

# Human Influences on Forest Ecosystems

The Southern Wildland-Urban Interface Assessment



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Edited by  
Edward A. Macie  
L. Annie Hermansen

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Edited by

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**Edward A. Macie**, Regional Urban Forester, USDA Forest Service, Southern Region, 1720 Peachtree Road, NW, Atlanta, GA 30367-9102, [emacie@fs.fed.us](mailto:emacie@fs.fed.us)

**L. Annie Hermansen**, Technology Transfer Coordinator, USDA Forest Service, Southern Research Station, 408 W. University Ave., Suite 101, Gainesville, FL 32601, [ahermansen@fs.fed.us](mailto:ahermansen@fs.fed.us)

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## Foreword

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**I**n 1998, Florida wildfires demonstrated the complexities of natural resource management in the wildland-urban interface. Shortly after these fires, the Chief of the USDA Forest Service identified the wildland-urban interface as one of the main challenges for the Forest Service in the South.

While many studies have addressed various interface issues, few have been conducted with an interdisciplinary perspective in the South. As this Assessment demonstrates, the South is facing dramatic change. The future sustainability of southern forests and the ability to manage for forest benefits, goods, and services are challenged. This Assessment is a first step toward addressing these challenges and validates the need to establish a wildland-urban interface center that addresses the many research and information needs identified.

The Southern Wildland-Urban Interface Council, an interagency team with representatives from the Forest Service; Southern Group of State Foresters; universities; the Cooperative Extension Service, Southern Region; and nonprofit organizations provided direction for the Assessment. Council members were principal advisors and planners for this project and identified key interface issues, which were then refined and validated by a series of focus groups held in six Southern States.

This Assessment is closely linked to the Southern Forest Resource Assessment (SFRA), which has comprehensively examined challenges to forest sustainability in the South. We focus here specifically on urbanization, changing land use patterns, and issues related to the wildland-urban interface. Readers of this Assessment, however, will find valuable supporting information in the SFRA report.

A comprehensive wildland-urban interface literature database and other supporting resources can be found on the Web site, Interface South ([www.interfacesouth.usda.gov](http://www.interfacesouth.usda.gov)). This Web site was developed to meet the growing demands for wildland-urban interface information and resources.

As you read this Assessment, remember that issues in the wildland-urban interface are too complex to be bound to a single topic or perspective. Furthermore, this Assessment was not meant to cover every possible issue related to the wildland-urban interface; space and other limitations made this impossible. Rather, our goal has been to start a dialogue. We hope that dialogue will lead us toward a more complete understanding of interface issues, challenges, and needs for the Southern United States.

### Peter J. Roussopoulos

Station Director  
Southern Research Station

## Contributors to this Report

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### Authors

**H. Ken Cordell** is a Project Leader and Senior Scientist with the USDA Forest Service, Southern Research Station, Athens, GA. He specializes in outdoor recreation, wildlands, and demographic trends.

**Terry A. DeMeo** is the Environmental Policy Program Coordinator with the Carl Vinson Institute of Government at the University of Georgia, Athens, GA. She conducts research on environmental management and policy issues and provides technical assistance to local, regional, and State governments.

**Mary L. Duryea** is a Professor at the School of Forest Resources and Conservation, University of Florida, Gainesville, FL. She teaches and conducts research in reforestation and urban forestry.

**John L. Greene** is a Forest Economist with the USDA Forest Service, Southern Research Station, New Orleans, LA. He specializes in the economics of nonindustrial private forestry and the effect of Federal and State taxes on the financial returns to forest management.

**L. Annie Hermansen** is the Technology Transfer Coordinator for the USDA Forest Service, Southern Research Station, Southern Center for Wildland-Urban Research and Information, Gainesville, FL. Her work focuses on expanding technology transfer capacity and delivery of wildland-urban interface information across the southern region.

**R. Bruce Hull** is a Professor of Forestry at Virginia Polytechnic Institute and State University, College of Natural Resources, Blacksburg, VA. He teaches and conducts research on the social dimensions of natural resource management, especially the public understanding of nature, sources of conflict in environmental management, and interface forestry.

**James E. Kundell** is Senior Associate and Director of the Environmental Policy Program at the Carl Vinson Institute of Government, and Professor of Environmental Policy at the Institute of Ecology at the University of Georgia, Athens, GA. He specializes in water resources, air quality, growth management and sustainable development, and hazardous and solid waste management.

**Edward A. Macie** is the Regional Urban Forester for the USDA Forest Service, Southern Region, Atlanta, GA, and Acting Project Leader for the Southern Research Station, Southern Center for Wildland-Urban Interface Research and Information, Gainesville, FL. His work focuses on the effects of urbanization and public policy on forest ecosystems.

**Steverson O. Moffat** is a Policy Analyst and Research Forester for the USDA Forest Service, Southern Research Station, New Orleans, LA. His research and publications are primarily focused on the policies and laws that affect forestry and forest management and on questions pertaining to the politics and policies of sustainable forest management.

**Martha C. Monroe** is an Assistant Professor at the School of Forest Resources and Conservation, University of Florida, Gainesville, FL. She teaches courses on natural resource communication and environmental education program development, and she develops extension programs that enable resource managers and citizens to work on resolving wildland-urban interface issues.

**Margaret Myszewski** is an Environmental Policy Specialist at the Carl Vinson Institute of Government, University of Georgia, Athens, GA. She conducts research and writes policy reports on a variety of environmental and legal topics including land use issues, growth management, and water resources.

**Susan I. Stewart** is a Research Social Scientist with the USDA Forest Service, North Central Research Station, Evanston, IL. Her research interests include amenity migration and other human settlement patterns and their implications for resource management.

**Wayne C. Zipperer** is a Research Forester with the USDA Forest Service, Northeastern Research Station, Syracuse, NY. His research focuses on how urbanization affects the structure and function of forest ecosystems in urban and urbanizing landscapes.

## Editorial Team

**Robert Biesterfeldt** is an editing consultant and a retiree of the USDA Forest Service, Southern Research Station, Asheville, NC, where he served as Group Leader for the Communications Office.

**L. Annie Hermansen** is the Technology Transfer Coordinator for the USDA Forest Service, Southern Research Station, Southern Center for Wildland-Urban Research and Information, Gainesville, FL. Her work focuses on expanding technology transfer capacity and delivery of wildland-urban interface information across the southern region.

**Edward A. Macie** is the Regional Urban Forester for the USDA Forest Service, Southern Region, Atlanta, GA, and Acting Project Leader for the Southern Research Station, Southern Center for Wildland-Urban Interface Research and Information, Gainesville, FL. His work focuses on the effects of urbanization and public policy on forest ecosystems.

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## Chapter 1

# INTRODUCTION

## L. Annie Hermansen and Edward A. Macie

Technology Transfer Coordinator, USDA Forest Service, Southern Research Station, 408 W. University Ave., Suite 101, Gainesville, FL 32601, [ahermansen@fs.fed.us](mailto:ahermansen@fs.fed.us)

Regional Urban Forester, USDA Forest Service, Southern Region, 1720 Peachtree Road, NW, Atlanta, GA 30367-9102, [emacie@fs.fed.us](mailto:emacie@fs.fed.us)

### Introduction

**L**arge areas of once primarily contiguous forest land in the South are increasingly influenced by humans and surrounded by or intermixed with urban development. These areas of increased human influence and land use conversion make up the wildland-urban interface. Severe wildfires in Florida in 1998 demonstrated the complex challenges that the wildland-urban interface presents for a diverse group of people that live and work there. These fires also brought the wildland-urban interface to the forefront for the U.S. Department of Agriculture Forest Service (USDA Forest Service) and other natural resource agencies across the South, spurring the development of this Assessment. ▶





*“In a word, the interface is a façade—the illusion that you are in the forest.” Texas*

Due to these wildfires, over \$600 million were lost through reduced tourism, fire suppression efforts, and damaged timber, businesses, and homes. Public health and safety were threatened; in some cases entire counties had to be evacuated and many elderly people and those afflicted with asthma needed medical treatment. Forest ecosystems were endangered. Although fire is a common occurrence in most southern forest ecosystems, the intensity of these fires was enough to kill large, mature trees (fig. 1.1). Firefighting agencies fought first to prevent loss of life and structures and second to protect natural resources. They also struggled to combine responsibilities of structural and wildfire firefighting, a necessity in the wildland-urban interface.

Though fire is a critical issue in the wildland-urban interface, it is but one of the many issues affecting the condition, health, and management of forest resources. Demographics, economics and taxation, and land use planning and policy are major forces driving change in the wildland-urban interface. Urbanization is influencing forest ecosystems by changing their structure, function, and composition, as well as the benefits derived from them. Management of water resources, recreation, traditional forest products, wildlife, and other natural resources is changing to meet the challenges in the interface. There are also many social consequences produced by this changing landscape.

Resource professionals need new management practices, skills, and tools to address the new and changing environment of the wildland-urban interface. New research is needed to place the best scientific information into the hands of decisionmakers. This Assessment is a first step towards addressing wildland-urban interface challenges, opportunities, and needs in the South.

We begin this chapter by defining the wildland-urban interface. Then we present the Assessment’s purpose, objectives, scope, and information sources. We conclude by describing the organization of the Assessment and a brief overview of each chapter.

## Defining the Wildland-Urban Interface

For this Assessment, we defined the wildland-urban interface as an area where increased human influence and land use conversion are changing natural resource goods, services, and management. Our definition was written from a natural resource perspective. Other common definitions are based on geographical, sociopolitical, biophysical, and fire perspectives.

The term wildland-urban interface most often brings to mind a definition based on geography. There are many types of interface that vary by spatial configuration. Spatial differences among these interface types are significant because they result in different conditions and challenges for natural resource managers, policymakers, and landowners.

The classic wildland-urban interface is characterized by areas of urban sprawl where homes, especially new subdivisions, press against public and private wildlands, such as private nonindustrial or commercial forest land, or land under public ownership and management (Hughes 1987) (fig. 1.2).



Photos courtesy of Florida Division of Forestry

**Figure 1.1**  
The intensity of the 1998 wildfires in Florida was enough to kill large, mature trees.



Photo by Hans Riekerk, University of Florida

**Figure 1.2**

The classic wildland-urban interface is characterized by areas of urban sprawl where homes and other human-made structures press against public and private wildlands.

The wildland-urban intermix refers to areas going through transition from agriculture and forest uses to urban land uses on the leading edge of development. Such areas are characterized by a mixing of urban, forest, and agricultural land uses in advance of where the urban fringe is moving into the rural countryside.

The isolated wildland-urban interface is made up of remote structures, typically second or summer and recreation homes, ranches, and farms, surrounded by large areas of vegetation (**fig. 1.3**).



Photo courtesy of Virginia Department of Forestry

**Figure 1.3**

The isolated wildland-urban interface is made up of remote structures surrounded by large areas of vegetation.

**Figure 1.4**  
Islands of undeveloped lands, such as public parks, are left when cities grow together. This creates wildland-urban interface islands.



Photo courtesy of USDA Forest Service

Finally, wildland-urban interface islands are areas of wildland within predominantly urban areas. As cities grow together, islands of undeveloped land are left, creating remnant forests. Sometimes these remnants exist as public or publicly protected openspace, or as land that is not developable or too expensive to develop due to site limitations, such as topography, wetlands, or rocky outcrops (**fig. 1.4**).

The interface can also be thought of in a sociopolitical context as a place of interaction between different political forces and potentially competing interests (Vaux 1982). It is a place of interaction between people with different beliefs and perceptions about how natural resources should be managed or between institutions with competing visions. One example is the opposing views within a community over the value of a local watershed. Some may see managing forests in a watershed to protect water quality as an important value while others may see more value in large expanses of parking lots within the same watershed.

**Figure 1.5**  
The wildland-urban interface can also be defined as an area where physical changes to forest ecosystems, such as this spot created by a southern pine beetle outbreak, are occurring as a result of increased urbanization.

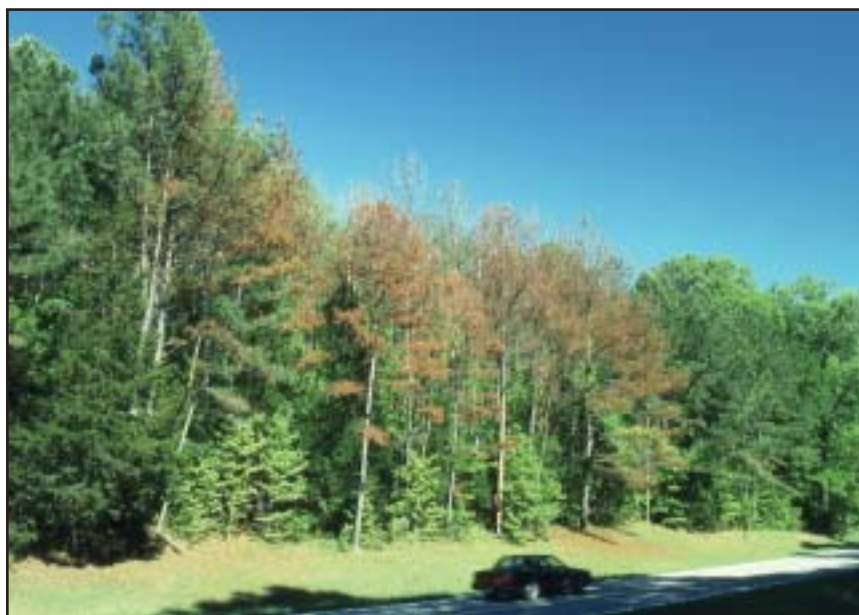


Photo courtesy of USDA Forest Service

From a biophysical perspective, the interface can be defined as an area where physical changes to forest ecosystems are occurring because of increased urbanization. Examples of these changes include habitat fragmentation, reductions in connectivity, changes in biodiversity, encroachment of invasive species, changes in stormwater runoff and quality, and increased soil erosion (**fig. 1.5**).

Fire managers in the wildland-urban interface are concerned with protecting people and built structures as well as natural areas. Their definition of the interface is an area where residential or commercial development is in or adjacent to areas prone to wildfire (Davis and Marker 1987, Tokle 1987).

## Purpose and Objectives of the Assessment

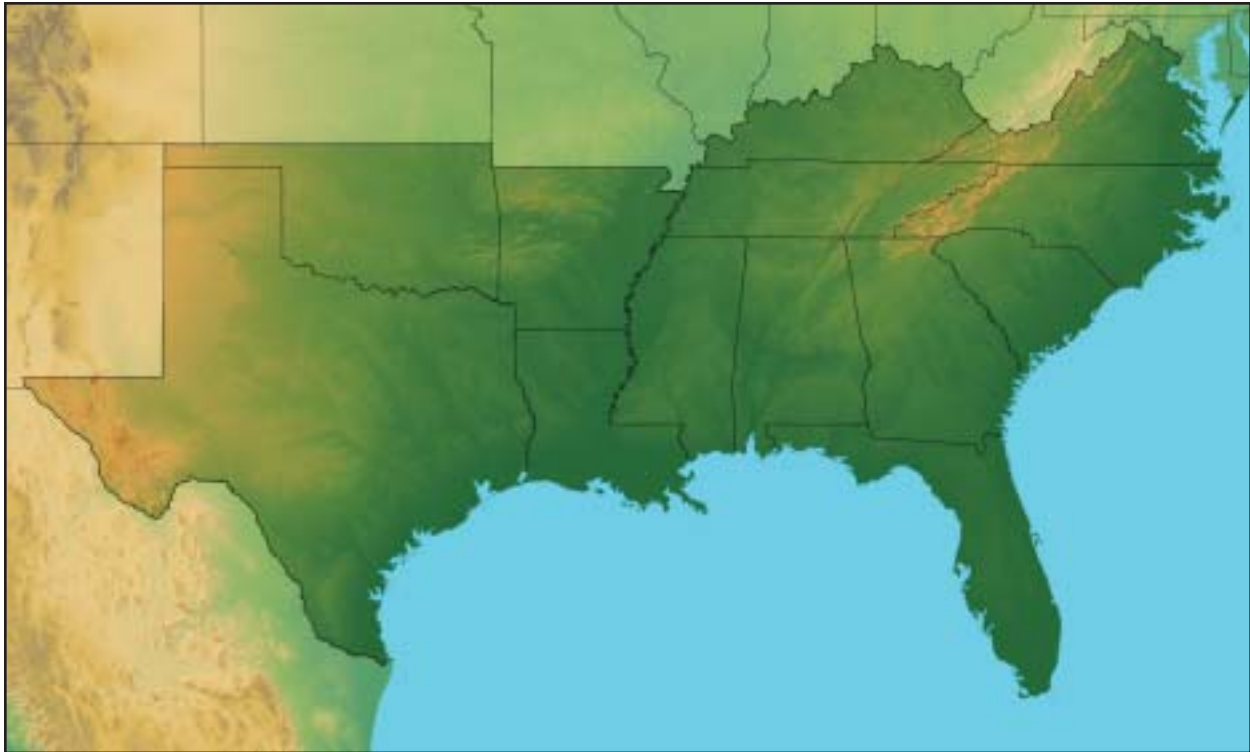
The main purpose of this Assessment is to provide a foundation for developing an integrated USDA Forest Service program of research, application, and development that addresses the issues, challenges, and opportunities of the wildland-urban interface. The five main objectives were to:

1. Explore the wildland-urban interface from an interdisciplinary perspective in order to understand the complexity and connectivity of interface issues.
2. Examine factors driving change in the interface, including population and demographic trends, economic and taxation issues, and land use planning and policy.
3. Explore consequences of this change on forest ecosystems, resource management, and social systems.
4. Identify gaps in our knowledge of interface issues to help us identify research and information needs.
5. Promote dialogue about and heighten awareness of interface issues among practitioners, researchers, and the public.

## Scope and Sources of Information

This Assessment covers the 13 Southern States shown in **figure 1.6**. Challenges in the wildland-urban interface in the South differ somewhat from those of other U.S. regions due to differences in the number of private landholdings, topography, climate, vegetation type, and culture. Although Assessment findings are for the South, many of the main themes and recommendations are applicable to other areas of the United States and abroad.

***“ . . . . The interface is sometimes very abrupt. You’ll have agricultural fields right next to shopping centers. There’s no transition zone there.” Virginia***



**Figure 1.6**  
The scope of this Assessment covers the 13 Southern States.

Several sources of information were utilized for this Assessment. Scientific literature was searched to identify the current state of knowledge on interface issues. Also, a total of 12 Assessment focus groups were convened in 6 communities experiencing rapid growth across the Southern United States. The States in which these focus groups took place are Texas, Georgia, Florida, Alabama, Virginia, and Mississippi. Findings of focus groups are reported in the USDA Forest Service General Technical Report “The Moving Edge: Perspectives about the Southern Interface” (Monroe and others, in press). These focus groups helped to refine and validate interface issues that are presented in this Assessment and demonstrated that interface challenges are complex, compelling, and shared commonly among a diverse group of people who live and work in the interface. Quotations from these focus groups are presented in each chapter.

*“The interface is a mosaic of incompatible land uses, a zone of increased conflict.” Texas*

## Organization of the Assessment

This publication is divided into three major sections. Within each section are several chapters, each beginning by exploring major issues, changes, and challenges in the wildland-urban interface. Then current programs, tools, research, and information that help address interface challenges are examined. Chapters conclude with suggestions for research, education, and development of management options and tools.

Section I (chapters 2 through 4) provides a foundation for subsequent chapters by overviewing factors driving the rapid change and expansion of the wildland-urban interface in the South. Chapter 2 begins with a discussion about population and demographic trends and projections in the South and predicts where forest resources are likely to face the greatest pressures from human influences. Chapter 3 follows with a look at economic conditions and tax policies that influence land use decisions and the rate of change in the wildland-urban interface. Chapter 4 then examines the role of land-related public policy at the Federal, State, and local levels and explores how natural resource management and conservation in the interface is complicated by current land-related public policies.

While the authors in the first section explore factors driving change in the interface, contributors to section II (chapters 5 through 7) assess some of the consequences of this change. Chapter 5 focuses on urban influences on forest ecosystems in the South. The author explores how urbanization is changing forest health and modifying the goods and services provided by forest ecosystems. The changing condition of forest ecosystems has a direct effect on the management of forest resources in the wildland-urban interface. Chapter 6 considers important changes and challenges that forest resource managers face when managing water resources, traditional forest products, fire, recreation, and wildlife in interface forests and gives some examples of innovative management and conservation alternatives. Chapter 7 reviews social consequences of change in the interface. It includes effects on communities and landowners as a result of changes in economics, policies, community structure, and quality of life in the interface. The authors conclude with a discussion of what natural resource professionals need to be effective in the changing social climate of the interface.

Section III (chapters 8 and 9) summarizes the Assessment by presenting a case study and addressing major themes and research and information areas. Chapter 8 uses fire in the wildland-urban interface as a case study to emphasize many of the questions and issues raised in the previous sections of the Assessment. Wildland fire perhaps best demonstrates how demography, economics and taxation issues, land use planning and policy, ecosystem structure and function, forest resource management, and social dimensions all affect efforts to manage resources and protect human communities in the wildland-urban interface. Chapter 9 concludes the Assessment by highlighting major themes that cross all of the chapters and by listing research and information needed to promote better understanding and provide solutions for wildland-urban interface challenges.

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