Managing Wildland Fire Risk in Florida

J. Brenner, D. Carlton, S. McLellan, A. Dozier, T. Spencer, D. Buckley, and A. Ralowicz

James Brenner, fire management administrator, Florida Department of Agriculture, Division of Forestry, Tallahassee, FL 32399; **Don Carlton**, President, Fire Program Solutions, Sandy, OR 97055; **Sue McLellan**, systems project administrator, Tallahassee, FL 32399; **Allan Dozier**, Chief, Forest Fire Control, Georgia Forestry Commission, Dry Branch, GA 31020; **Thomas Spencer**, Predictive Services Department Head, Texas Forest Service, College Station, TX 77840; **David Buckley**, senior consultant, Sanborn Map Company, Aurora, ON, L4G6A1; **Andrew E. Ralowicz**, principal geospatial scientist, Environmental and GIS Services, MDA Federal Inc., Rockville, MD 20852.

Abstract

Florida's Wildland Fire Risk Assessment (FRA), which was completed in 2002, is a statewide effort to develop a comprehensive suite of standardized spatial data layers developed to support implementation of a statewide fuels management strategy. By maintaining focus on fire and fuel dynamics for use with scientifically credible local to statewide applications, the FRA builds on a statewide surface fuels map, fire history data from many agencies, and weather data collected over a period of 20 years. Change detection is currently being utilized to update the statewide surface fuels layer. The process used in the FRA builds on a process first applied in the Lake Tahoe Basin Management Unit. Subsequently, the methods used in the FRA have recently been applied to 13 Southern States in the Southern Wildfire Risk Assessment.

Introduction

Florida possesses a unique set of characteristics that make much of the state highly susceptible to wildfire. The state is blessed with an abundance of wildlands. The state has also experienced an influx of new residents into these wildlands, creating an intermingling of urban settlement within wildlands and increasing need for wildfire protection services.

Florida's weather is conducive to starting and spreading numerous and sometimes large wildfires. Florida's rate of lightning strikes is unequaled in the Nation. Lightning, coupled with extended periods of drought, sets the stage for catastrophic fire episodes. Whereas lightning accounts for a large proportion of wildfire ignitions, human-caused fires are increasing as the population rises.

Florida's wildland vegetation evolved in a fire ecosystem. The vegetation is adapted to burn periodically. Fine fuels, which are easily ignited and spread fire rapidly, are abundant throughout Florida. The lack of managed fire in much of the wildlands has promoted an accumulation of these fuels that can burn with high intensity and be difficult to control.

To reduce the risk to life and property loss from wildfire, communities and fire management organizations are encouraged to actively manage wildland fire risk. Managing wildland fire risk can be challenging as fuels frequently change across the landscape and through time. Fire behavior can be affected by changes in land development policies, fuels, weather conditions, and topography. In addition, many social, technical, and institutional barriers to proactive fire-risk management and planning frequently exist.

Florida's fire managers face a complex problem of managing wildfire risk that is compounded by increasing fire intensities owing to accumulation of vegetative materials, continued residential growth into wildland fire-prone areas, and increasing firefighting costs. To address this problem, the Florida Division of Forestry (FDOF) initiated a process to assess fire risk and the values to be protected. The process developed (the Florida Fire Risk Assessment, or FRA) provides managers with a strategic view of the state to improve public safety and protect them from property losses like those experienced in 1985, 1989, 1998, and 1999.

The purpose of the FRA is to identify the potential for wildfires within the State of Florida and prioritize areas where mitigation options may be desirable. The FRA can also be used to locate areas within the state where interagency planning may be of value to effectively manage wildland fire risk. The results can be used to complete a more detailed analysis at the local level and communicate wildland fire management issues to the public.

The objective of this case study is to present the risk assessment methodology and results from the Southern

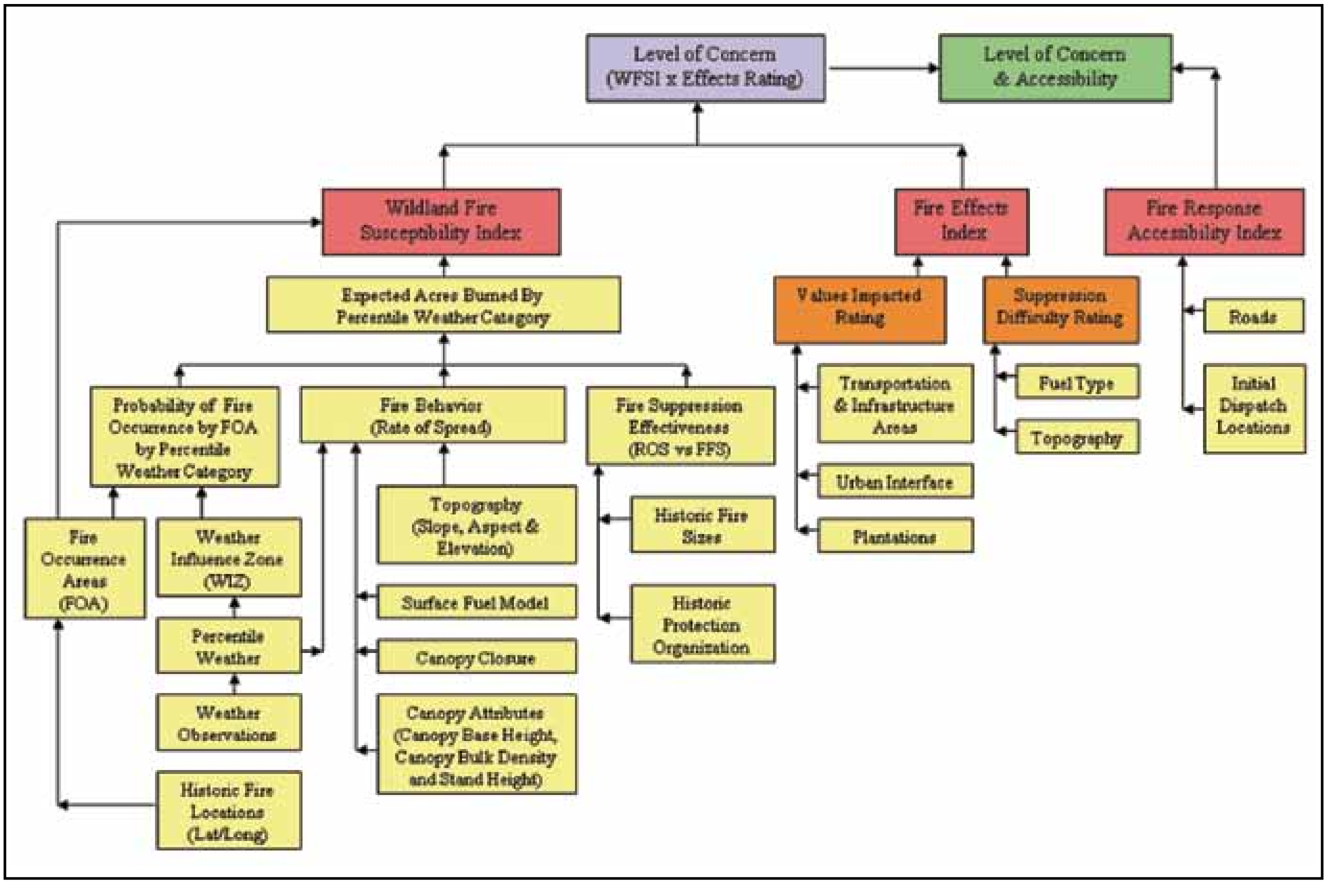

Figure 1—Southern Wildlife Risk Assessment (SWRA) model is shown above.

Wildfire Risk Assessment (SWRA) (Buckley and others 2006) for the State of Florida. We start by describing the methods involved in defining our index of wildland fire risk, which we call Level of Concern, based on its major components, wildland fire susceptibility and fire effects. We then describe the construction of a fire response accessibility index. Finally, we discuss how, in Florida, the fire risk and fire response accessibility indices are being used and applied to improve fire protection decisions.

Wildland Fire Risk

Webster's dictionary defines risk as "the possibility of suffering harm or loss." As one can see, there needs to be both a likelihood and effect of an action or event before one can incur a risk. Two primary indices were assigned to each 30- by 30-m cell in all 13 Southern States including Florida. These are the Level of Concern (LOC) Index and the Fire Response Accessibility (FRA) Index (Figure 1).

Within the risk assessment, the Level of Concern is the best measure of wildland fire risk. The Level of Concern Index is calculated from the likelihood of an acre burning, called the Wildland Fire Susceptibility Index (WFSI) and the expected effects of the fire (Fire Effects Index, or FEI). The FRA Index is a measure of the initial attack response time to a cell from existing initial dispatch locations for fire protection resources. Taken as a pair, these two indices (LOC and FRA) define a cell's accessibility and its vulnerability to wildland fire occurrence and effects.

Wildland Fire Susceptibility Index

As used in the Florida and Southern Wildfire Risk Assessment, the Wildland Fire Susceptibility Index is a value developed to represent an index related to the probability of an acre burning. The determination of an acre burning integrates the probability of an ignition and expected final fire size, the latter being affected by rates of fire spread in four weather categories and fire suppression effectiveness.

Fire Occurrence (Fire Occurrence Areas)—
The first task to determine the WFSI is to determine the probability of an acre igniting. A fire occurrence area (FOA) is an area where the probability of each acre igniting is the same. The historical fire ignition locations for a defined period of time are used. Pictorially, if one were to locate the point location for historic ignitions on a map of an FOA, the points would appear with randomly dispersed densities different from adjacent FOAs.

A grid illustrating the probability of a wildfire igniting was developed using ArcMap by analyzing the location of historic ignitions from 1997 to 2003. Fire occurrence rates were described as the number of fire ignitions per 1,000 acres per year. A surface grid with fires per 1,000 acres per year was generated using a spatial filtering calculation available in ArcMap. The FOAs were developed to identify areas where the probability of a fire igniting was similar. Hence, within an FOA, the probability of each acre igniting is the same.

An example of a FOA map for Flagler County in Florida is shown in Figure 2.

Weather Influence Zones—
To determine an estimate of fire spread upon fire ignition using a fire behavior model, environmental conditions are needed so that fuel moisture and windspeed values can be used in the fire behavior models. To determine these environmental conditions, areas of uniform weather conditions were defined and the weather conditions within each area determined. A weather influence zone (WIZ) is an area where the weather on any given day is uniform. A fire weather meteorologist developed 20 weather influence zones in Florida, and these are displayed in Figure 3.

Development of Percentile Weather Values—
Within each WIZ, daily weather data are gathered for a defined period of time. These data were gathered from land management agency weather stations (National Fire Danger Rating System [NFDRS]) and from National Oceanographic and Atmospheric Administration (NOAA)-maintained weather stations. A computer program developed by research meteorologist Dr. Scott Goodrick (Forestry Sciences Laboratory, 320 Green Street, Athens, GA 30602-2044) was used to change weather observations from NOAA stations to NFDRS standards. Another program developed by Dr. Goodrick was used to georeference the weather observations from the weather stations within a WIZ to the geographical center of the WIZ. Hence, one weather data set was developed with a weather observation for each day during the defined period for each WIZ. From this weather data set, percentile weather was developed for each WIZ.

The weather observation data set was checked for errors and then imported into the USDA Forest Service's FireFamilyPlus program. The NFDRS index spread component (SC) was calculated for each day. The fire season was set for each WIZ and the SC calculated using the NFDRS fuel model G. Fuel model G is used, as it contains fuel loading in all of the dead (1-h, 10-h, 100-h and 1,000-h) and live (herbaceous and woody) fuel categories. This allows for the influence in the spread component calculation of the fuel moisture values from all of the fuel categories. In addition, climate class 3 (subhumid/humid) and slope class most applicable to the WIZ were used.

The spread component was then divided into four commutative percentile categories: low (0-15 percent), moderate (16-90 percent), high (91-97 percent), and extreme (98-100 percent). The median SC was determined for each category. The environmental values for 1-h, 10-h, 100-h timelag fuel moisture, live herbaceous fuel moisture, live woody fuel moisture, and the 20-foot, 10-minute average windspeed were determined as the average of the respective values on days when the SC was equal to the median SC. This allows for the determination of four percentile weather categories with the percentage of occurrence of each category and with environmental values to define the weather conditions within each category.

Probability of a Fire Occurrence Within Each FOA by Percentile Weather Category—
We allow for the possibility that the higher percentile weather categories may be relatively more conducive to generating fire ignitions from ignition-initiating sources. That is, if 15 percent of the days during the fire season are

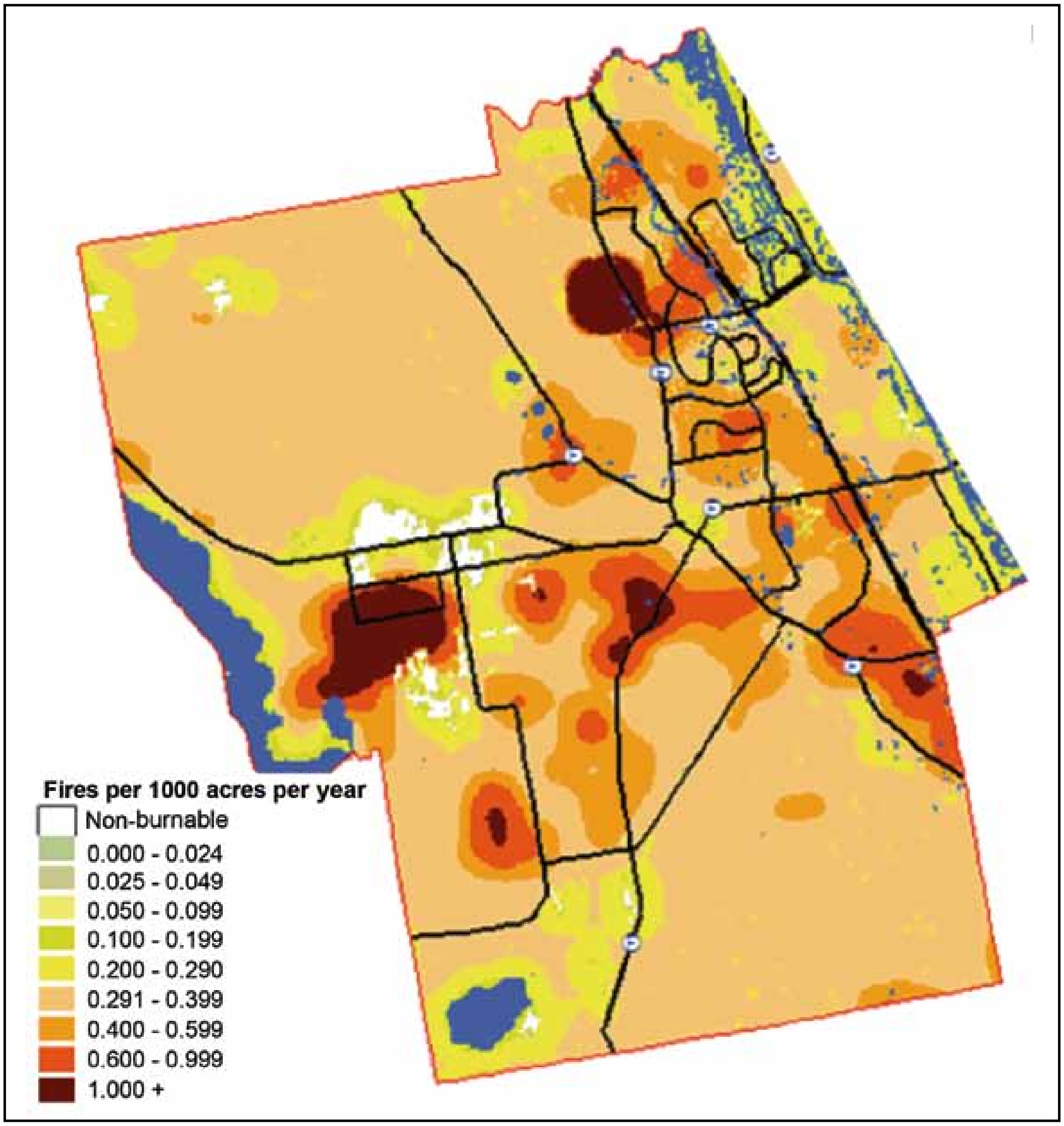

Figure 2—Flagler County, fire occurrence areas are detailed above.

in the low percentile weather category, one cannot assume that 15 percent of the fires during the fire season will occur on the days in this percentile weather category. Four percentile weather categories were developed: low, moderate, high, and extreme. The percentage of days within each is 15 percent, 75 percent, 7 percent, and 3 percent, respectively.

Each fire within the fire occurrence database for all agencies within a weather influence zone has a fire start date. Each historical fire was assigned a spread component based on the fire's start date from the results of the FireFamilyPlus runs. The four percentile weather categories were also developed using the same assumptions for SC, and the four categories have SC ranges. Hence, a correlation is made assigning each historical fire to one of the four percentile weather categories. From these assignments, the proportion of fires that occurred in each percentile weather category by WIZ was determined. For Florida, 14.2 percent, 74.1 percent, 8.1 percent, and 3.5 percent of the fires started within the low, moderate, high, and extreme categories, respectively.

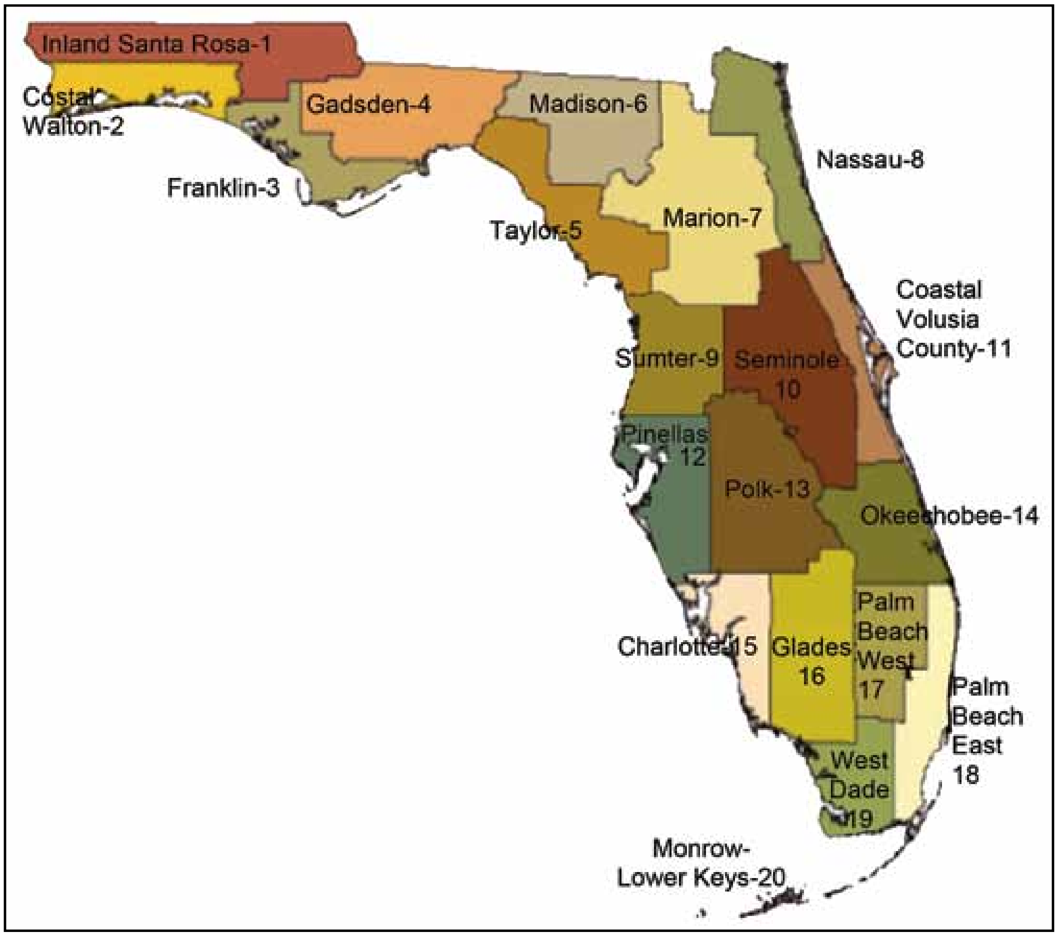

Figure 3—Weather influence zones are illustrated in Florida.

The probability of a fire within an FOA for each percentile weather category is the product of the total fire occurrence rate in the FOA by the proportion of fires within each percentile weather category.

Fire Behavior Prediction Inputs

Predicting fire behavior requires knowledge of fuels, weather, and topography. The previous section provides information on how the environmental conditions (weather) can be determined. The topographic conditions required are knowledge of slope steepness, aspect, and elevation. Aerial and surface fuel data required include canopy cover and the surface fuel model. If aerial fuel attributes are provided, then the occurrence and behavior of a crown (canopy) fire can be modeled. The aerial attributes needed are canopy base height (CBH), canopy bulk density, and stand height.

Data layers for the state were developed for slope, aspect, and elevation for U.S. Geological Survey Digital Elevation Model information. Fuel models for Florida were developed in 2002 for the FRA using a process where actual satellite imagery was correlated with the surface fuel model. These fuel models were also used in the SWRA, and a statewide fuel model map is displayed in Figure 4. An SWRA and FRA design requirement was to classify each acre of burnable land using the fuel models (Anderson 1982) in the Fire Behavior Prediction System (FBPS). A data layer defining the percentage canopy cover was developed using satellite imagery for Florida. For the FRA and SWRA, none of the canopy fuel layers (Canopy Ceiling Height, Canopy Base Height, and Canopy Bulk Density) were developed or used. All fire behavior predictions were based on surface fuel models.

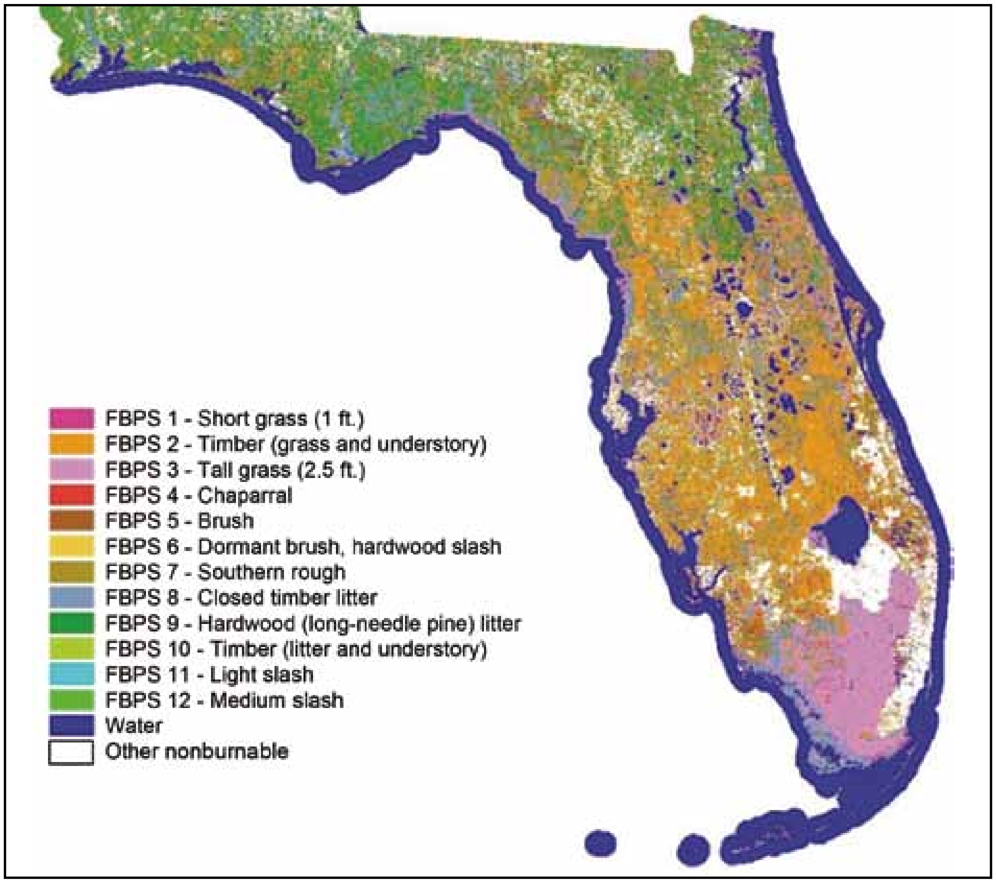

Figure 4—Surface fuel models are displayed in Florida.

Fire Behavior Outputs

Fire behavior outputs are a key component of the model used to estimate the WFSI. Potential fire behavior can be evaluated using a fire behavior prediction program, much like FARSITE (Fire Area Simulator) (Finney 1998) and FlamMap (Finney 2006). For the FRA, the FlamMap program was used.

The fire behavior program uses topographic information, fuel characteristics, and weather to calculate rate of spread, flame length, fire type, and other characteristics of fire behavior. Fire behavior prediction can also be done using a fire behavior dynamic link language (dll) program, which provides a more flexible and customizable method of calculating the required fire behavior outputs needed for the risk assessment model. The fb3.dll used in the SFRA has the advantage of providing tight integration capabilities with geographic information systems (GIS) and other programs.

The main fire behavior variable calculated by the fire behavior prediction programs such as the fb3.dll for the calculation of the WFSI is fire spread rate. This variable was developed because it can be used to estimate a fire's expected size.

For further analysis and display, it is worthy to note that additional fire behavior outputs such as fire intensities and flame length are available outputs of the fb3.dll program. The FlamMap program and the fb3.dll calculate the behavior of a fire occurring in each 30- by 30-m cell under defined weather conditions. Fire behavior is described independently for each individual cell.

Fire Suppression Effectiveness—Rate of Spread vs. Final Fire Size Relationships

For a cell, the FOA designation provides an estimate of the cell igniting. To calculate the WFSI, the expected size of a fire needs to be determined. To do this, it is necessary

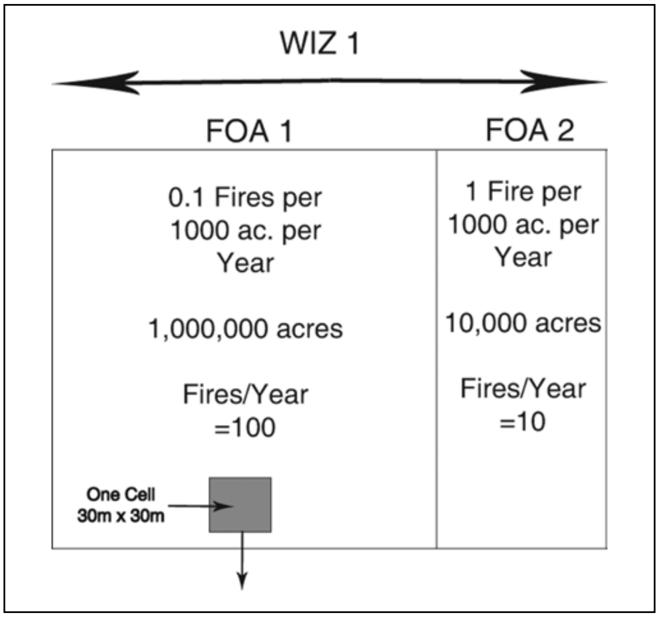

Figure 5—Example WIZ and FOA are detailed.

to develop relationships between fire spread rates and the expected final fire size. The inputs to this relationship are the expected fire behavior, which depends on fuels, weather, and topography and a measure of suppression effectiveness of fire protection forces.

For each weather influence zone, a relationship between the rate of spread and final fire size is developed using historical fire report data. This relationship can also be determined from the outputs of preparedness staffing modeling. Development using historical fire reports data requires the creation of several fire size classes where the time from fire start to fire containment can be estimated using fire report data. For all weather influence zones, the time from fire start to fire containment for the benchmark fire sizes of 0.5, 2, 10, 50, 100, 500, and 1,000 acres was determined. Additional fire sizes greater than 1,000 acres are used when fires of these sizes occurred historically within a WIZ.

The average fire rate of spread for each benchmark fire size is estimated by using the double ellipse area model developed by Fons (1946) as documented by Anderson (1983). The model calculates fire size (Area) as: Area = K $\times D^2$ where K is a constant dependent solely on midflame wind speed, and D is the distance the fire has traveled from its point of origin (D = rate of spread times containment time). A relationship between the fire size and average rate of spread values for the benchmark fire sizes is developed using multivariate regression using a power series equation form ($Y = A + BX^C + DX^E$ where X = rate of spread, Y is the expected fire size and A through E are the regression coefficients). In some cases, a fourth-order polynomial equation form was utilized. In some WIZes, the constant term A was changed so that a 0.5-acre fire was expected when the rate of spread was 1 chain per hour (1.1 feet per minute). In addition, for each WIZ a maximum fire size was assigned.

Example of the Calculation of the Cellular Value for the Probability of an Acre Burning

The cellular value for the probability of an acre burning (CPAB) is calculated for each percentile weather category for each 30- by 30-m cell on burnable acres within the State of Florida. The four values from the four percentile weather categories are summed to obtain the total cellular value for the probability of an acre burning for a cell. The calculation is done for cells within an FOA and WIZ intersection. When the calculation is done for a cell, it is assumed that all cells in the FOA and WIZ intersection have the attributes of the cell. In essence, one is asking, “What would be the expected probability of an acre burning if all cells in the FOA and WIZ intersection were the same as the selected cell?”

To assist in the understanding of the calculation, an example is presented. Assume that the calculation is being done for a cell in FOA 1, WIZ 1 (Figure 5). The data flow is shown via the example in Table 1.

For the example, assume that the fire occurrence rate in FOA 1 is 0.1 fire per 1,000 acres per year and assume there are 1,000,000 acres in the FOA 1, WIZ 1 intersection (Figure 5).

Note there are 100 fires per year. Row 1 of Table 1 gives the percentage of fires that have historically occurred within each of the percentile weather categories. Multiplying the proportion of fires in each percentile weather category by the total number of fires in the FOA 1 / WIZ 1 intersection (100 fires) allows for determination of the number of fires in

Table 1—Example calculation of the cellular Wildland Fire Susceptility Index

		Percentile weather				
Row	Item	Low	Moderate	High	Extreme	Total
1	Percentage of fires	10%	80%	8%	2%	100%
2	Number of fires	10	80	8	2	100
3	Rate of spread (chains/hr)	2	5	12	24	N/A
4	Final fire size (acres)	1	6	98	900	N/A
5	Annual acres burned	10	480	784	1800	3074
6	Cellular probability of an acre burning	0.00001	0.00048	0.000784	0.00180	0.003074

each percentile weather category, Row 2 of Table 1.
The fire program (FlamMap for the FRA and the fb3.dll for the SFRA) has calculated a rate of spread for each percentile weather category (Row 3, Table 1) and a rate of spread versus expected final fire size relationship (Row 4, Table 1) has been determined. This allows for the determination of the expected final fire size within each percentile weather category.

Multiplying the number of fires per year in each percentile weather category by the expected final fire size yields the annual expected acres burned for each percentile weather category (Row 5, Table 1). Dividing the annual expected acres burned for each percentile weather category by the total acres within the FOA 1, WIZ 1 intersection (1,000,000 acres) yields the CPAB within each percentile weather category (Row 6, Table 1). The CPAB for the cell is the sum of the four percentile weather category CPAB values (Figure 6).

To consider the flammability of cells in the area of a given cell, a roving window (eight cells in radius) is drawn around each cell, and the average WFSI for all of the cells within that roving window is determined resulting in the roving window probability of an acre burning value (Figure 7). This allows for integration of the nearby CPAB values to reflect the flammability of the cells around a given cell.

Fire Effects

The Fire Effects Index comprises two input ratings: values impacted and suppression difficulty. The purpose of the index is to identify those areas that have important values at risk to wildland fire or are costly to suppress, or both.

Values Impacted

Several important values potentially impacted by wildfire were combined into an index for inclusion in the SWRA. These values were also used in the FRA and include:

- Transportation and infrastructure areas
- Urban interface
- Plantations (natural and planted)

The transportation infrastructure effects were created from calculating a 300-m buffer around level 1, 2, and 3 roads and a 500-m buffer around elementary and secondary schools, airports, and hospitals.

The wildland urban interface (WUI) was downloaded from the SILVIS Lab at the University of Wisconsin - Madison (USDA FS 2001). The WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of 1 structure per 40 acres (16 ha). Intermix communities are places where housing and vegetation intermingle. Intermix areas have continuous wildland vegetation cover of more than 50 percent and 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 miles of an area (made up of one or more contiguous census blocks) over 1,325 acres (500 ha) that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI.

The plantation data were obtained from each individual state. This information was supplemented with a crosswalk from Gap Analysis Program data where available.

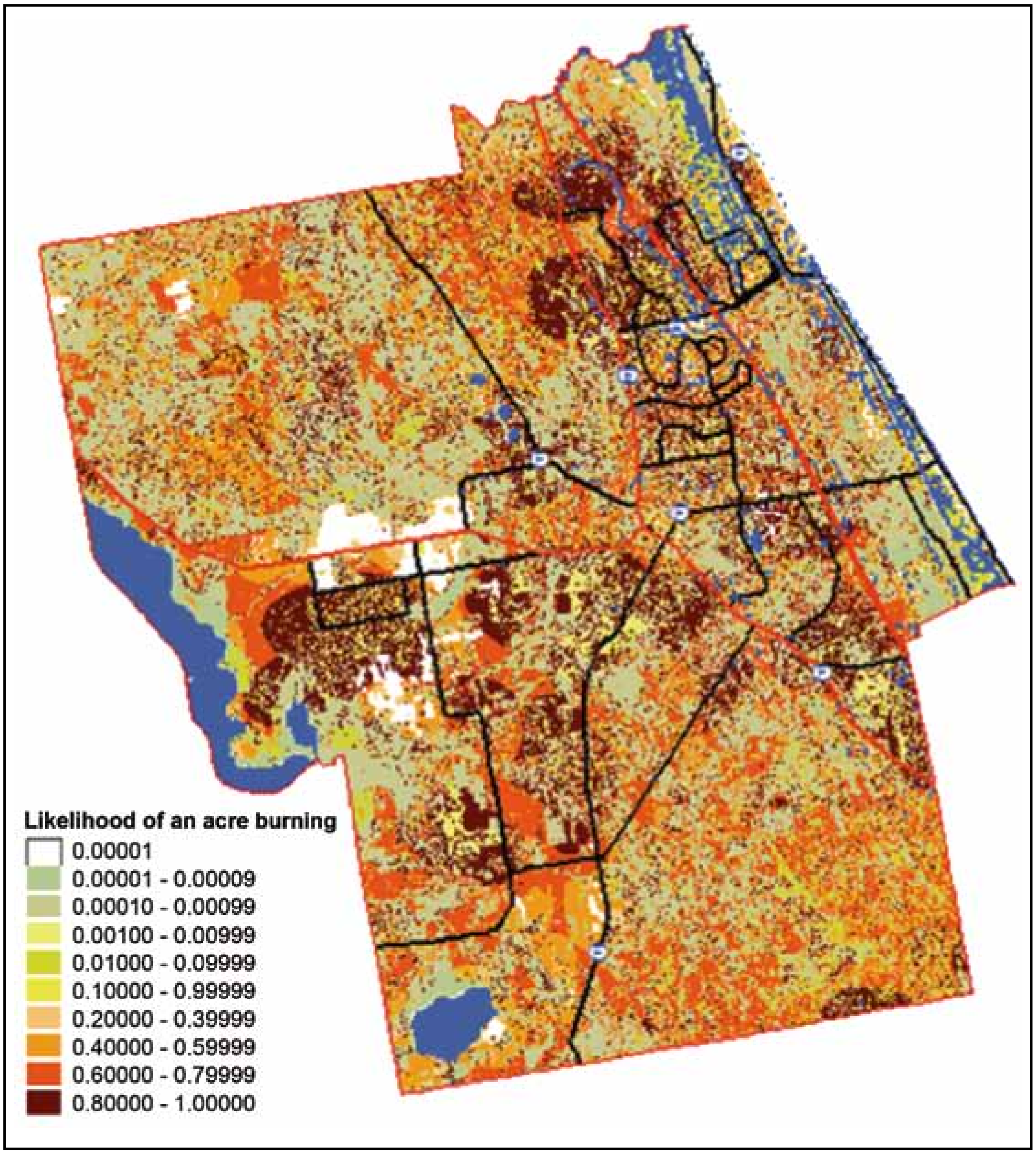

Figure 6—Flagler County, Cellular Wildland Fire Susceptibility Index.

Each value-impacted input was assigned an impact score by state fire managers using a matrix to assign a value of 1 to 4 (1 being low effect, 4 for high) for each flame length vs. fire size scenario. To arrive at a score for a value impacted, the individual values in the matrix were summed, i.e., 33. The Values Impacted Rating was determined by summing the values impacted scores for a cell × 100 and dividing that total by the maximum possible score to normalize the result to a value between 1 and 100.

Suppression Difficulty Elements

The suppression difficulty elements are fuel type, topography, and soil type. A fuels layer was used to assign each cell in the state a fuel type of grass, shrub, timber litter, or slash. A topography multiplier was assigned to each of the following slope classes by state fire managers: slope class 1 is 0 to 25 percent; slope class 2 is 26 to 40 percent; slope class 3 is 41 to 55 percent; slope class 4 is 56 to 75 percent, and slope class 5 is 76+ percent. Organic/peat (muck) soils

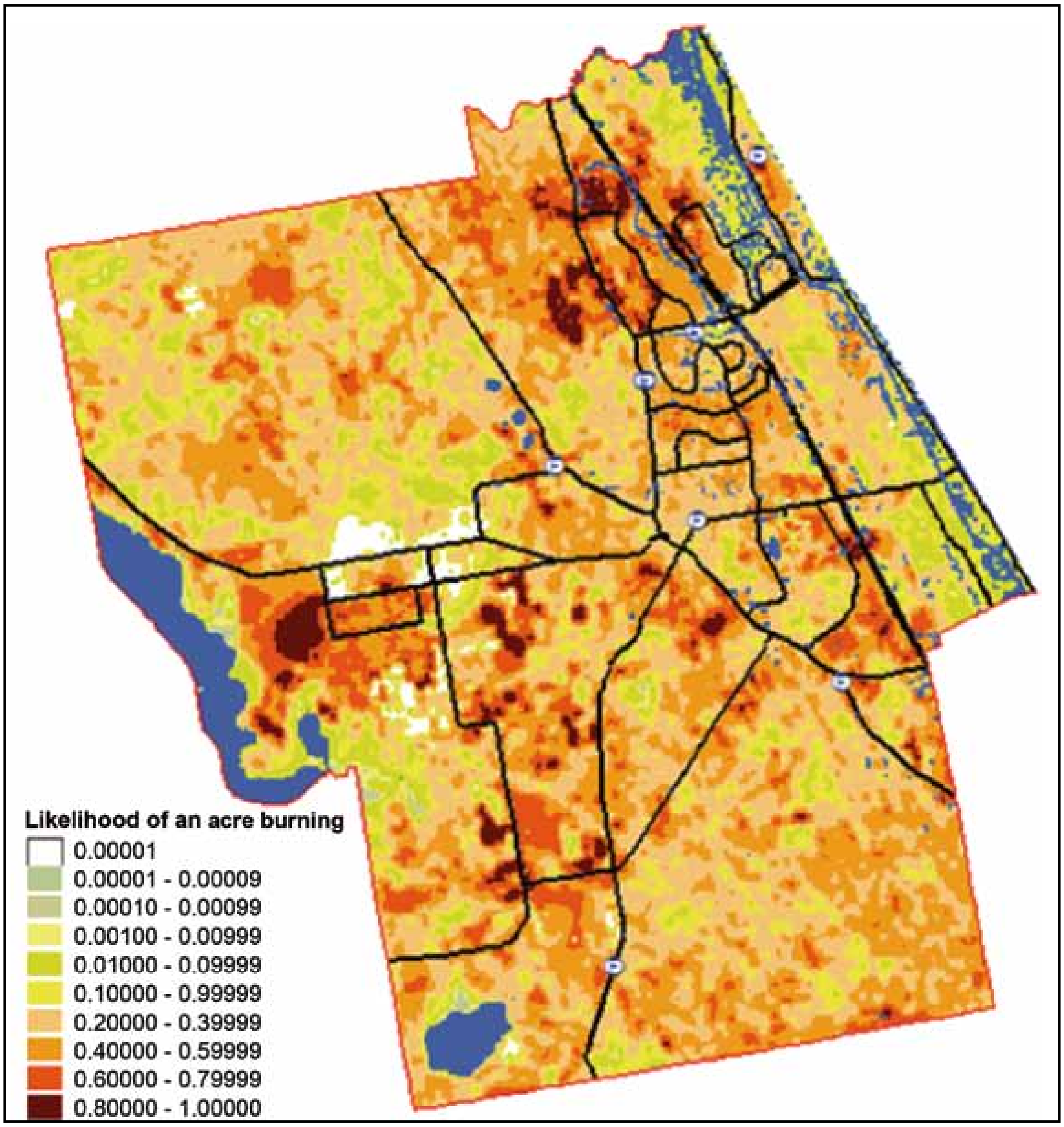

Figure 7—Flagler County, roving window Wildland Fire Susceptibility Index.

were extracted from SURGO data by the states. These soils constitute areas of concern for firefighting efforts, as fires within these areas tend to be expensive and difficult to extinguish.

In arriving at the Suppression Difficulty Rating, suppression costs are evaluated by fuel type and topography. Each burnable cell in the state was assigned a suppression score using a matrix process similar to the one used for the values impacted score. The grass, shrub, timber litter, and slash fuel type scores were based on professional judgment of the state fire managers. The increased difficulty of suppression based on slope was also made. The suppression difficulty score for organic/peat soils was assigned to be 60, which is 1.25 times the maximum score of 48. This higher value is to reflect the increased suppression difficulty in this situation. The Suppression Difficulty Rating for each cell was calculated by multiplying the fuel type score and the topography multiplier by the product of the maximum fuel type score and the maximum slope multiplier.

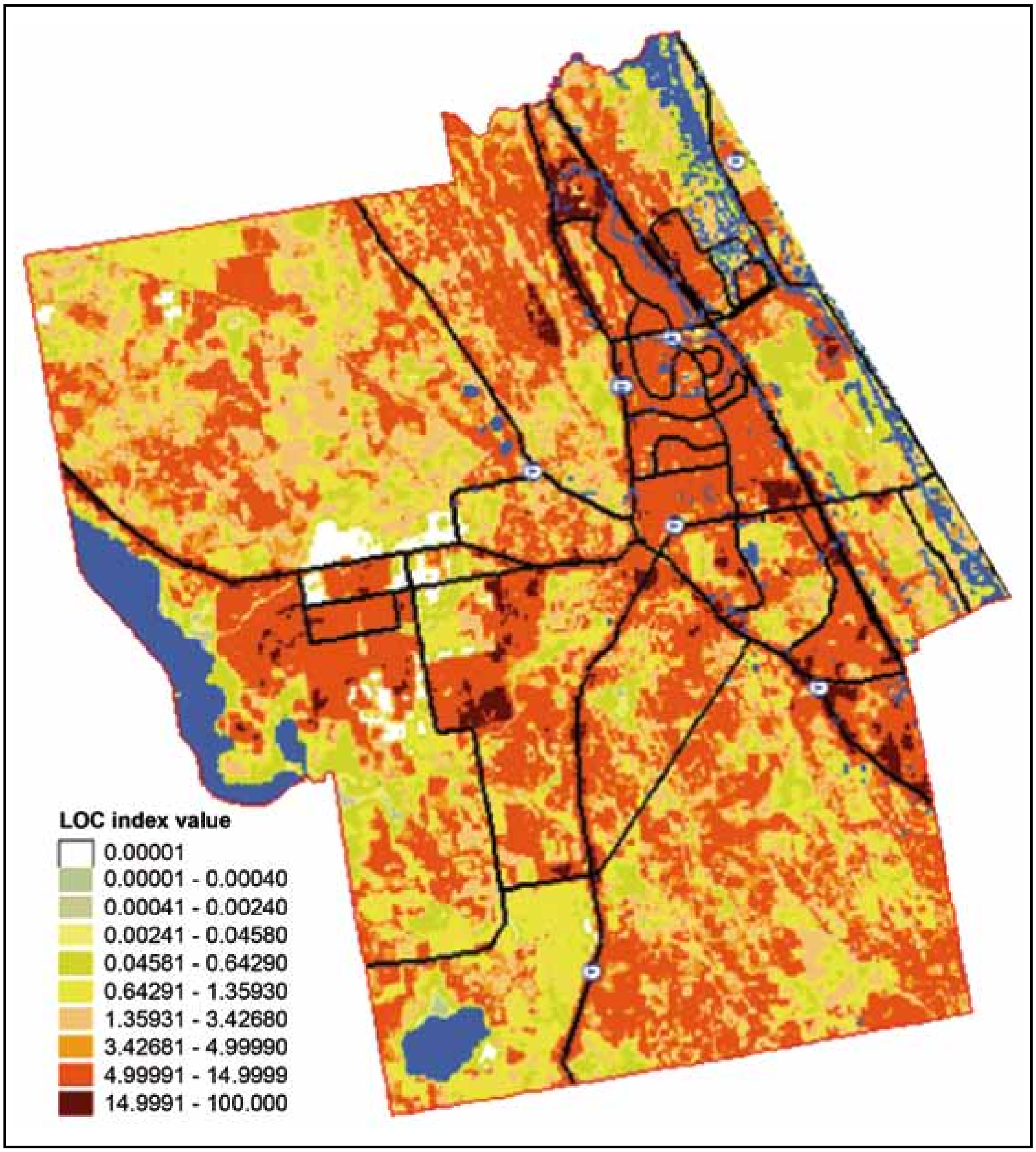

Figure 8—Flagler County, Level of Concern (LOC).

Fire Effects Index

The Fire Effects Index was calculated as the sum of the Values Impacted Rating times 0.68 and the Suppression Difficulty Rating times 0.32. The final Fire Effects Index can range from 0 to 100.

Level of Concern Index

The Level of Concern Index is calculated as the Wildland Fire Susceptibility Index times the Fire Effects Index. The WFSI is a value between 0 and 1. The Fire Effects Index is a value between 0 and 100. Hence, the LOC is a value between 0 and 100.

The output values were assigned to 10 LOC categories ranging from low concern to high concern. The LOC output can be used to prioritize areas for further analysis. An example LOC map for Flagler County in Florida is shown in Figure 8.

The LOC results can be used to complete a more detailed analysis at the local level and communicate wildland fire management concerns. The LOC results can be used to:

- Identify areas where mitigation options may be of value.
- Allow agencies to work together and better define priorities.
- Develop a refined analysis of a complex landscape and fire situations using GIS.
- Increase communication with local residents to address community priorities and needs.

Fire Response Accessibility Index

The Fire Response Accessibility Index (FRAI) is a relative measure of how long it would take initial attack resources to drive from their resource location to each cell. The Fire Response Accessibility Index is calculated based on the distance from resource locations. The speed traveled on roads was estimated based on the class of road. Travel off of roads was assumed to be at 5 mph. Water was coded as "NO DATA," meaning that travel across water could not be done unless there was a road crossing. A cost distance analysis was run allowing Arc/Info to assign an approximate time to reach each cell.

The Fire Response Accessibility Index allows users to identify areas of low accessibility from their resources. Coupled with the Levels of Concern data, this information will highlight areas where accessibility is low and the level of concern is high, providing valuable information for those concerned with the impacts of wildland fire. An example FRAI map for Flagler County in Florida is shown in Figure 9.

Uses and Application in Florida

During the initial development phase of the Florida Risk Assessment, the development team outlined the following project objectives:

- Rapidly identify areas that may require additional tactical planning.
- Allow agencies to work together to better define priorities and improve emergency response.
- Develop refined analysis of a complex landscape and fire situations using GIS.
- Increase communication with local residents to address community priorities and needs.
- Plan for fire protection resource needs.
- Identify fire protection resource allocation based on potentially severe fire problems.

Although it is generally believed that the goals and objectives were met, one point concerning the assessment should be emphasized. The FRA has many parts, and some of these parts have been used to support other state agency critical applications such as the Fire Management Information System. The success of the FRA extended beyond the original goals and objectives.

The Division of Forestry has produced two products to convey the Wildland Fire Risk in Florida. The first is the stand-alone desktop application that requires the following software: ArcView 3.x, Spatial Analyst, and FlamMap (Version 1) as well as the data for the specific areas of concern. This application permits the user to view the published data and make changes to both the fire occurrence and fuels to alter the relative risk in the area. The purpose of the modifications to fire occurrence or to fuels is to determine the effect a changing prevention effort or fuels management effort might have on the overall wildfire risk in a particular area.

The second application is Web based and can be found at: http://www.fl-dof.com/wildfire/wf_fras.html. This tool allows anyone with Web access to view the four primary published results data layers for Florida. These include the Wildland Fire Susceptibility Index, which is an indicator of the potential for wildfire in that area; the Fire Occurrence Areas, which is a map of the probability of an acre igniting based on the fire history in an area; the Surface Fuel Model Layer, which maps the surface fuels across the state; and the Level of Concern, which is a combination of all of the above as well as the suppression costs and environmental effects to give the user the general associated risk from wildland fire for a particular area. This tool has been very popular with homeowners and the media.

As an example of the interest in the FRA by the media, the following example from Brevard County is provided.

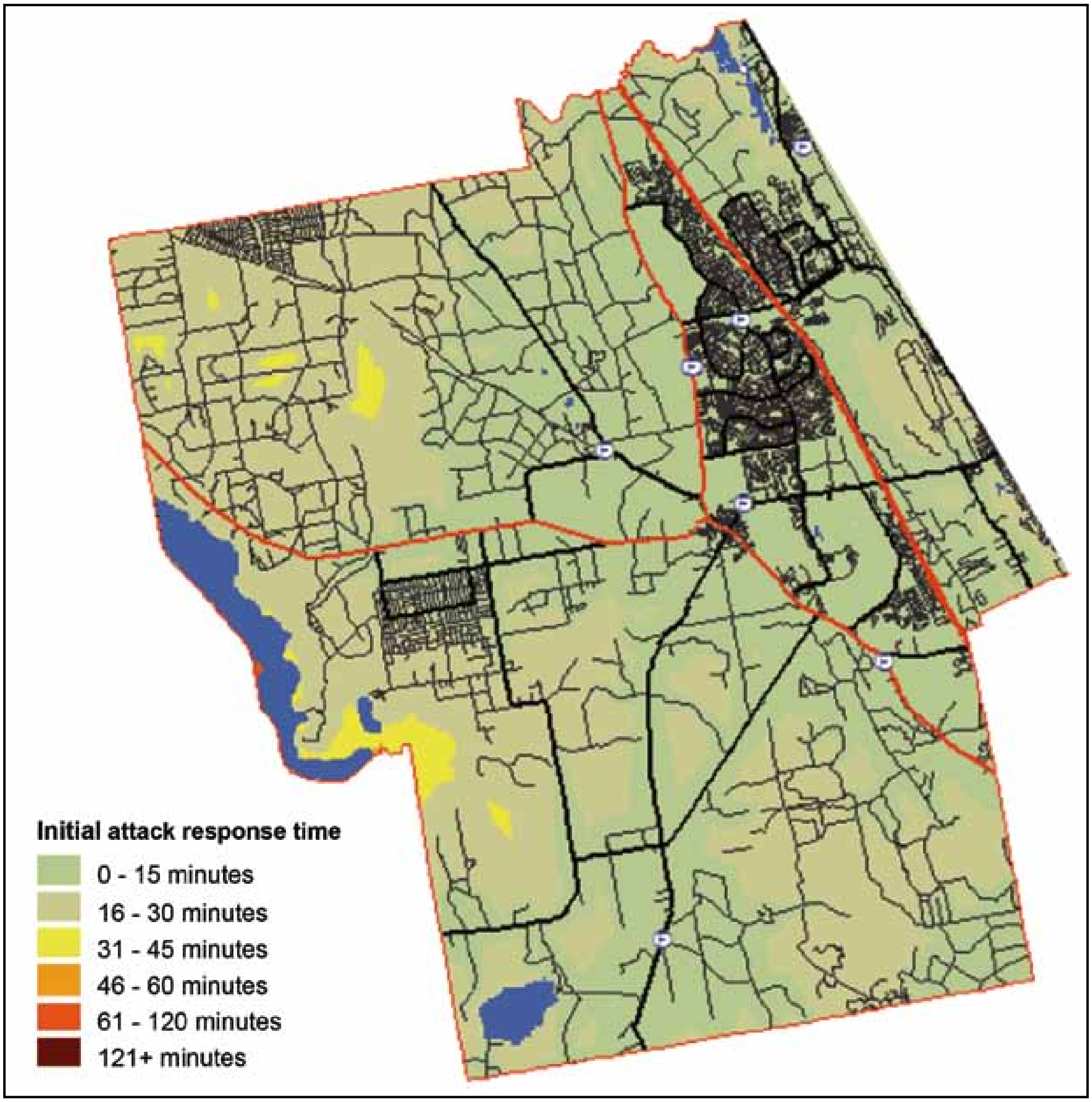

Figure 9—Flagler County, Fire Response Accessibility Index.

In May 2006, the *Florida Today* newspaper published an article about the Florida Wildland Fire Risk Assessment and highlighted some particular points the paper felt the general public should know. The paper detailed information about certain areas in Brevard County, which was impacted by the 2006 fire season. The following is a list of bullets that were included in the article:

- Thousands of homes in Brevard County lie within zones state foresters deem the most dangerous places for wildfires but often the least practical to burn or clear.
- Many single-family houses (5,000+) in Brevard were built on land considered at highest risk for wildfires.
- Thousands more mobile homes and other structures fall within the same danger zones.
- In Brevard County, 78,669 acres are in the high-risk zone, or about 12 percent of the county. Most of it, 49,545 acres, is in unincorporated areas, such

as those surrounding Lake Washington, west of Melbourne, and Lake Poinsett, west of Cocoa.

- West Melbourne, Melbourne, Melbourne Village, and Rockledge had the highest percentage of high-risk land, West Melbourne being the worst with 67 percent of its 3,648 acres within the highest risk area.
- Trees and brush border most homes, making few Brevardians immune from the wildfire threat.
- State fire managers focus most of their preseason prevention where forest hugs neighborhoods and important infrastructure. So they hope people such as Dyan Hilton, who lives in Poinsett Trailer Park—west of Cocoa and across from a huge wildfire danger zone to the south—take steps to keep the flames away.

In addition to the media, county and municipal governments are using the FRA as part of the county or local Comprehensive Planning Program that requires that all risk be considered as part of the planning for new development.

Fire departments and county planners are closely monitoring how communities structure access as well as do vegetation/fuel management in the initial phases of community development. It is emphasized that developers and homeowners should accept each party's responsibility in the protection of the property. When drought conditions occur and the fire weather gets to the point that fires begin to impact neighborhoods, firefighters have difficulty providing structure protection at every location within a subdivision. Planning for the future can prevent many of the problems experienced in recent years.

Florida has staffed four fuels mitigation teams that exclusively work in urban-interface areas. The FRA is the primary designator as to where these teams plan their efforts. The FRA paints a bull's-eye across the Florida landscape for everyone managing land and fire today, placing the priorities where they need to be based on fuels, climate, and historical fire activity.

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