic, allowing residents of fire-prone communities to distance themselves from wildland fire: fires are either natural, and should be left to burn, or threaten life or property, and should be extinguished by firefighters, eliminating any personal involvement. What could be understood

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as an unusual event that requires precaution is typically regarded as an extraordinary and potentially disastrous event requiring professional intervention.

Historical Use of Fire

Fire was once considered a regular part of life for most of the world's inhabitants, a tool requiring experience and skill to master. The wildland fires that swept savannahs and forests were understood to be a potentially hazardous, yet ordinary part of living on earth. Wildland fire's elevation in the public conscious to natural disaster status is a recent one. Humans have been divorced from the practice of cultivating fires for only the last several hundred years. Before the industrial revolution, fire was an important tool for creating and sustaining quality of life, providing essentials like light, heat, and cooked food, in addition to its role in maintaining and altering the physical landscape of our planet. Many of the fires that burned hundreds of years ago were ignited or directed by human beings, the anthropogenic fires falling into two rough categories.

Indigenous populations in present day New Zealand, Australia, Canada, and the United States used fire in a sophisticated manner for landscape-level maintenance and alteration of the land. Not every fire was a deliberate event; plenty of fires were ignited accidentally or maliciously. Just as we experience today, there were probably a fair number of fires that were ineffective, either not achieving the goal of the tender, or escaping control altogether.

Ultimately, however, fire constituted a very important part of life.

Under the shade of a spindly Mulga tree, Mrs. Tjikadu watches the shimmer of heat on the arid central Australian grasslands through half-closed eyes. An elder of the Anangu Skin or tribe, Mrs. Tjikadu is one of the traditional owners of Uluru-Kata Tjuta National Park that still

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remembers life before her Skin was removed from Uluru half a century ago. They and other relatively low-density indigenous populations were forced off their land; in the case of Australian aborigines, systematic removal began with the event of contact with European explorers following Captain Cook, while for North Americans, with the Columbian explorations. Following a landmark decision by the Australian government, the guardianship of Uluru has reverted to its traditional owners, and Mrs. Tjikadu has returned to her childhood home. Despite her age, she still moves quickly; on our small fire beside a billy of hot water, a goanna she killed is roasting. As we speak, Mrs. Tjikadu uses a stick to illustrate her words, poking it fiercely into the bone-dry ground. Even with just an absence of fifty years, enormous amounts of their oral tradition have been lost. The problem, Mrs. Tjikadu believes, is getting the children involved in fire-tending after a gap of more than one generation. Yet returning land to traditional owners is rarely popular, and integrating traditional and western knowledge and methods in terms of land management remains a significant obstacle.

The second group whose lives and livelihoods have been profoundly affected by the use of fire are those who make their living from the land; farmers, gamekeepers, and hunters. Unlike the indigenous peoples, these cultivators of fire have largely continued in their burning habits into the present-day, igniting fires whose size were severely curtailed and effects carefully monitored. Because of high population density and the concept of property owned by individuals rather than held in common, fires existed on a far smaller scale than those ignited by the indigenes in Oceania and the Americas. The land was burned at regular intervals, resulting in landscape that was altered in a predictable, moderated manner. Today, these cultivated fires are still set in many places. For some, this use can be attributed to the fact that use of fossil fuels for energy has not replaced fires in their communities or societies. For them, fire has not been

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industrialized. But for many, like the farmers in Mediterranean Europe, fire is simply too valuable a tool to discard in favor of more technological treatments.

Relegating Fire Management to "Professionals"

The current system of forest management in much of the world as well as the conscious decision to protect large tracts of land is a recent one. State mandated forestry has only been around since the nineteenth century. Indeed, the United States Forest Service has only managed the national forests since the Transfer Act of 1905. In the United States, creation of national parks for the first time brought about the protection of huge tracts of forest and watershed areas, the majority of which were adapted to frequent wildland fires. At the time of the Transfer Act, North America was experiencing an upsurge in the size and frequency of wildland fires. Foresters considered fire an immediate and significant issue. The devastating fires experienced by North Americans in 1910 only exacerbated this belief. While some in the United States advocated a policy of "light burning", they were outnumbered by those deeply opposed to the idea. As a result, complete fire exclusion was practiced for decades in the United States as well as other countries that historically experienced significant fires. Yet some forty years after the policy of fire exclusion ended, North America continues to experience extreme wildland fires, the intensity of which can be attributed in part to the heavy fuel loading that persists in our woodlands. When fires occur in un-thinned forests, this excess biomass in the form of dense stands, woody shrubs and slash exacerbates the intensity of the fires. Every year, foresters and firefighters labor to remove this material, through mechanical thinning and controlled burns. Yet with vast tracts of land to thin and a continually regenerating problem, the task of thinning and maintaining healthy forests seems almost Sisyphusian in nature. The build-up of fuels in our

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forests clearly plays a significant role in the extreme fire behavior countries all over the world are experiencing. While extremely effective, manual or mechanical thinning is a costly and labor-intensive option to decrease stand density, compared to prescribed burning.

The Scottish highlands are not where you'd expect to see ecologists lobbying for prescribed burning. The wild, spartan hills were once home to a forest that many believe stretched the length and breadth of Scotland, and some blame the decimation of the Caledonian forest on the annual burning of the heather moors. Muirburning by gamekeepers is a centuries-old tradition, however, and the exclusion of fire in many parts of Scotland has resulted in rank heather and a steadily deteriorating ecosystem. Once an area that discouraged the burning of the heather moors, public and private land managers have begun to reintroduce regular controlled burns as part of ongoing research into the effectiveness of prescribed fire on maintaining healthy biomes.

In the last thirty years, more and more agencies have begun implementing controlled burning policies in conjunction with other ecosystem maintenance activities. Having accepted that fire is essential to the sustained health of many ecosystems, many management agencies utilize prescribed burning as a preemptive strike, reasoning that by burning in favorable conditions, they will be able to limit the intensity and scope of future fires. Just as the financial support of fire science has prompted significant progress in the field, governmental backing of prescribed burning has encouraged the development of knowledge regarding the science of prescribed burning. Yet despite the growing knowledge about prescribed burning, many agencies continue to implement treatments in an overly simplistic manner, some going as far as touting prescribed burning successes in terms of acreage burned in a year. This system is

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limiting because not all prescribed burns can be counted as beneficial fires, just as not all natural or unplanned fires can be counted as adverse or damaging.

Fire-adapted ecosystems vary widely, and it would be a mistake to expect that a unified fire policy can be created except in the general of terms, or that fire plans appropriate for one ecosystem could be applied to another. Optimally, for the creation of such a document, each zone, forest, and ecosystem would be evaluated to produce a landscape scale fire policy. For example, stand replacing fires that would be devastating to Ponderosa pine forests adapted to frequent low-intensity surface fires are very important in biogeoclimatic zones such as those found in interior British Columbia. Ecologists have already reported that areas burned in the high-intensity Canadian fires of 2003 have been colonized with Douglas fir and Lodgepole pine seeds, with willow and birch shrubs re-sprouting and grasses growing. Each zone, forest, and ecosystem must be separately evaluated to produce a landscape scale fire strategy.

Integrating Scientific and Practical Knowledge of Fire

Fire-adapted ecosystems vary widely. Most fire-adapted ecosystems, notably Ponderosa pine and Douglas fir forest lands, optimally experience a low-severity fire every five to fifteen years. Historically, such environments are believed to have undergone regular surface fires, burning the understory and consuming slash and small woody fuels, while leaving a well-thinned forest and revitalizing shrubs and trees. But this is by no means the only formula for a fire-adapted ecosystem. Not only are there many other kinds of ecosystem requirements, but in many places, the different varieties intermingle, requiring a complex blend of treatments to maintain

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stand health. Ecosystems requiring mixed fire regimes are caused by many factors, including: forest or stand density, aspect, fuel loading, and slope. Prescribed fire is clearly not a simple procedure. Annually, it requires extensive planning as well as experienced foresters to implement ignitions and tend the fires. In the past thirty years, the duties of firefighters have been stretched to include ecosystem maintenance, setting and controlling prescribed fires. Yet there remains a gap between the scientists who have technical knowledge of controlled burning and the firefighters who have practical experience of the prescribed fires. A great deal would be gained by integrating the two, or better still, creating specialized groups consisting of personnel with both practical experience with and technical knowledge of prescribed burning whose sole task would be planning and executing fires individually tailored to local ecosystems in order to maximize the potential of such treatments. To do that, however, we must first define our objectives relating to fire. What would be the optimal results? Simply restoring damaged ecosystems isn't sufficient. If we acknowledge fire to be a tool, one for use in ecosystem management at a landscape level, we can then use fire to reshape the composition and appearance of that landscape. But how do we decide what landscape we want to promote, or which trees, shrubs, and ecosystems we want to encourage?

The weight we placed on terms such as natural and native may no longer apply. Is saving a "native" savannah the most important factor when scientists believe the savannah has existed only as long as the anthropogenic fires have? The picturesque heather moors of Scotland are a recent chronological development, a matter of hundreds of years rather than millennia, yet preservation groups and individuals annually spend hundreds of thousands of pounds trying to ensure the future vitality of the unique biome. Gorse, the bane of New Zealand's fire forces and farmers, has been present and *thriving* in its adopted homeland for more than two centuries

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despite vigorous attempts to root it out. Instead of blindly focusing on the preservation of "native" species, I would suggest a shift in vocabulary, substituting "value" for "native." By defining our management goals in terms of the values we wish to protect rather than simply restating a desire to protect native species, we can more effectively use and control fire to help achieve our goals. The role of fire in maintaining healthy ecosystems is impossible to dismiss. Fire is a catalyst in changing the face of our world. It is incumbent on us as policy makers, firefighters, and as concerned citizens living on a fragile planet to work to harness that catalyst and use it to conserve what we value. At this time, perhaps more than any other, we have a unique opportunity to shape the future impact of wildland fire throughout the world. While its destructive potential must always be respected, fire is a natural resource to be conserved and tool that requires regular use to *protect* our values. The question is, once we have articulated our values through a mechanism specific to each country and culture, how will we utilize fire to protect and restore those values?

Fire on a Global Scale

Fire is no longer a national problem. In one anecdote at the 2003 International Wildland Fire conference in Sydney, Australia, a speaker recalled a request for assistance from a small country in Asia. They had observed a great deal of smoke, but they couldn't locate the fire! If the international community could please tell them *where* the fire was, they would put it out. The fire, it turned out, was in another country. This is no longer unusual: New Zealand air quality is affected by fires in Australia, two countries separated by hundreds of miles of water. NASA researchers are confident that the fires throughout Central America play a large part in exacerbating asthma and allergies in the United States. But these international problems pale in

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light of the grave consequences unchecked wildland fires may have for our planet as a whole.

The intervention by the international community in helping to contain the 2003 fires in Guatemala not only preserved precious hectares of rain forest, but decreased the amount of carbon pollution being sent into the atmosphere. How can we *avoid* being involved with international fires when they have such an immediate impact on our quality of life?

Increasing Burdens on Resource Managers

As more and more environmentally damaging fires occur in our wild spaces, ecosystems that we've spent years and billions of dollars to protect are destroyed as surely as if we'd opened the land to clear-cutting. Certainly, a number of natural coincidences have conspired to make the fire environment more challenging in the past few seasons. Regions throughout the world are experiencing significant ongoing droughts, including Oceania, Africa, the Americas and parts of Europe. Such a drought in Scotland last year led to some of the most devastating fires the United Kingdom had experienced in February and March of 2003. Throughout the world, firefighters are reporting their fire seasons are longer, hotter, and drier. This trend is unlikely to change; in the post-mortem of the 2003 fires in California, one firefighter was quoted as saying, "this fire season is not abnormal, it is the new normal." Little evidence serves to contradict this statement. In New Zealand, where rain has historically extinguished any natural fires, lightning ignitions are on the upswing.

Key issues include the lack of community involvement in tackling the issue of wildland fire, the losing battle by foresters to thin and maintain healthy forests, significant areas of tree mortality, and the presence of homes in traditionally wildland or forested areas. The trend toward interface fires is only increasing as more and more people move into forested and

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formerly rural areas. The "shotgun effect" of population scatter will be magnified as more and more habitations are built in the midst of surrounding wilderness areas. Unlike the populations that occupied such areas decades or hundreds of years ago, those colonizing the rural areas are mainly urban dwellers. Better transportation systems allow them to live "in the country" while still working in towns and cities, and few of them cultivate the land as their predecessors did. Homes rarely are effectively prepared for wildland fire because such open spaces are seen to dispel the sense of living in the woods. Also, the urban immigrants often lack the rural skills and knowledge that their predecessors had, making them doubly dangerous in the event of a fire.

The settlement of rural and forested areas can only increase the burden on the traditional wildland fire response networks. Resources are being spread thin in an attempt to prepare and protect as many values as possible. Foresters can't keep up with the perpetually increasing biomass in our forests, and often, natural resources are sacrificed in favor of protecting structures. Land managers already reticent to authorize controlled burns will have to protect diverse and scattered holdings within areas to be burned, a task that few will have the resources to attempt. If the public will not accept cataclysmic fires such as occurred in Australia, California, and southern Europe in 2003, they will not accept prescribed burns that cannot be controlled. The financial burden to state-run forestry has been enormous, consistently over-running all budgeted expectations throughout the world. State-funded forestry simply lacks the resources to be fully responsible for fire. As it stands, it is an untenable situation.

Need for Change in Fire Policy: Budget Concerns

A change in fire policy is needed, but what are the options? The system of state-sponsored forestry has worked tolerably well in the past. If there has been an increase in the

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number and size of fires, there has been a commensurate development in knowledge about effective firefighting tactics and fire ecology. Yet the past decades have seen a number of deviations from the system of state-sponsored forestry; from South Africa legislating a move to private landholders bearing responsibility for wildland fire prevention and suppression to Australia's novel program encouraging aborigine involvement in fire ignition and suppression, and, in its most extreme expression, the decision in New Zealand to do away with their Forest Service altogether, selling off or leasing the majority of their public lands, and creating a Department of Conservation (DOC) to manage the rest. Clearly, what has been successful in one place will not necessarily work effectively in another. Eliminating the Forest Service might have been the right choice for New Zealand, but that doesn't mean that it should be adopted elsewhere. Obviously, our National Parks should not be sold to private forestry organizations. The conservation of large tracts of public lands is important, and for its flaws, state-run forestry has also been instrumental in lobbying for more public land and protecting existing reserves. As the human race continues to multiply, straining the seams of our planet, there is a good chance that unprotected lands would soon be urbanized into developed areas. We must ensure that these lands are not destroyed for the sake of our society, our environment, and our planet. Yet not doing anything may be the most dangerous step of all, endangering the health and survival of delicate ecosystems. An important resource might be private land-holders who for years have been dealing with the issue of fire prevention and suppression. In Scotland, while they are not legally responsible for fire suppression, landowners have found themselves in the situation of having to provide their own training and equipment to ensure that resources will be available to respond to wildland fire incidents, simultaneously making a profit. By entering into a dialogue with private landholders, it might be possible to come up with new solutions and ideas for

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creating healthy ecosystems. Indeed, by privatizing some of the duties that foresters have traditionally assumed, we might stimulate growth of new financially viable treatments for healthy forests. For the best possible outcome, partnerships between government organizations, business, and civil society are necessary. The management of public resources, particularly public resources that have the capacity to so profoundly affect lives and property values, should incorporate the public whose right and responsibility it is to be part of wildland fire solutions.

Community Ownership in Fire Management

This is particularly evident in interface fires where residents of fire-prone areas often do little or nothing to prepare their houses, properties, and communities for the eventuality of wildland fire. Confronted by the daunting spectacle of communities and forests consumed by flames on television, few inhabitants of fire-prone areas are willing to be involved in fire preparation, mitigation, or response. Wildland fire was once recognized in many societies as an effective tool, utilized by all of the members of a community. Fire should be viewed as both a modern social resource and a social problem. It is incumbent on those living in fire-prone areas to educate themselves about fire, preparing their properties and themselves to respond to wildland fire. This is already beginning to happen, thanks to proactive work by programs such as FireWise in the United States, Community Fireguard in Australia, and Project Ukuvuka Operation Firestop in South Africa. The past decade especially has witnessed a dramatic increase in public awareness of wildland fire, but much more remains to be done.

In addition to the problems suffered by the industrialized world, fires in developing nations continue to pose grave risks to property, lives, and the health of our planet. Unchecked wildland fires in the developing world contribute to the carbon pollution caused by fire, in

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addition to irreparably damaging fragile ecosystems. In Ghana, some estimate desertification through fire claims as much as 15 percent of arable land annually, an incredible statistic. Such loss cannot be endured for long. Yet many community education programs have found unexpected resistance in the third world.

Frustrated westerners often justify failed efforts at community education with the comment that many third-world societies approach life in a different way than the rest of the world. A lack of common sense, or an understanding of cause and effect, they posit. Trying to establish a clean water program, or a system for infant vaccination, can be incredibly difficult. Community members simply do not associate sewage disposal upstream of their village with continued health and sanitation problems. Similar problems can be expected with community fire education programs. It is not difficult to understand why. The complaint that third-world, poverty-stricken populations have no "common sense" with respect to fire management could be valid. Common sense is not a genetic trait, it is a learned behavior. We teach our children from a very early age that they must look both ways before crossing the street, that if they eat all of their snacks before their first recess, they will have nothing to eat for lunch. We call their confidence in a future beyond their next mouthful of food and their next step *common sense*. But for people spending their lives struggling for survival, it is difficult to believe with any certainty in their own future, much less ensuring a future for their children. It is a luxury to be able to spend resources in conservation, rather than consuming them. It is, without a doubt, a luxury with limited time remaining, but nevertheless, one they cannot afford. Therefore, an important step in combating ecologically damaging fires is the eradication of poverty. Encouraging the development of sustainable communities will enable people to think beyond their next meal or the next harvest, and begin to imagine a future for their children, one that will necessitate

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changing behavior on the part of community-members. Working with local communities can stimulate innovative solutions to both poverty and ecosystem degradation, such as training and then contracting with local forest land restoration workforces like the watershed restoration teams working in the Pacific NW of the United States.

Thinking Globally- Managing Locally

Ultimately, wildland fire is a complex issue. The threat posed by uncontrolled fire to the world at large cannot be overstated. The potential benefits that we could sustain by guiding wildland fire in shaping the face of our planet and maintaining healthy ecosystems is equally great. Likely the goal of encouraging and creating healthy biomes would be achieved through a number of different prescriptions and programs tailored to individual communities and ecosystems. For wildland firefighters to be successful in the years to come, we must be as adaptable as our rapidly changing world. Having realized the importance of working together to create networks of co-dependence between agencies, both nationally and internationally, we must next move to draw private land-owners and residents into the problem-solving process. Eventually, by collaborating to define the values that we wish to protect, we can encourage community and individual responsibility for the future of wildland fire around the world. The solutions we create will be tailored to the individual needs and strengths of the local ecosystem and communities, both developed and carried out by local inhabitants with the assistance of national or international fire authorities. By giving residents a sense of ownership in the process, community-based fire programs will foster a feeling of responsibility towards preparing for fires. Wildland fire has been too long viewed solely as a problem, rather than imaging the solutions that could be found using fire to create and preserve. While unchecked wildland fire is a

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significant problem, by encouraging collaboration between experienced fire professionals and the community at large, we can mitigate the risks to communities, property, and ecosystems we value.