

Module 1: Trainer's Guide

Wildland-Urban Interface Issues and Connections



USING THIS MODULE

This module will increase natural resource professionals' knowledge and awareness of the complexity of wildland-urban interface (WUI) issues and their interconnectedness. This information is provided in four main sections that address these questions:

1. What is the wildland-urban interface?
2. What are key issues in the interface and what are their interconnections?
3. Why focus on the interface?
4. What knowledge, skills, and tools do natural resource professionals need to be most effective in the interface?

You can use this module on its own or in any combination with the other modules in *Changing Roles: Wildland Urban Interface Professional Development Program*. This trainer's guide provides you with background information on interface issues. If you want to present all of the information in this trainer's guide from start to finish, use **Presentation 1**. If you plan to address only certain sections of this trainer's guide, use the corresponding sectional **Presentations: 1.1, 1.2, 1.3, or 1.4**. Slides for the case studies are in **Presentation 5**. You can pick and choose from the exercises in this module to create a training program that fits your audience and its particular interface issues.

Supporting materials, such as the publication "Human Influences on Forest Ecosystems: The Southern Wildland-Urban Interface Assessment" (Macie and Hermansen 2002), are included with this module as background reading material for you. Also included is "The Moving Edge: Perspectives on the Southern Wildland-Urban Interface" (Monroe, Bowers, and Hermansen 2003), which provides the results of a series of focus groups conducted across the South to better understand the diversity of interface issues in this region. The other three program modules go into more depth on some of the knowledge, skills, and tools needed by today's natural resource professional. A video, titled "When Nature is at Your Doorstep," provides an introduction to the range of interface issues found in the South, voicing the challenges and opportunities from both natural resource professionals' and interface residents' perspectives. The Trainer's CD includes all of the Module 1 materials — the PowerPoint® presentations, pdf files, and Microsoft Word® files of the exercise handouts for you to adapt for each group. You can also design a quiz to measure participants' learning by selecting and adapting the sample questions provided behind the evaluation tab.

The materials in this module can be organized for a two-hour introduction or for a much longer program, depending on which mix of materials you use. The following table lists the exercises and appropriate case studies for each section of this module, which are listed in the order that they are mentioned in the text.

Section	Training Materials
Introduction	<ul style="list-style-type: none"> • Exercise 1.1: Piecing Connections Together • Video: When Nature is at Your Doorstep
1. What is the wildland-urban interface?	<ul style="list-style-type: none"> • Presentation 1.1 • Exercise 1.2: Describing the Interface
2. What are key issues in the interface and what are their interconnections?	<ul style="list-style-type: none"> • Presentation 1.2 • Exercise 1.3: Prioritizing Interface Issues • Case Study 8: Island Interface Issues: Puerto Rico and the Virgin Islands • Exercise 1.4: Using Case Studies • Presentation 5 • Case Study 4: Deer Debate in Hilton Head, South Carolina • Case Study 5: The Domain: Managing Interface Forests in Tennessee • Case Study 7: Interface Issues in the Georgia Mountains • Case Study 11: Life on the Edge: Interface Issues in Bastrop, Texas • Case Study 16: Restoring Coastal Wetlands in Louisiana • Exercise 1.5: Weaving Connections
3. Why focus on the interface?	<ul style="list-style-type: none"> • Presentation 1.3
4. What knowledge, skills, and tools do natural resource professionals need to be most effective in the interface?	<ul style="list-style-type: none"> • Exercise 1.6: What Would You Do? • Presentation 1.4

BACKGROUND

Introduction

The southern United States is experiencing unprecedented population growth, resulting in rapid land-use change and profound effects on forest ecosystems. The population of this region increased by 14 percent between 1990 and 2000; it is expected to increase another 24 percent between 2000 and 2020 (Cordell and Macie 2002). According to the 2000 U.S. Census, of the 100 fastest-growing counties between 2003 and 2004, 60 were located in the South, 23 in the West and 17 in the Midwest. None were in the Northeast. Florida leads the nation with 14 of the fastest-growing counties. Not far behind, with at least 10 counties among the 100 fastest-

growing, were Georgia (12), Texas (12) and Virginia (10). Result of this influx of new residents is an expansion of urban areas into forests and other natural areas, resulting in areas referred to as the wildland-urban interface.

In many areas forested land has become more valuable for urban land use than for growing timber. Lack of growth management and other related factors have led to extended low-density development. This has increased the burden on local jurisdictions to provide necessary amenities—such as schools, roads, sewer, and water—to an increasingly spread-out population. This inefficiency translates into increased costs for taxpayers.

As a result of this urbanization of the rural landscape, dramatic changes in natural resource practices have occurred, such as the way forest fires are fought. Not only must the trees be protected but also the homes and people living in the forest. Increased human influences on southern forests strain the ability of many natural resource professionals to deal with the complex array of social, economic, and political issues in the interface. As the ownership and geographic continuity of interface forests become more fragmented, managing them becomes a challenge.

Newcomers to the interface bring new cultural values, attitudes, lifestyles, and perceptions regarding the use of forestlands and how they should be managed. The newcomers may see the forest as more valuable for recreation and visual amenities, as opposed to longtime residents who may depend on forest products for their livelihood. Water and air quality may be affected due to factors such as increased areas of impervious surface and increased transportation demands. The result is a threat to the very values that attract people to the interface. Working with natural resources in these wildland-urban interface areas requires an understanding of these and other interface issues and opportunities. **Exercise 1.1: Piecing Connections Together** gives participants a chance to identify interface issues and understand how they are connected. This exercise also serves as an excellent icebreaker for starting this module or any of the other modules that are a part of this professional development program. The video **When Nature is at Your Doorstep** will also help you to introduce this module to your participants.



1. What is the Wildland-Urban Interface?

The term *wildland-urban interface* often conjures up images of a sharp delineation between developed and undeveloped lands. It is also commonly thought of as areas where development occurs within forests, places where built structures intermix with natural areas. The wildland-urban interface, however, must be thought of in much broader terms. The interface involves areas of mixed ownerships and multiple jurisdictions, resulting in an array of political, social, and economic challenges that must be taken into account when defining the interface. This section discusses a variety of interface definitions, which are also covered in **Presentation 1.1** for you to present to your participants.



From a spatial or geographical perspective many different types of wildland-urban interface have been defined. One type is the *classic interface*, where urban sprawl presses up against public and private natural areas, bringing to mind a distinct line

between urban and rural areas. The *intermix* refers to areas undergoing a transition from agricultural and forest uses to urban land uses. As the name implies, there is a mixing of rural and urban land uses in the same area. The *isolated interface* is made up of structures interspersed in remote areas, such as summer and recreation homes, ranches, and farms that are surrounded by large areas of vegetation. And there are *interface islands* within predominantly urban areas. These are islands of undeveloped land that are left as cities grow together and create remnant forests.

The wildland-urban interface is also referred to as the metropolitan fringe or the *rural-urban fringe*—that area between the open countryside and the built-up cities and suburbs where the landscape is growing and changing (Daniels 1999). On average, the South's major metropolitan areas grew faster than 3 percent per year since 1970 (Autry et al. 1998). The South has a growth pattern of urban centers surrounded by successive rings of suburban neighborhoods and bedroom communities that cover an increasingly larger area. Charleston, South Carolina, for example, has had an increase of 1 percent of population since 1973, but an increase in urban land use of 6 percent (Allen and Shou Lu 1999).

The interface is most commonly defined from a *wildland fire* perspective. Fire issues in the interface attract the public's attention and images of communities in flames on the outskirts of cities are often used to depict the interface. On an individual homeowner scale, the wildland-urban interface can be thought of as an area where human-made infrastructure is in or adjacent to areas prone to wildfire. On a community scale, the interface can be thought of as an area where conditions can make a community vulnerable to a wildland fire disaster.

From a *sociopolitical* perspective, the interface can be thought of as a place of interaction between different political forces and potentially competing interests (Vaux 1982). This perspective also includes the ways that the diverse cultural, ethnic, and age groups, which comprise the South's population, affect how resources can be managed and used in the interface. These different groups often have different values and attitudes regarding the forests and other natural areas and how they should be used.

In the publication "Human Influences on Forest Ecosystems: The Southern Wildland-Urban Interface Assessment" (Hermansen and Macie 2002), the interface is defined from a *natural resource* perspective as an area where increased human influence and land-use conversion are changing natural resource goods, services, and management. Accordingly, the interface is described as a set of conditions that challenge resources and their management rather than a geographic place.

The variety of definitions and the rapid land-use change occurring across the country make quantification of total land area in the wildland-urban interface difficult (Duryea and Vince 2005). A team of scientists with the USDA Forest Service and the University of Wisconsin, Madison, attempted to address this problem by mapping the wildland-urban interface based on two components: a) human presence, measured by using housing data from the block-level housing unit counts from the decennial censuses; and b) wildland vegetation, assessed with the 1992/3 National Land Cover dataset (NLCD). *Box 1* provides more details about how the wildland-urban interface was defined, both as the interface and intermix.

Box 1: The Wildland-Urban Interface Defined

The characteristics of the maps of the wildland-urban interface were defined in the following way:

Housing density. Housing density information was derived from U.S. census data. Analysis was conducted at the finest demographic spatial scale possible, census blocks, from the 2000 census. All measures of housing density were reported as the number of housing units per square kilometer.

Land cover. The National Land Cover Dataset, a satellite data classification produced by the USGS with 30m resolution based on 1992/93 imagery and available for the entire U.S., was utilized to identify wildlands. The definition of *wildlands* encompasses a range of management intensities. NLCD classes that were included as wildlands are forests (coniferous, deciduous, and mixed), native grasslands, shrubs, wetlands, and transitional lands (mostly clear-cuts). They excluded orchards, arable lands (e.g., row crops), and pasture.

The *Wildland-Urban Interface (WUI)*. WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres (16 ha). *Intermix* communities are places where housing and vegetation intermingle. In intermix, wildland vegetation is continuous, more than 50 percent vegetation, in areas with more than 1 house per 16 ha. *Interface* communities are areas with housing in the vicinity of contiguous vegetation. Interface areas have more than 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area (made up of one or more contiguous census blocks) over 1,325 acres (500 ha) that is over 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI.

Buffer Distance for Interface. The California Fire Alliance (2001) defined “vicinity” as all areas within 1.5 mi (2.4 km) of wildland vegetation, roughly the distance that firebrands can be carried from a wildland fire to the roof of a house. It captures the idea that even those homes not sited within the forest are at risk of being burned in a wildland fire. They adopted this buffer distance to identify interface areas.

For more information visit: http://silvis.forest.wisc.edu/projects/WUI_Main.asp

Source: Radeloff et al. 2004.

Overall, 9.3 percent of the continental United States, more than 175 million acres, was classified as WUI (intermix and interface combined). Regional differences were considerable. The Rocky Mountain states had the least extent of WUI and the north-eastern and southeastern states had the most. Among the southeastern states, North Carolina had the highest percentage of its total land area classified as WUI with 41 percent (12.8 million acres). The highest percentage in the West was Washington at 9 percent (3.7 million acres). Several of these maps can be found in **Presentation 1.1**. To



view more of these maps, see the suggested resource “The 2000 Wildland-Urban Interface in the U.S.” (Radeloff et al. 2004).

However the interface is defined, it is clear that increased human influences are changing forest ecosystems and creating new challenges and opportunities for natural resource professionals. Most important for natural resource professionals is not *where* the interface is located but *how* interface issues are affecting their ability to manage and conserve natural resources. **Exercise 1.2: Describing the Interface** will help your group define the interface based on their own experiences and priorities. You also may wish to ask participants to focus on how interface issues affect their ability to manage and conserve resources.



2. What are Key Issues in the Interface and What are their Interconnections?

Interface issues of most concern vary from state to state, but some key issues are consistent across the South. This was demonstrated in a series of focus groups conducted by the Forest Service in 2000 (Monroe, Bowers, and Hermansen 2003). *Table 1* summarizes some of the key issues gleaned from these focus groups and other related sources. **Exercise 1.3: Prioritizing Interface Issues** provides your training participants with an opportunity to determine and rank the interface issues they perceive as most critical. Refer to **Presentation 1.2** to present the information in this section to your participants.



Table 1: Priority WUI Issues for Six Locations across the South

Locations ^a	Priority WUI Issues ^b			
Birmingham, Alabama	Lack of vision and leadership	Lack of comprehensive planning	Water quality and quantity	Lack of natural resource education
The Woodlands, Texas	Population growth and the influx of people	No empowerment of regional planning	Lack of publicly owned land, overuse of public land	Lack of education for students, adults, and newcomers
White County, Georgia	Erosion and sedimentation	Lack of comprehensive planning	Water quality and quantity	Land is taken out of production by development

continued Table 1

Locations ^a	Priority WUI Issues ^b			
Deland, Florida	Growth management needed at all levels	Private property rights	Water quality and quantity	Lack of natural resource education of homeowners and developers
Orange Grove, Mississippi	Influx of people, all competing for limited resources	Protection of open space and conservation areas	Drainage and wetland issues	Wildlife habitat is being lost or degraded
Loudon County, Virginia	Taxes lead to pressures to sell land and develop	Lack of landscape level planning	Water quality	Lack of mandate to manage natural resources

^a Two focus groups were conducted at each location.

^b Selected from a compiled list from both focus groups.

Source: Monroe, Bowers, and Hermansen 2003.

Demographic changes. People are living longer, migrating from one region of the United States to another (e.g., the Rocky Mountains, the South, and the Pacific Coast are gaining in population, whereas the North and Midwest are losing population), and immigrating from abroad. These trends are making us much more diverse as a country than at any other time in our history. This diversity influences how forests will be used (see next issue). Statistics reveal the following:

- Between 1990 and 2000, the South's population increased by 14 percent. By 2020, the South's population is projected to increase another 24 percent, reaching almost 114 million people (Cordell and Macie 2002).
- According to the U.S. Census (2000), the number of people aged 65 and over will more than double between 2000 and 2030.
- In the 1990s, non-Hispanic whites made up 72 percent of the South's population. Of minority populations, Hispanics made up 9 percent, African Americans 17 percent, and Asian and other races just over 2 percent. By 2020, Hispanics are expected to account for about 16 percent of the population, African Americans 20 percent, and Asians and others around 3 percent. Non-Hispanic whites will drop to about 61 percent (Woods and Poole 1997).

Diverse public attitudes and perceptions. As our population ages and becomes more ethnically and culturally diverse, public attitudes, perceptions, and values undergo change. One such change is that forest ecosystems are increasingly valued more for the services they provide, such as clean water, beauty, and inspiration, than for the direct economic benefits that can be derived from them. Public attitudes affect natural resources by influencing how they will be used and managed. Research has shown that age and ethnic groups differ in how they use and value forests and other natural resources. For example, many studies have noted differences in outdoor recreation preference depending on ethnicity. One difference noted in several studies (Johnson et al. 1998, Dwyer 1994) was that African Americans tend to place more emphasis on consumptive uses of wildland recreation places, like fishing and hunting. Whites tended to place more emphasis on less consumptive or aesthetic uses, such as camping, hiking, and nature observation.

Newcomers and longtime residents may have different opinions about the value of natural resources and a different set of objectives for managing land in the interface. Newcomers tend to be more educated, wealthy, and politically connected and hence are a force that can make a lasting effect on how resources are to be managed (Hull and Stewart 2002). Strong and varied attitudes about private property rights—whether the rights of individuals should take precedence over community well-being—also influence the management of natural resources. Natural resource professionals must have the skills to communicate with the diverse constituency in the interface (*Module 4*).



Economic and taxation issues. Increases in employment opportunities in the South have contributed to the unprecedented growth in cities both large and small. As cities grow, the interface often becomes a more attractive place to develop due to lower property taxes and the natural setting that so many people prefer. But as more people move to the interface, land values and property taxes rise, forcing some large landowners to subdivide or move. The mortgage insurance system, which favors single-family dwellings, has also encouraged low-density suburban development. And in addition, until recent changes in tax laws, national tax policy encouraged people to buy bigger new homes to avoid capital gains taxes (Snyder and Bird 1998). Increased development changes the rural environment that earlier residents sought, motivating some to seek home sites in even more remote locations. Heirs to lands in the interface sometimes must sell or subdivide inherited land in order to be able to pay estate taxes. Focus group participants (Monroe, Bowers, and Hermansen 2003) stressed the need to quantify the monetary values of natural resources and estimate the cost of degrading resources, as well as the actual costs of growth and development, so that they can help policy makers see the value of natural resources. Having this kind of information can help policy makers create policies that support natural resource management and conservation, which can begin to address complex interface-related issues.

Land-use planning and policy. Major factors contributing to interface problems across the South include a lack of vision and little or no planning and regional coordination for comprehensive growth management. Current land-use policies are difficult to implement across federal, state, and local jurisdictions, which often

overlap. As a result, various levels of government make land-use decisions independently of and often in conflict with each other (*Box 2*). Sometimes these decisions are made without any common understanding of the long-range growth-management goals each government level wants to achieve and without a common approach for addressing environmental issues across jurisdictional boundaries (Kundell et al. 2002). Additionally, in many southern states the local governments have limited authority to plan and control development. Zoning and land-use plans are often not enforced and waivers are routinely granted. Another concern is how urbanization brings increased regulation of forest and land management practices (*Module 3*).



Box 2: Multiple Jurisdictions Complicate Land-Use Decision Making

It is common for cities to have a variety of agencies making decisions about land use. For instance, the city of New York has more than 700 governmental jurisdictions in three different states. These agencies have not been able to effectively control sprawl in the New York Metropolitan Area. Between 1960 and 1985, New York City expanded its land area by over 65 percent, while the regional population grew by only 8 percent. Competition for sales tax revenue among adjacent jurisdictions also pushes each tax district to seek retail development.

Source: Snyder and Bird 1998.

Land-use change. Largely due to the previously described demographic changes, economic and taxation issues, and land-use policies, the South is undergoing dramatic land-use change. Data from the American Housing Survey indicate that nationwide more than 3,000 square miles of land is converted annually to residential development over one acre in size. If this pattern were sustained for an additional 30 years, it would amount to an area of land the size of the entire state of Colorado (Nelson 2004). The South is forecast to lose 12 million forest acres (8 percent) to developed uses between 1992 and 2020 and an additional 19 million forest acres between 2020 and 2040 (Wear 2002). Additionally, forests are being fragmented into smaller patches that are surrounded by nonforest land uses including residential developments. Based on the current trends of urbanization across the South, it is likely that forested habitats will continue to be permanently altered and the amount of available wildlife habitat will decrease in some areas.

Changes to ecosystems. The most obvious direct influence of urbanization and other human activities on forests is the reduction of total forest area and fragmentation of remaining forest parcels. Human influences indirectly alter forest ecosystems by modifying hydrology, altering nutrient cycling, introducing non-native species, modifying disturbance regime, and changing atmospheric conditions. These changes significantly affect forest health and modify the goods and services provided by forest ecosystems.

Fragmentation of forests alters the biological diversity of native plants and animals by reducing the size of habitats and isolating plant and animal populations. Wildlife species differ in their response to fragmentation and habitat loss and degradation—some are habitat generalists and have adapted to the edge habitats where they thrive, while those that have specialized habitat requirements have not fared as well (Graham 2002). A few non-native species, including plants, animals, and pathogens, that have been introduced into native ecosystems as a result of urbanization and agriculture have caused great harm (this group is between 4 and 19 percent of introduced exotic species). Dutch elm disease, for example, devastated the American elm population as it spread across most of the country (Graham 2002).

Urbanization alters water flows in the interface and significantly affects aquatic habitats. Impervious surfaces can change streambank stability, water quality and quantity, and biodiversity of aquatic systems. Besides the increase in impervious surfaces, urbanization also channelizes streams, drains wetlands, and increases the amounts of pesticides and nutrients found in streams. Development often occurs in the headwaters of many streams and rivers, which endangers local species that are extremely sensitive to adverse environmental changes. See **Fact Sheet 2.7: Water Management** for more information about water issues in the interface.



Forests that are embedded in urban landscapes differ environmentally, compositionally, and structurally from rural forests. They are more susceptible to external stresses, such as compaction of soil and physical damages; invasive plants; higher temperatures, which cause changes in microclimate; and exclusion of natural fire regimes. These stresses change forest composition, structure, and consequently function of these ecosystems, causing problems with certain diseases, insects, and the general health of the ecosystem.

Key issues related to ecosystem changes include air quality, water quantity and quality, wildlife habitat, species composition, biodiversity, and soil quality. Resource professionals are concerned with how to maintain the critical goods and services that forest ecosystems provide humans, such as recreation, climate regulation, beauty, and inspiration (Monroe, Bowers, and Hermansen 2003). These benefits of forested ecosystems are increasingly valued over traditional forest products.

Risks from increased human influences. With these changes to human and natural systems, the risk of catastrophic events increases. Important risks associated with urbanization include changes to natural disturbance regimes, such as fires, floods, and winds. With urbanization the frequency, severity, and the types of disturbances seen in an area are altered. For example, wildfire suppression has threatened the existence of fire-dependent communities and species and has led to large-scale wildfires (increased size and severity), which have been numerous in many parts of the country during the past decade. We now understand that fire-dependent ecosystems need periodic fires to regenerate some species, maintain ecological integrity and biological diversity, and reduce fuel buildup. Fuel loads have reached undesirable, dangerous levels, resulting in destructive fires that alter ecosystems and threaten human communities. Similar effects result from controlling floods and other natural events (Zipperer 2002).

There are also risks to quality of life and human health associated with increased development in the interface. The pollution, crime, and stress of urbanized life can have negative effects on human health. Sprawling developments can lead to increased commute times and fewer opportunities for walking, consequently resulting in less physical activity and time to spend with family and friends. Both can lead to increased susceptibility to depression and other mental illnesses (*Box 3*).

Box 3: The Health Connection

Urban areas were once (and in some cases still are) characterized by inadequate housing, poor air quality, and limited water supplies. Life spans were short, accidents were common, and diseases were epidemic. As a result, many people moved to the suburbs in search of an improved quality of life. But life in the suburbs has brought its own set of problems. Suburban living is characterized by automobile travel. People have to spend more time behind the wheel to get to work, school, and other activities. As a result more air pollution is generated, the potential for more automobile accidents increases, and drivers experience more stress. There is also a correlation between obesity and suburban living due to the car-dominated lifestyle. People spend more time sitting in the car than getting out and exercising. The lack of sidewalks and bike-friendly roads limit how people travel and exercise. The distance between and the locations of stores, schools, and residences also limit opportunities for walking.

There are other human-health factors related to suburban design. In the dispersed developments of the suburbs many neighbors do not know each other. Where physical activity is limited and social contact with neighbors is constrained, people may be more susceptible to depression and mental illness. Social capital—the glue that enables people to trust each other, share resources, and work together to solve problems—has declined over the last 50 years. This trend is documented in the decrease of citizenship activities, voter turnout, charitable giving, and much more. Studies consistently indicate that people with stronger social networks live longer and have lower rates of heart disease and stronger mental health.

More cars mean increased impervious surface. Paved surfaces increase runoff and decrease groundwater recharge. In Atlanta, for example, it has been estimated that between 57 and 133 billion gallons of water are lost as runoff per year. The channels and streams that receive the fast-moving runoff are susceptible to erosion; the resulting silt carried into water treatment plants downstream makes it harder for chemicals to treat microbes in the water. The increase in impervious surfaces also increases the risk of flooding in some communities and causes combined sewer systems to overflow, dumping raw human waste into rivers and streams. These and other factors degrade the suburban environment and consequently affect human health.

Source: Frumkin, Frank, and Jackson 2004.

Lack of public education about natural resource issues. Focus group participants believe the public undervalues the contribution of natural resources to our health and well-being—the benefits of open space and natural ecosystems, for example, are not understood or appreciated (Monroe, Bowers, and Hermansen 2003). New residents may not know much about the environments that they are moving into and must be made aware before moving there. New residents, landowners, and policy makers need science-based information to make good decisions and follow appropriate practices. Policy makers must better understand the natural resource and ecological consequences of policy decisions. Schoolchildren need improved education about ecosystem function and natural resource issues. People in general need to better understand the relationship between human activities and consequences to the environment (**Module 4**).



Challenges of managing natural resources. All of the aforementioned issues affect how resources can be managed in the WUI. There are more people moving into forested and other natural areas, all with varied attitudes about how agencies should manage resources, such as water, fire, wildlife, traditional forest products, and recreational uses. Surveys of landowner objectives increasingly find that preserving and appreciating the natural aspects of the land, such as providing wildlife habitat, aesthetics, and recreational uses, rank higher than timber management and harvesting (Wear and Greis 2002). This creates new challenges for natural resource professionals as they balance public values with landowner wishes. **Module 2** provides more detailed information about how to manage resources in the interface.



The management of public lands lying close to cities face many similar challenges. **Case Study 8: Island Interface Issues: Puerto Rico and the Virgin Islands** discusses some of the challenges faced by the Caribbean National Forest in Puerto Rico due to its proximity to urban areas (*see note below*). Some of the major issues confronting professionals of national forests under urban influences (Dwyer et al. 2000) are

- greater use of the forest;
- pressures from adjacent owners;
- development along boundaries;
- concerns over landscape views, trash, fire, invasive plants, and animals;
- higher degree of visibility to a greater population; and
- more complex planning and decision making.



Note: For each of the case studies mentioned in this Trainer's Guide, discussion questions can be found in **Exercise 1.4: Using Case Studies** and slides can be found in **Presentation 5**.



Managing non-industrial private forest (NIPF) lands in the interface brings a host of issues that are different from the management of public lands. These issues are of critical importance since 50 percent of the NIPF owners and 48 percent of the NIPF acreage in the United States is in the South (Hubbard and Hoge 2005), and include the following:

- Small parcels cannot be managed in the same ways as larger ones. Cross-boundary and small-scale harvesting techniques that are less capital intensive are needed, as well as techniques for enhancing small lots for environmental services and benefits.
- NIPF lands are subject to local conservation codes, growth management regulations, and policies; forest practice acts; and tree preservation ordinances—all of which can affect the ability to manage lands in the interface.
- Landowners in the interface who are interested in growing and marketing traditional forest products like pulpwood and sawtimber often face limited markets for these goods. Those who might be interested in leasing their lands for hunting and recreational purposes are also finding it difficult to operate with favorable economic returns in the interface.
- NIPF owners in the interface are often unsure or unaware of the information and technical assistance they need on their property.

Some specific management challenges relate to fire, recreation, and wildlife. The growth and influx of newcomers into the interface makes it harder to use prescribed burns and other fuel reduction treatments (*Box 4*). People may oppose the use of prescribed burning due to smoke, which may affect health and traffic. The risk of wildfire damage to human life and property increases with more development in forested areas. Given differences in fire behavior between wildland and structural fires, suppression of interface fires necessitates that crews be trained in both types: wildland and structural firefighting techniques.

Box 4: Concerns over Fuel Treatments in the Interface

A series of focus groups was conducted in four locations across the country, one of which was in the South (Clay County, Florida), to examine what factors influenced public acceptance of different fuel treatments. It was found that residents would generally support a proposed fuel management strategy when it was perceived as well planned, the responsible agency had adequate resources to manage the risks (e.g., a prescribed fire getting out of control), the strategy included some level of citizen participation, and the acreage involved in the treatment was manageable. Agency trust was also important—residents wanted assurance that the treatment would be carried out by knowledgeable professionals. Studies like these can help ensure that land managers will successfully negotiate fire management plans that address the concerns of interface residents.

Source: Winter, Vogt, and Fried 2002.

Recreation planners face the challenge of providing high-quality experiences while sustaining the quality of natural resources on an ever-shrinking land base. They also need the necessary skills to communicate with the wide range of recreation users, who have different cultural backgrounds and value systems and are from different age groups.

Conserving, managing, and restoring wildlife habitat in the interface is a major challenge. Wildlife professionals must be able to address both consumptive and nonconsumptive uses of wildlife (e.g., hunting vs. bird watching) and possess the communication skills to resolve people-wildlife and people-people conflicts (*Box 5*). **Case Study 4: Deer Debate in Hilton Head, South Carolina** discusses both of these conflicts as they relate to the challenges associated with deer overpopulation. (*Remember to use the supplementary materials mentioned in the note on page 12.*)



Box 5: Deer Threaten Ginseng

Humans and deer threaten the long-term survival of American ginseng (*Panax quinquefolius*), a species related to the Asian wonder herb, *Panax ginseng*. Local residents of Appalachia harvest the ginseng to sell for commercial use in everything from beer and sodas to cures for headaches and insomnia. In West Virginia alone, more than 10,000 people harvest the plant each fall, and in 2004 they collected more than 6,400 lbs at a value of more than \$2 million. Ginseng is a protected species under the Convention on International Trade in Endangered Species, a global treaty to which the United States has agreed. The federal government must certify each year that harvesting the root will not threaten its existence. This level of harvesting may not be sustainable according to biologists at West Virginia University, especially given that grazing by over-abundant deer populations is quite high in some areas.

Biologist James McGraw feels that reducing deer populations is necessary in order to protect American ginseng from extinction. He says either reintroducing predators, such as wolves and mountain lions, or loosening hunting restrictions can accomplish this. However, Curtis Taylor, chief of the West Virginia Division of Natural Resources' wildlife section, says that reintroducing top predators would be "sociological suicide." "Look at what's going on out West with the reintroduction of wolves. There are hundreds of thousands of acres there with no people, and people are fighting it. I wouldn't even dream of proposing to people that we reintroduce mountain lions," he said. Given this, hunting may be the control method that makes the most sense in terms of public acceptance. But some feel it is unnecessary. Taylor believes that people still pose the greatest threat to American ginseng and that "deer get blamed for everything."

Source: Smith 2005.

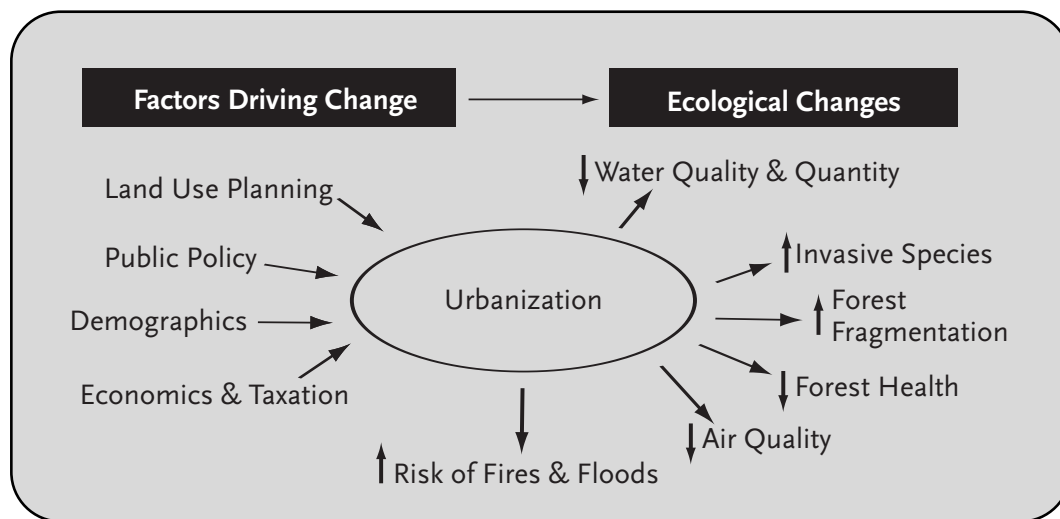
Interconnections

All of these issues, and others not mentioned here, are interconnected. Any one issue cannot be addressed in isolation. For example, as land uses change from rural to urban uses in the interface, property values and taxes often increase.

Consequently, the sale of subdivided land can become more profitable for the landowner than continuing to practice forestry. Upfront costs for improving infrastructure and providing public services are extremely high. Often, these costs exceed the tax revenues for local government generated by conversion of forestland. For another example, refer to *Box 3*, which discusses the connection between suburban living and ecosystem and human health. *Figure 1* demonstrates the connection between factors that are driving change in the interface and some of the ecological effects of such change. These interconnections may be best described by real-life examples that are depicted in the case studies from Sewanee, Tennessee (**Case Study 5: The Domain: Managing Interface Forests in Tennessee**), White County, Georgia (**Case Study 7: Interface Issues in the Georgia Mountains**), Bastrop, Texas (**Case Study 11: Life on the Edge: Interface Issues in Bastrop, Texas**), and coastal Louisiana (**Case Study 16: Restoring Coastal Wetlands in Louisiana**) (see note on page 12). **Exercise 1.5: Weaving Connections** gives your training participants an opportunity to determine how important interface issues are intertwined.



Figure 1: Connections between Critical WUI Issues



3. Why Focus on the Wildland-Urban Interface?

As part of this introduction, you may ask your participants why their agencies should focus on the wildland-urban interface. Why are they here? Create a list of their reasons and complete it with any of these following reasons that your participants do not address (**Presentation 1.3** discusses these reasons):



- The South is undergoing tremendous change—land-use change, population pressures, demographic shifts, etc.—with no end in sight. These changes are

having and will continue to have dramatic effects on the sustainability of forests and other natural areas. They will also affect the ability of natural resource professionals to manage forests and other natural areas for critical ecosystem benefits, goods, and services.

- Urbanization alters natural disturbance regimes, increasing the risk of natural disasters such as catastrophic fires and floods, which consequently compromises public health and safety. Natural resource professionals have the opportunity to help maximize the ecosystem goods and services while minimizing the risks of urbanization.
- Resource professionals have the opportunity to become involved with local land-use decisions by providing science-based information about the potential consequences that those decisions will have on natural resources. This is critical since land-use planning and policy decisions are often made without facts and information from natural resource professionals. Policy makers and the general public have limited understanding of the benefits that ecosystems provide and how their land-use decisions affect ecological processes and disturbance regimes.
- Interface and urban areas are where the majority of the population lives; hence interface and urban constituencies will have the greatest impact on national and state policies affecting natural resources and the management of public lands. Natural resource programs that focus on these constituents may cultivate support and influence for policies that support natural resource management and conservation.

4. What Knowledge, Skills, and Tools do Resource Professionals Need to be Most Effective in the Interface?

In this module a brief introduction is provided to many of the new knowledge, skills and tools needed by today's resource professional working in the interface is provided. Most of these are covered in more depth in the other program modules.



Presentation 1.4 discusses these main areas of needed skills and tools.

In an increasingly fragmented landscape, traditional forestry tools and programs are often ineffective. New skills, such as cross boundary and small-scale harvesting techniques, are desperately needed. Information about how to protect trees during construction and land development and how to work as a team with the various professions involved is important for foresters working in areas undergoing land-use change (*Box 6*). Silvicultural techniques must be modified to take into account the amenity concerns of landowners, neighbors, and communities unfamiliar with sustainable forestry practices and often skeptical of the motives of those associated with the timber industry. Enhancement of wildlife habitat, visual quality, trails systems, and other amenities are often just as important as or more important than timber harvesting for many interface landowners. Thus, managing the amenities of interface forests is critical. Tax incentive and cost-share programs must be adapted to interface landowners if they are to be of use for this clientele. Forest owner coopera-

tives need to be further explored as a possible mechanism for meeting landowner needs, protecting regional ecosystems, and sustaining local economies (**Module 2**).

Exercise 1.6: What Would You Do? helps your participants to brainstorm potential solutions to a variety of public and private land management scenarios. You can help your participants to think of some of the new skills and tools that can help them to face these management challenges in the interface.



Knowledge of public policies and land-use decision-making processes and their effects on natural resources is requisite. Familiarity with growth management measures, such as Smart Growth programs, alternative zoning ordinances, and conservation easements, can help natural resource professionals work with planners and decision makers to conserve natural resources in rapidly changing landscapes.

Becoming part of the land-use decision-making process helps ensure that decisions are based on the best available science (**Module 3**).



Box 6: Building with Trees

The Building with Trees recognition program, presented by the National Arbor Day Foundation® in cooperation with the National Association of Home Builders and Firewise Communities, outlines tree protection practices. It provides two opportunities for builders and developers to receive recognition for their efforts—one following the planning and design phase of a project, another following construction.

For more information visit:

<http://www.arborday.org/programs/Buildingwithtrees/index.cfm>

Source: National Arbor Day Foundation 2005.

Natural resource professionals must be able to work with not only a variety of landowners but also a variety of agencies. Partnerships are critical in the fragmented interface. The ability to communicate effectively is an increasingly important part of a natural resource professional's job. The abilities to identify your audiences and listen to their viewpoints and concerns, communicate with a diverse range of audiences, build public trust in your agency, and be familiar with conflict resolution are critical skills in areas where people are in close contact with management practices. The ability to translate forestry and other natural resource information into terms that the public is familiar with is important for building understanding and acceptance of natural resource practices and environmental processes (**Module 4**).



Many technologies can aid the natural resource professional in influencing policies that affect natural resources, as well as aid in conservation and management. Geographic Information Systems (GIS) and modeling are just two of the important tools. GIS can aid in land-use planning by analyzing land-use trends, such as how forestland cover has changed over time. There are GIS applications such as CITYgreen (developed by the nonprofit organization American Forests) that can help

calculate the environmental and economic benefits of forests and trees. Land-use modeling is another useful technology that can provide natural resource professionals and local government planners with the information that they need to determine where growth can be accommodated without sacrificing environmentally sensitive land.

Land will continue to be developed in the South, so natural resource professionals must be aware of the changes that development brings about, the consequent risks, and how the critical benefits that forest ecosystems provide to society can be maintained. Natural resource management can play an important role in mitigating risk and maximizing the benefits of natural resources.

Summary

There are many interconnected issues that affect natural resource professionals' ability to work effectively in the changing environment of the wildland-urban interface. There are also unique opportunities to play an important role in educating the public, policy makers, planners, and others about the importance of maintaining the ecosystem goods and services that are critical for our health and well-being. To meet this challenge we must be aware of the changes brought about by urbanization and understand the diverse interface issues and interconnections. We must also learn the skills and tools that can help us successfully communicate with interface residents, work with policy makers, become involved in the planning process, and manage and conserve natural resources.

Supporting Materials

Human Influences on Forest Ecosystems: The Southern Wildland-Urban Interface Assessment edited by Edward A. Macie and L. Annie Hermansen, 2002.

The Moving Edge: Perspectives on the Southern Wildland-Urban Interface by Martha C. Monroe, Alison Bowers, and L. Annie Hermansen, 2003.

When Nature is at Your Doorstep (video)

Suggested Readings

Forests at the Wildland-Urban Interface: Conservation and Management edited by Susan Vince, Mary L. Duryea, Edward A. Macie, and L. Annie Hermansen, 2005. Boca Raton, Fla: CRC Press.

The Southern Forest Resource Assessment edited by Dave Wear and John Greis, 2002. Gen. Tech. Rep. SRS-53, Asheville, North Carolina: USDA, Forest Service, Southern Research Station.

The 2000 Wildland-Urban Interface in the U.S.: Maps, Statistics, and GIS Data Library (http://silvis.forest.wisc.edu/projects/WUI_Main.asp) by Volker Radloff, Roger B. Hammer, Susan I. Stewart, and John F. Dwyer, 2004.

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