The Wildland-Urban Interface and the Design Professions

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ABSTRACT

This paper defines the wildland-urban interface and identifies opportunities for the design professions in the design, planning, and management of development in the wildland-urban interface. The paper explores the wildland-urban interface and the design professions role through understanding fire's history, a case study of a fire-damaged community, policies, codes, and ordinances, and Firewise.

1. THE WILDLAND-URBAN INTERFACE AND THE DESIGN PROFESSIONS

1.1 Wildland-Urban Interface Defined

The wildland-urban interface is defined as "an area where various structures, most notably private homes, and other human developments meet or are intermingled with forest and other vegetative fuel types" (Kline et al., 2004).

2. PURPOSE

This paper's purpose is to explore the emerging role of the design professions in the Wildland-urban interface. The paper addresses basic knowledge about the Wildland-urban interface and identifies opportunities for design professionals in the design, planning, and management of the Wildland-urban interface.

3. METHODOLOGY

This presentation focuses on the role that the design professions can have on development in the Wildland-urban interface. Specifically, the methodology consists of analyzing, comparing, and synthesizing fire's history, case study evaluations of a fire-damaged community, policies, codes, ordinances, organizations, and proposes potential avenues that the design professions can take to positively influence design and development in the Wildland-urban interface. In order for the design professions to better address planning and development issues in the Wildland-urban interface, fire's history must be understood.

3.1 Fire's History

The heightened risk of fire, predominately wildfire, is a serious concern regarding development in rural areas. Fire's history precedes human history, but the human influence on fire's history is significant. Stephen Pyne states that, "humans have so thoroughly restructured fire on Earth that it is difficult to find truly natural fire regimes" (Pyne, 2001, p. 20). Pyne (2001) also points out that "we are truly a species touched by fire" and that "every place humans visited they touched with fire" (p. 24-25). Our early ancestors utilized and manipulated fire to gain control of their environment and as a result impacted our species evolution. Human's use of fire played an integral role in broadening fire-adapted ecosystems.

With this propensity to burn, a fire regime that met our ancestors' needs was established. This anthropogenic fire regime remained in place in much of the world until the Enlightenment (Pyne, 2001). In the U.S., by the mid-19th century, fire's use to manipulate the land began to decrease as conservation ideals gained favor (Sorvig, 2001). This change in philosophy resulted in the altering of many landscape level fire regimes. In many instances, the fire-prone (starved) landscapes we see today, including the Wildland-urban interface, can be attributed to our removal of anthropogenic fire and the subsequent change in the fire regime (Brose et al., 2001). This change in philosophy is significant ecologically, culturally, economically, and in some cases catastrophically. Based on the wildfire events seen in the last few years, especially those occurring in the Wildland-urban interface, the consequences extend beyond biological and include cultural and economic ramifications.

As development patterns continue to blur the edge between the urban, suburban, and rural landscape, the Wildland-urban interface expands. The expansion of the Wildland-urban interface increases the likelihood of a wildfire event. The increased demand of building and inhabitation in these areas is largely spawned from exurban populations seeking a rural *woodsy* escape (Monroe et al., 2003; Kline et al., 2004). The primary amenity or reward is the *natural* landscape, however, the natural landscape burns, and without human *control*, the landscape is prone to burn *uncontrollably*. In these instances, with reward comes risk.

3.2 **Case Study of Fire Damaged Communities in the Wildland-Urban Interface**

In order to understand how the design professions can contribute to minimizing potential wildfire damage in their projects, it is worth taking a close look at a community that has suffered a substantial loss to wildland fire. The 1991 East Bay Hills Fire in the Oakland-Berkeley area of California captured the attention of a national audience, partially due to the sheer magnitude and tremendous damage to the community. This event also created a much broader national concern for wildfire in the urban interface, and became a pivotal example that led to the heightened federal and state efforts that we see taking place today.

The East Bay Hills region is no stranger to periodic wildfire, in fact it is seemingly built for it due to the state's unique climate, terrain, and natural fuels. Significant wildland fires have occurred in the Oakland-Berkeley area throughout the twentieth century, including the Berkeley fire of 1923, the Fish Canyon fire of 1970, and the Wildcat Canyon fire of 1980. Each of these major fires occurred after a period of extreme drought and during a season of the area's unique gusty winds. Fire marshals recognized as early as the 1920's that building homes with wood shingle roofs and siding, and that maintaining vegetation right next to the homes should not be allowed in this high fire risk area, but the community stubbornly refused to enact these ordinances. Thirty-nine homes that had burned in the 1970 fire were rebuilt in exactly the same location, only to be destroyed again by the 1991 fire. The direct cause of the 1991 East Bay hills fire is still undetermined, but we do know that a dry brush fire that seemed to be easily managed suddenly gained strength in the growing winds, and was soon out of the control of firefighters. Within 15 minutes of the intense flare-up the first residence burned, and within the first hour of the firestorm, 790 homes were consumed. The East Bay hills fire of 1991 was the worst wildfire event in California's history and was the costliest urban fire in the nation at that time. Twenty-five people were killed and another one hundred and fifty injured. Two thousand four hundred and forty nine residences were destroyed, along with four hundred and thirty seven apartments and condominiums. The wildfire was estimated to have cost over $1.5 billion in property damage alone.

A report from the US Fire Administration after the fire revealed that a dangerous situation was created from a prolonged drought, the steep terrain, low humidity levels, and the gusty 'Diablo' winds. The report also pointed out, however, that there were other risks that contributed to the extent of the fire. One factor was the inadequate separation between the woodland vegetation and the residential structures. The state of California suggested as early as 1961, that a minimum of a thirty foot fuel break should be around all structures in high fire risk areas, and that hazardous fuels should be reduced within one hundred feet of structures. The report also mentioned that the use of wood shingles for roofs and structural siding was a major cause of property damage and that the narrow winding roads hampered firefighting and evacuation

efforts in the cities and subdivisions. The report specifically mentions that damage could have been reduced through the use of fire-resistant landscaping and construction materials and methods. It was evident that the homes that did escape fire damage had large cleared yards from vegetative and other fuels as a common element. Whether design professionals were involved in any of the residential properties or community planning or not, taking wildland fire seriously in the designs could have saved structures or possibly lives.

3.3 **Policies, Codes, & Ordinances**

Over the past decade, a significant increase in the number of ordinances in cities, subdivisions, and counties concerning wildland-urban interface development has occurred. These ordinances directly impact all development, including the scope of work for architects and landscape architects. Each community has differences in codes and regulations according to fire hazard severity, but zoning laws apply to various aspects of land use. In addition to contacting local or regional planning agencies, a comprehensive national database on wildfire hazard mitigation ordinances can be accessed on the National Wildfire Programs Database. These zoning aspects include, but are not limited to: require covenants on structural components such as roofing materials; implement defensible space standards such as vegetative clearance around structures; incorporate infrastructure such as fire apparatus access and water supplies; develop preventative measures such as greenbelts and fuel breaks; discourage development in areas prone to wildland fires; encourage reduction of fuel loads.

3.4 **NFPA 299 (1144)**

The publication NFPA 299, *Standard for Protection of Life and Property from Wildfire,* has been the standard reference for many state and community fire ordinances. The National Fire Protection Association is a nonprofit organization that has established codes and standards for fire safety. This guide provides the criteria for fire safe development in areas that may be threatened by wildfire including: definitions and addressing the creation of defensible space; providing safe means of access and evacuation; provision of road signage; structure location, design and construction; and community planning.

NFPA also provides the basis for analyzing the severity of wildfire hazard for improved properties, and includes a ranked checklist for measuring wildfire risk based upon a point system. This is the Wildfire Hazard Severity Rating Checklist for Homes and Communities that uses the NFPA as a basis. Basically, the higher the points scored for an area, the higher the degree of fire hazard or damage potential. In 2002, this guide was revised and is now known as NFPA 1144. The revision incorporates the latest research and industry data, and reassesses the attributes of wildland/urban interface subdivisions.

3.5 **The International Urban-Wildland Interface Code ™**

On the regulatory side, the International Code Council, Inc. (ICC) produced the International Urban-Wildland Interface Code™ in 2003. The ICC is a nonprofit organization dedicated to developing national model construction codes. This ready to adopt wildland-urban interface code is written for municipalities and counties to administer and enforce development standards for fire prone areas. The document provides for minimum regulations for land use and development in wildland-urban areas, and covers the administration and authority of government; definitions of terms; permitting; special building construction regulations; and general fire-protection requirements.

The ICC International Urban-Wildland Interface Code calls for the review and approval of all plans within a designated wildland-urban interface area by a code official (typically within the fire department), and includes the fire safety of the properties topography, width of roads, landscape and vegetation details, vegetation management plans, locations of structures, and types of construction materials. Obviously this code has strong impacts for design professionals working in fire risk areas. The code provides strong

limitations on the choice of building and plant materials, the preservation and management of native vegetation, driveway widths, utility locations, and planting and management plans. Municipalities and their citizens should look closely at the regulations of these model codes before adoption and determine which are in the best interests of their community.

3.6 **State public resource codes**

The only states that currently have statewide wildland/urban fire regulatory codes are California, Colorado, and Oregon. In 1997, Oregon adopted a state law to reduce losses to wildland fire. The Forestland-Urban Interface Fire Protection Act sets out minimum standards for fuel hazard reduction in wildland-urban interface areas. In 1996, Colorado adopted a state law to require counties within the state to adopt a master plan for the physical development of the municipality. This statute gives the authority to the Colorado State Forest Service to determine the areas of wildfire hazards. Within these designated areas, special requirements for wildfire risk mitigation may be subject to approval for certain land uses.

Of all the states, California has enacted the most comprehensive regulatory wildland fire protection standards for lands within State Responsibility Areas. The state regulations address work within the scope of landscape architects services that include emergency access standards for roads, signage and building numbering, and fuel modification standards. Since 1992, all new parcels, construction, land development, and new road construction must have building permits reviewed by the local California Department of Forestry and Fire Protection.

3.7 **Community wildland-urban zoning codes**

States with local zoning and subdivision regulations regarding wildland-urban planning include Florida, Montana, Washington, Utah, Arizona, New Mexico and Idaho. In certain communities, development plans for subdivisions are regulated, subject to review, and given approval by the local fire departments. While the state of Florida does not have a statewide urban-wildland public law, a model ordinance for local communities has been developed through the Florida Department of Community Affairs. The guide, *Wildfire Mitigation in Florida* is a comprehensive document for regional communities on land use planning strategies and best development practices in wildland-urban zones. Similar to Colorado, counties and municipalities are required through a Florida Statute to produce a *Local Government Comprehensive Plan* to guide their future development and growth. Local jurisdictions can adopt local policies, such as wildland-urban regulations with oversight from the FDCA, as part of their comprehensive plan. A major difference between this ordinance model and others, such as the International Urban-Wildland Interface Code™, is that the regulation language is not intended to be incorporated verbatim, but instead offers informed choices from which communities can then decide. This document is a highly educational reference for communities to learn about wildland-urban issues. This document includes background information on Florida fire ecosystems, examples of neighborhood design for reducing wildfire risk, Firewise construction principles, general cost ranges for individual residence modifications, landscaping examples for wildfire mitigation, and maintenance and management.

3.8 **The National Fire Plan and Firewise**

As a result of the devastating fire year of 2000, the National Fire Plan was borne in Congress through a fiscal year 2001 Appropriations Act. The Act mandated that State and Federal agencies address the wildland fire problem through hazardous fuels reduction and habitat restoration. A National ten-year Comprehensive Strategy was drafted with all 50 states as partners in the planning, decision-making and implementation of the plan (DOI, USDA, 2001). As a result of the National Fire Plan, the National Wildfire Coordinating Group was formed from multiple agencies including the USDA Forest Service, the Department of the Interior, the National Association of State Foresters, the U.S. Fire Administration and the National Fire Protection Association.

This interagency group prioritized public education and wildfire awareness with Firewise, a program that offers public workshops, instructional media, and accessible resources for landowners and communities in order to minimize fire risks on private and public lands. The Firewise Communities/USA recognition program allows members of small population areas to assess the fire risks in their communities to create a plan for hazard reduction, and to implement solutions with state and federal assistance (National Wildland/Urban Interface Program, 2004).

4. CONCLUSION

The design professions must accept fire as a natural process that must be understood. Homeowners, architects, landscape architects, and others continue to perpetuate visions of living within idyllic woodland settings when it is actually a fire ecosystem. We have a responsibility to understand and mitigate wildfire concerns when working in the wildland-urban interface. There are many issues propelling development in wildland-urban interface areas, such as: increasing population, changing demographics, economic development, changing land use, and land related policies (USDA, 2004). Likewise, the aftereffects of these issues will significantly alter and influence our economy, environment, and society for better or worse.

In order for the design professions to successfully engage the issues and ramifications of wildland-urban interface development, we must recognize, accept, and address these issues at multiple scales including: regional-land planning scale, state, city, and county planning and policies, community scale, and the site scale. The design professions must contribute in this endeavor through research, practice, public education, and governmental involvement. Fire officials and foresters are in the forefront because they understand fire dynamics and its impact on safety, so must we. This presents an opportunity for professionals working in high risk areas of the wildland-urban interface to establish, understand, and incorporate the necessary planning elements and management strategies to minimize structural damage and potential loss of life.

Developing in the wildland-urban interface must address a broad range of factors that extend beyond a single discipline's expertise. Therefore, in order to successfully integrate development into wildland-urban interface areas, a multi-disciplinary approach is essential. The design professions routinely collaborate with one another, however, the issues posed by the wildland-urban interface requires the design professions to broaden their collaborations to include: ecologists, biologists, federal agencies, state and local governments, foresters, fire departments, insurance companies, developers, stakeholders, and the public.

Wildland-urban interface development poses significant challenges. The design professions can contribute in the building of these areas to ensure the health, safety, welfare, and sustainability of the land and its inhabitants. Whether it is developing alternative strategies for areas of high risk at a regional scale or designing defensible space at the site scale, the design professions must recognize and address the challenges presented in the wildland-urban interface.

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