

# Appendix A

## *The Data Sources for the Assessment of Terrestrial Resources in the Southern Appalachians*

### *Introduction*

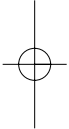
Identification of medium and fine scales data sources to address current status and past trends for broad land cover/vegetation types, communities, habitats, populations, and components of forest health was accomplished early in the process. Primary sources of data included: LANDSAT remotely sensed data; Forest Inventory and Analysis (FIA), Continuous Inventory of Stand Condition (CISC), and other inventories; Species Element of Occurrence (EOR) data; county density estimates for game species; 1:100,000 DLG ownership coverage; 1:100,000 water/stream reaches; 1:100,000 road coverage; 1:100,000 Digital Elevation Models; and the Southern Forest Health Atlas. Data analysis and interpretation processes relied heavily upon Geographical Information System (GIS) spatial and quantitative capabilities for data storage, retrieval, analysis, and display. Scientists and experts reviewed selected analyses and narratives throughout the assessment.

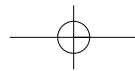
### *The Southern Forest Health Atlas*

The Southern Forest Health Atlas is a GIS database of the 13 southern states designed to show point-in-time status of several forest conditions and help in evaluation of the effects of combinations of conditions on forest health. It was originally developed as the Southern Forest Atlas Project, funded by the National Survey Program in the mid-1980s (Marx 1988). The original purpose was to test correlations of atmospheric pollutant concentrations with poor forest health conditions, but it has since evolved into a more comprehensive database including major pest conditions, weather, soils, and forest resources in addition to atmospheric deposition. It is maintained at the USDA Forest

Service, Southern Region, Forest Health Field Office, Asheville, NC, and is updated annually. Data layers and sources include:

1. Forest Types: county distribution for 22 Society of American Foresters (SAF) cover types with acreage and volume. Source: USDA Forest Service, Southern Research Station.
2. Soils: state soil associations (combinations of associated phases of soil series) with attributes (e.g. texture, pH, water-holding capacity, internal drainage). Source: State Soil Geographic (STATSGO) Database (1994).
3. Weather: monthly averages, monthly deviations from the mean and 0.5 degree grids for precipitation, maximum and minimum daily temperatures, relative humidity, and wind speed for the period 1951 to 1990. Source: National Climatic Data Center.
4. Ozone Concentration: point and girded coverages of 7-hour averages and the number of hourly occurrences above certain ppb levels since 1973. Source: EPA monitoring stations.
5. Pest Stressors: data may include one or more of the following: incidence, severity, risk rating, host range. Stressors included are annosum root disease, balsam woolly adelgid, beech bark disease, butternut canker, dogwood anthracnose, fusiform rust, gypsy moth, hemlock woolly adelgid, littleleaf disease, oak decline, and southern pine beetle. Source: Most data supplied by the USDA Forest Service, Southern Region Forest Health, from field survey. Other contributors include pest management specialists from state forestry agencies, USDA Forest Service Research (Forest Inventory and Analysis and Forest Insect and Disease Research Work Units) and the Animal and Plant Health Inspection Service.





## **Forest Inventory and Analysis**

The FIA provides information to public and private sectors on the status, trends and uses of forests in the US. Information contained in FIA comes from a series of permanent forest sample plots. There are 7,160 plots in the Southern Appalachian Assessment (SAA) area. The approximate densities of these plots range from one plot per 3,500 acres to one plot per 5,000 acres. The FIA information is administered by three research project leaders with different sampling and estimation procedures. The FIA is designed to assess large sampling areas. The inventories are commonly designed to meet sampling errors at the state level at the 67 percent confidence limit, with a 3 percent error per 1 million acres of timberland being the maximum allowable sampling error for area. As the sampling areas are subdivided into smaller sizes, sampling errors increase and reliability of estimates decrease (Hansen and others 1992).

For the SAA, FIA information was used primarily to determine successional class percentages of the identified forest cover classes and 20-year trends for forest cover classes and successional classes (Chapter 3). This information was stratified according to total area, ecological sections and section groups and broad ownership categories. FIA information was also used in many of the forest health hazard rating prediction models (Chapters 6 and 7).

## **Continuous Inventory of Stand Condition**

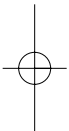
The National Forest System, Southern Region, maintains CISC, a database designed to continually reflect current forest description of every stand mapped. It also tracks planned management activities within a stand. Information in CISC is based on field examinations and aerial photographic interpretation. CISC has GIS capabilities with related tabular attribute data for each stand. These data were used to characterize forest cover successional classes on national forests and display and analyze initial inventory of possible old-growth on national forests (Chapter 3). CISC was also used in some forest health hazard rating prediction models (Chapter 6).

## **Satellite Imagery**

LANDSAT satellite Thematic Mapper™ digital imagery was the primary data source used to produce a spatial land cover data theme for the SAA. The analysis of current land cover conditions (Chapter 3) and habitat suitability (Chapter 3) relied on the satellite imagery. Imagery acquired between May 1992 and August 1994 from 13 scenes was required to provide coverage of the SAA. Both leaf-on and leaf-off images were available to the contractor, Pacific Meridian Resources (PMR), to perform the classification. Recent leaf-on satellite imagery was the primary source of spectral data. Ancillary data, including digital elevation models and National Wetlands Inventory (NWI) maps, were also used in developing the classification. A 16 class hierarchical land cover classification and associated decision rules were defined to support assessment activities. Classification, review, and editing produced a final raster cover classification that labeled each 30- by 30-meter (approximately 1/4 of an acre) image resolution element (pixel). A polygon land cover layer generalized to a 2-acre minimum mapping was derived from the raster classification. The final polygon classification was rasterized to provide the classification in an alternative format for analysis activities.

A multi-phase assessment of the accuracy of the land cover classification is being planned. More than two hundred primary sampling units distributed across the SAA at the nominal locations of Forest Health Monitoring sample points are the basis for the analysis. At each sample point a stereo triplicate of 1:12,000 color infrared aerial photography has been acquired and a circular sampling unit approximately 8,100 feet in diameter has been defined. The aerial photo interpretation phase of the assessment involves examination of a sample of between 1,500 and 2,000 land cover polygons located within, or intersected by, the sampling unit boundaries. A portion of the sample polygons will be visited during the ground phase of the accuracy assessment.

Because the accuracy assessment for the LANDSAT data will not be completed prior to the printing of the Terrestrial Report, caution in the use of this data is necessary. The validation and correction (if needed) of this data cannot



be completed until the field portion of the accuracy assessment is conducted. For this reason, these data were only used in cases when describing acres of combined forestland classes summaries, nonforest summaries, and landscape habitat suitability analysis (that utilized combined classes in most cases).

## ***Biological Conservation Database***

Selected biological conservation database (BCD) EOR data fields were obtained in March 1995 from natural heritage programs of the Alabama Department of Conservation and Natural Resources; Georgia Department of Natural Resources; North Carolina Department of Environment, Health and Natural Resources; South Carolina Wildlife and Marine Resources Department; Tennessee Department of Environment and Conservation; Virginia Department of Conservation and Recreation; and West Virginia Department of Natural Resources.

Use of EOR data centered on occurrence of federally listed T&E species and species with viability concern (federal category 1 or 2, globally ranked 1, 2, or 3). Any occurrences of rare communities were also utilized. The key records utilized in the SAA were Element Code (ELCODE), latitude, and longitude. The reliability of the individual records was considered, but could not be validated due to inconsistency in data entry for the first observation and last observation for an EOR. For this reason, all records were considered in the analysis. Users of the derived SAA data themes for T&E and viability concern species should be aware that all records are included. The raw data obtained from states in the SAA area will be destroyed or returned by January, 1996. Only derived themes will remain in the SAA data set and will contain no EOR locational information. The EOR data were the primary data used in determining findings shown in Chapter 3.

## ***Game Species County Density Estimates***

County population density estimates were obtained from biologists with the Alabama Department of Conservation and Natural Resources; Georgia Department of Natural

Resources; North Carolina Wildlife Resources Commission; South Carolina Wildlife and Marine Resources Department; Tennessee Wildlife Resources Agency; Virginia Department of Game and Inland Fisheries; and West Virginia Division of Natural Resources. These estimates are based on a combination of field inventories and knowledge of local state biologists. This was the primary data used in developing the findings shown in Chapter 3.

## ***Ownership***

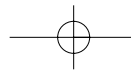
Ownership was generated from USGS 1:100,000 Digital Line Graph (DLG) files. The 1:100,000 DLG data contained only the proclamation boundaries for national forest lands. To include actual national forest ownership, the 1:24,000 stand cover layers were used to derive actual national forest ownership. Most of the analysis results were stratified to ownership based on this data set.

## ***Water and Stream Reaches***

Water body were generated from EPA Reach File Version 3.0 (RF3) digitized from 1:100,000 scale USGS 30- by 60-minute quadrangle maps. The RF3 database contains primarily 4th order streams. Most 2nd and 3rd order streams, and nearly all 1st order streams, are not included in the database. The SAA Aquatics Resources Team estimated that about 30 percent of the total length of headwater reaches on upper slopes is represented. Riparian habitat was estimated using these data elements (Chapter 3).

## ***Roads***

Road data were developed from USGS 1:100,000 Digital Line Graph (DLG) files. The roads within this database are identified based on road size and use. Class 1 includes all primary highways, both federal- and state-numbered routes. Class 2 is secondary routes such as major county roads. Class 3 is minor paved county roads and major gravel-surfaced roads. Class 4 includes paved streets in cities and towns and lesser rural gravel roads. These data were used to analyze black bear habitat and habitat for area-sensitive species in Chapter 3.



## ***Elevations***

Elevation information was derived using the 30 arc-second Digital Elevation Model (DEM). The general scale for this data set is 1:250,000. The data layer contains elevation values on a 3,050 foot grid. These data were developed through a series of procedures conducted by the Defense Mapping Agency Topographic Center and the National Telecommunications and Information Administration. Elevation data were used to distinguish suitable habitat for species and communities related to elevational changes (Chapter 3).

## ***Natural Resources Inventory Database – Trends for Non-Forest Lands***

The 1982 and 1992 Natural Resources Inventory (NRI) database was used to determine trends for nonforest land cover types since the early 1980s (Chapter 3). This data set was obtained from the Natural Resources Conservation Service. The NRI has more than 300,000 primary sampling units and approximately 800,000 sample sites nationwide (USDA NRCS 1994).

## ***Ecological Mapping Unit***

Spatial information-related ecological mapping units for provinces, sections, and subsections were obtained from 1:2,000,000 DLG data layers. These boundaries were developed from R.G. Bailey's (1995) work for provinces and sections. The subsections were developed by a USDA Forest Service interdisciplinary team in the Southern Region. Most of the analysis results were stratified to ecological sections or subsections based on this data set.

## ***National Interagency Fire Management Integrated Data Base***

Information used to map and report wildfire occurrence on public lands administered by the USDA Forest Service was obtained from individual fire reports within the SAA area. Fire reports provide timely statistical data and information for both administrative purposes and managers to use in making land and resource management decisions. The report is a record of occurrence, related fire behavior conditions, and the suppression actions taken by management. Data collected from a fire report enable the manager to monitor program performance and plan the most cost-effective fire management organization.

Individual Fire Reports for the USDA Forest Service are stored in the National Interagency Fire Management Integrated Data Base (NIFMED) at the Kansas City Computer Center. By the use of computer runstreams, data archived in this base were retrieved to provide wildfire information for public lands administered by the USDA Forest Service. Information for wildfires on lands administered by state, private, and the National Park Service was provided by representatives from those agencies. For the SAA, fire report information was used to display fire locations, fire size, fire causes, number of fires, and number of acres of private, state, and public lands burned by wildfire.

