

North Carolina's Forest Resources Assessment

A statewide analysis of the past, current and projected future
conditions of North Carolina's forest resources

2010

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"This document was produced in part with funding from the USDA Forest Service"



June 18, 2010

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June 18, 2010

Dear friends and colleagues,

Periodic reviews of our forest resources are needed to evaluate their ever-changing status and to assess the ability of our programs to meet the conservation and sustainability directives of the North Carolina Division of Forest Resources. These directives are to lead the people of our state to develop, protect and manage these resources to ensure that they will be conserved now and sustained for future generations. This is a daunting task and we must work together as partners to be successful. The document attached to this letter is our completed statewide forest resources assessment that evaluates and analyzes the past and current conditions and projects the future conditions of these resources. In addition, the document includes goals and objectives that describe what we need to do to address key findings of the assessment. The document also outlines strategies on how we plan to achieve these goals and objectives. And finally, it contains priority maps to help tell the story of our forest resources and to help build partnerships. This compilation of assessment, goals, objectives, strategies and priority maps will guide us in the next five years in planning for the conservation of these resources and the associated economic, ecological and public benefits these resources provide.

North Carolina is blessed to have rich and diverse forest resources. From our seashores to the peaks of the Appalachian and Blue Ridge Mountains, our forest resources enrich the lives of all North Carolinians. Forests provide us with clean water and air, wildlife, recreation and forest products. They provide jobs and income, as well as, a place to escape from our jobs. They support the number one manufacturing industry in North Carolina. Our forest resources entice people to come to North Carolina and they make our state great.

All North Carolinians are stewards of our forest resources and we must work together as partners to be successful. Throughout the past 18 months we have invited the help of partners to make this document and strategic plan useful and pertinent. If you have been a partner in this project, I want to thank you for your help. If you are new to this document, I encourage you to join us as a partner. At this time of rampant change, it is critical that we work together to develop, protect and manage the multiple resources of North Carolina's forests through professional stewardship, enhancing the quality of life for our citizens while ensuring the continuity of these vital resources.

We respectfully submit this assessment, strategies and priority maps for your consideration.

Wib Owen
North Carolina State Forester

Executive Summary

The following forest resource assessment and accompanying strategic plan and priority maps constitute a coordinated plan for moving North Carolina forests into the future. Driven by the need to efficiently target efforts to address state and national priorities, this document constitutes a broad vision for protecting and enhancing North Carolina forest values and benefits. While the mandate for this document and critical assessment originated in the 2008 Farm Bill under the Cooperative Forestry Assistance Act, its origins are deeply seated in a public that is demanding increased impact, accountability and innovation from its agencies. With that challenge as our goal, a committed group of staff, partners and sister agency personnel met over the past 18 months to make this publication a reality. The scope of this immense effort was only surpassed by the dedication and commitment of partners and staff who labored enthusiastically to complete this publication on time and on budget.

The arrangement of chapters mirrors the evolution of this effort from the Introduction (the process), Chapters 2-4 (reflect the national themes of Conserving Working Forests, Protecting Forests from Harm and Enhancing the Public Benefits from Forest. Within each of those chapters are comprehensive reviews of the condition of our forests and the impending threats and opportunities that exist to make them healthier, productive and yielding increased public benefits like clean air, water and precious wildlife habitat in urban and rural communities. The concluding Chapter 5 (Goals and Strategies is the logical follow-up to the assessment effort and constitutes a comprehensive a “strategic plan” for the next five years. The plan is organized by global goals that narrow to specific strategies that can be implemented at county and landowner level. Individual strategies specify the priority area, partners involved, resources required and connection to state assessment and national goals. The seven goals identified for North Carolina are listed below:

- Goal 1: Increase the sustainable management and conservation of forest lands in NC.
- Goal 2: Reduce negative impacts from forest threats.
- Goal 3: Increase the restoration, maintenance, and management of fire adapted species and ecosystems.)
- Goal 4: Maintain or increase the viability and sustainability of existing and emerging markets.
- Goal 5: Increase and enhance fish and wildlife habitat on North Carolina’s forests
- Goal 6: Manage, conserve, restore, and enhance forestlands important to current and future supplies of clean water for economic, social, and ecological uses.
- Goal 7: Enhance the benefits and sustainable management of urban forests.

The priority landscape and program maps complete the document by illustrating areas within the state that will best be served by the strategic efforts detailed in the plan. The maps reflect the conservation, protection and enhancement themes that permeate the assessment document and

federal directives. The priority landscape and program maps were developed to educate and inform constituent and to focus implementation and ultimately deploy resources. Priority areas will likely be used for USDA Forest Service accomplishment reporting by the Division of Forest Resources and for multi-state partnerships funding pursuits. Priority areas will not restrict program delivery nor interfere with equitable provision of assistance nor services. Certain functions, such as firefighting and insect / disease outbreak response, imminent threats to life and property will always take precedent. The intent from the onset was to use the assessment and planning process to become a more efficient agency in the delivery and deployment resources to protect, enhance and conserve our state forest resources. We welcome your assistance and support in making our intentions your reality!

Acknowledgements

The following individuals and the organizations they represent contributed countless hours to the development and completion of this document. The coordinators express our sincere gratitude to all who played a role in this effort.

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Partners and Stakeholders

Representatives from the following federal state and local government agencies, non-profit organizations, associations, partnerships and private interests contributed to this effort in numerous ways. Individuals representing the numerous partners and stakeholders listed below served on various working groups during the assessment phase, participated in one or more of the three partner/stakeholder meetings, provided comments and suggestions during the review process, assisted in development of GIS map products and were involved in the development of

goals, objectives and strategies. Engagement of and collaboration with these same partners and stakeholders is crucial as the focus turns to implementation of the strategies identified in this assessment.

Albemarle-Pamlico National Estuary Program	NC Prescribed Fire Council
Camp Lejeune Forestry	NC State University College of Natural Resources
City of Wilmington	NC State University Department of Forestry and Environmental Resources
The Conservation Fund	NC Tree Farm Program
The Conservation Trust for North Carolina	NC Urban Forestry Council
Duke University	NC Wildlife Federation
Environmental Defense Fund	NC Wildlife Resource Commission
The Nature Conservancy	NC Woodlands
NC Association of Consulting Foresters	Resource Management Service, LLC
NC Association of Professional Loggers	Southern Appalachian Multiple-Use Council
NC Cooperative Extension Service	Southern Environmental Law Center
NC Department of Agriculture	State Climate Office of North Carolina
NC Department of Environment and Natural Resources	Triangle Land Conservancy
NC Division of Forest Resources	US Environmental Protection Agency
NC Division of Parks & Recreation	US Fish and Wildlife Service
NC Division of Water Resources	USDA Forest Service
NC Division- Society of American Foresters	USDA Farm Service Agency
NC Farm Bureau	USDA Natural Resources Conservation Service
NC Forestry Association	Weyerhaeuser
NC Green Builders Association	
NC Natural Heritage Program	

A special note of thanks to the following individuals: Susan Moore, PhD and Kelley McCarter of NCSU's Forestry and Environmental Outreach Program for editing, layout, and review website development; Barbara Scott, NCSU Communication Services for reviewing/editing style for the total project; Tom James, Webmaster, NCDFR for design and maintenance of the website ncforestassessment.com; and Carol Price, PhD, former State Wildlife Action Plan Coordinator with the NC Wildlife Resources Commission for assistance in identifying important strategy linkages to the Wildlife Action Plan.

Contents

Executive Summary	ii
Acknowledgements	iv
List of Goals and Objectives	ix
List of Tables.....	x
List of Figures	xiii
Chapter 1. Assessment Process and Outcomes	1
a. Background and Approach	2
b. Priority Map Development.....	8
c. Multistate and USFS Redesign Efforts.....	15
d. Implementation and Next Steps	18
Chapter 2. Conserving Working Forest.....	23
a. North Carolina’s Forests in 2007	24
b. Declining Forest Types	52
c. Family and Minority Forests Ownership.....	62
d. Population Growth and Land-Use Change Impacts.....	69
e. Management Practices for Forestry and Wildlife.....	80
f. Emerging Markets in Ecosystem Services.....	105
Chapter 3. Threats to Forest Health	112
a. Insects, Diseases, and Non-native Invasive Plants: Threats to Forest Health.....	114
b. Fire and Fire Exclusion in North Carolina’s Forests.....	131
c. Climate, Atmosphere, and Natural Disasters	140
Chapter 4. Enhancing the Benefits of North Carolina's Forests.....	150
a. Forest Industry Employment	153
b. Timberland Property Values	162
c. Timber Stumpage Values	166

d. Primary Wood-Using Facilities.....	176
e. Non-timber Forest Products	184
f. Water Quality and Quantity	189
g. Forest Wildlife Habitat.....	200
h. Bioenergy in North Carolina	242
i. Recreation Resources	248
j. Heritage Resources.....	254
k. Maintaining Viable Urban Forests	258
Chapter 5. Goals, Objectives, and Strategies	276
a. Introduction	279
b. Goals, Objectives, and Strategies Summary	281
c. Abbreviations and Acronyms	288
d. Goals, Objectives, and Strategies Matrix	292
Glossary	348
Appendix A: Contributing Plans & Resources	358
Appendix B: GIS Processes and Data Sources.....	359
Appendix C: Legacy Assessment of Need.....	413
Appendix D. Acres planted by cost share program.....	471
Appendix E: Game and Priority Species in North Carolina.....	472

List of Goals and Objectives

Goal 1.—Increase the sustainable management and conservation of forests.....	292
Objective 1.1.—Conserve high-priority forest ecosystems and landscapes.	292
Objective 1.2.—Assist landowners with actively and sustainably managing forests for economic and social benefits.....	293
Objective 1.3.—Assess and redefine services provided to forestland owners to efficiently and effectively meet their diverse management objectives.	295
Objective 1.4.—Strengthen and support an urban-focused initiative that meets ownership objectives for urban-rural interface landowners and communities.	297
Goal 2.—Reduce negative impacts from forest threats.....	299
Objective 2.1.—Minimize the impacts of wildfire on forests, citizens, and communities.	299
Objective 2.2.—Minimize negative impacts to forest health caused by major, locally significant, or imminent insects, diseases, and nonnative invasive plants.....	302
Objective 2.3.—Identify impacts and develop long-term approaches that minimize negative influences on forests caused by climate change, air quality, and weather events.....	306
Goal Statement 3.—Increase the restoration, maintenance, and management of fire-adapted species and ecosystems.....	308
Objective 3.1.—Promote a greater acceptance of prescribed fire and its increased use.....	309
Objective 3.2.—Restore and conserve fire-adapted species, habitats, and forest ecosystems.....	312
Objective 3.3.—Restore and conserve longleaf pine forests.	314
Goal 4.—Maintain or increase the viability and sustainability of existing and emerging markets.....	316
Objective 4.1.—Advocate forest sustainability and market viability (current and future) for consumers and producers.	317
Objective 4.2.—Advocate and promote domestic and export market opportunities for traditional forest products, including biomass and underutilized species.....	319
Objective 4.3.—Advocate and promote markets for forest-derived ecosystem services, non-timber products, and ecotourism.	320
Goal 5.—Increase and enhance forest fish and wildlife habitat.....	323
Objective 5.1.—Protect and conserve priority forest fish and wildlife habitat.....	324

Objective 5.2.—Restore and actively manage forests to benefit priority fish and wildlife habitats.	327
Objective 5.3.—Promote the restoration and conservation of declining tree species and forest ecosystems.....	330
Objective 5.4.—Educate natural resource professionals, the general public, landowners, and K-12 schoolchildren about forestland conservation, restoration, and management, and the value of forests for fish and wildlife habitat.	332
Goal 6.—Manage, conserve, restore, and enhance forestlands important to current and future supplies of clean water for economic, social, and ecological uses.	334
Objective 6.1.—Increase implementation of forestry BMPs and compliance with water-quality regulations.	334
Objective 6.2.—Retain or increase the area of forestland within priority watersheds.....	336
Objective 6.3.—Conduct education and outreach on the relationships between forests and water resources.....	337
Objective 6.4.—Offer landowners technical assistance that incorporates water-resource management with forest management.....	339
Goal 7.—Enhance the benefits and sustainable management of urban forests.	341
Objective 7.1.—Reduce the impacts of land-use change and urbanization on forested landscapes in and around urban areas.	342
Objective 7.2.—Facilitate strategic planting and maintenance of community trees for public benefits.	343
Objective 7.3.—Assist communities with establishing and managing their urban forests.	345
Objective 7.4.—Encourage policies and guidelines that sustain urban and community forests for the public’s benefit.	346

List of Tables

TABLE 1c-1.—Current USFS Redesign Grant projects managed by the NC Division of Forest Resources	16
TABLE 1d-1.—NC Forest Stewardship Program accomplishments	20
TABLE 1d-2.—NC Forest Legacy Tracts (enrolled from 2000 – 2009)	21
TABLE 2a-1.—Timberland area by major species groups, forest type groups and survey unit, 2007.....	28

TABLE 2a-2.—Summary of NC CPP Activity by Fiscal Year and National Forestland.....	35
TABLE 2a-3.—Acres of land owned by major military installations in NC	36
TABLE 2a-4.—Timberland acres by survey unit and forest management type for survey years 2002 and 2007.....	40
TABLE 2a-5.—Change and percent change in timberland acres by survey unit and forest management type for survey years 2002 and 2007.....	40
TABLE 2b-1.—Total area (acre) for longleaf pine type (141) and longleaf–scrub oak type (403) and ownership of combined forest types, 1990 – 2007	53
TABLE 2b-2.—Area (acres) of Atlantic white cedar forestland, 1990 – 2007.....	56
TABLE 2c-1.—Area of family-owned, private, and public forests in North Carolina, 2006	62
TABLE 2c-2.—North Carolina Farm Demographic Summary, 2007.....	65
TABLE 2d-1.—Growth in number of housing units in North Carolina.....	71
TABLE 2d-2. National Resources Inventory (NRI) data for change in developed area by geographical region, 1987-2007	75
TABLE 2d-3. Development projections by county groupings, 2007-2027.....	76
TABLE 2e-1.—Status and trend of NC forest management practices by ownership group, 1990 – 2002, in annual acres treated and percent change over survey period.....	83
TABLE 2e-2.—5-year summary of urban and forest management plans developed and acres impacted by management or assistance	84
TABLE 2e-3.—Summary of FDP acres accomplished by management practice (1999 – 2008)	86
TABLE 2e-4.—5-year summary of forest stand improvement accomplishments ¹ by NIPF	88
TABLE 2e-5.—Projected growth and yield data for unthinned pine management intensities levels	89
TABLE 2e-6.—Summary of prescribed burning acres in North Carolina by region and purpose, 2000 – 2005.....	93
TABLE 2e-7: 5-year Summary of Non-Timber Resource Protection and Enhancement ¹ projects conducted by NIPF owners involving NCDNR personnel or programs	95
TABLE 2e-8.—Summary of forestry site inspections ¹ for <i>NC Forest Practices Guidelines</i> (FPG) related to water quality.....	96
TABLE 2e-9.—Summary of NC forest practices guidelines (FPG) referrals ¹	97
TABLE 2e-10.—Primary organizations conducting forestry research in North Carolina	99
TABLE 2e-11.—Forestry-related cooperatives in North Carolina.....	99
TABLE 3a-1.—Locally significant diseases	122
TABLE 3a-2.—Locally significant Insects	122
TABLE 3a-3.—Locally significant Non-native Invasive Plants	123
TABLE 3a-4.—Forest threat organisms found in transported firewood.....	128
TABLE 3c-1.—Acres damaged and value lost when timber was damaged by three recent major hurricanes.....	147
TABLE 3c-2. Acres damaged and value lost during three recent major winter storms	148

TABLE 4a-1.—NC forest industry related employment and wages average annual growth rate (%) by NAICS sector, 1990 – 2008	156
TABLE 4d-1.—Primary wood-using facilities in North Carolina by mill type and percent change, 1990 – 2007	177
TABLE 4d-2.—Number of sawmills by size and survey unit, 2007	178
TABLE 4g-1. Primary forest habitat types in North Carolina by type and region.....	202
TABLE 4g-2. NC longleaf pine acreage by county, 2005.....	222
TABLE 4h-1.—NC woody biomass availability (tons/year)	244
TABLE 4k-1.—Area within each urban designation by forested and nonforested land use.....	259
TABLE 4k-2.—Size classification of North Carolina communities based on population	260
TABLE 4k-3.—Layer weights for Issue 1 (Changing land use patterns and increasing urbanization are threatening the health and viability of urban forests.)	261
TABLE 4k-4.—Area within city boundaries and ETJ, by forest and nonforest acres, for 2010 and 2030.....	263
TABLE 4k-5.—Layer weights for Issue 2 (Natural catastrophic events can threaten the health, value and ecological integrity of urban forests.).....	264
TABLE 4k-6.—Layer weights for Issue 3 (The rise in atmospheric concentrations of greenhouse gasses, especially carbon dioxide, as a result of the burning of fossil fuel and conversion of forest to other land uses has and will continue to have an impact on our climate, air quality, urban forest health, and quality of life.).....	266
TABLE 4k-7.—Net benefits of an urban tree from time of planting to 40 years by NC region	269
TABLE 4k-8.—Layer weights for Issue 4 (The urban tree canopy is underutilized as a tool in energy conservation efforts.)	269
TABLE 4k- 9.—Layer weights for Issue 5 (Urban forestry information and education is not reaching the citizen level to generate support and advocacy at the local/municipal level needed to develop proactive urban forest management programs.)	271
TABLE 4k-10.—Layer weights for the “Overall Urban Forest Priority”	272
TABLE 4k-11.—Number of municipalities and population analysis within each priority class for the overall urban forest priority	274
TABLE 4k-12.—Top 20 communities, ranked by population, for overall priority for maintaining viable urban forests in North Carolina.....	274
TABLE D-1.—North Carolina acres planted by cost share program (1970-2008).....	471
TABLE E-1.—Game Species in North Carolina.....	472
TABLE E-2.—Priority aquatic species in North Carolina	474
TABLE E-3.—Priority species for the Mid-atlantic Coastal Plain ecoregion.....	481
TABLE E-4.—Priority species for the Piedmont ecoregion	484
TABLE E-5.—Priority species for the Southern Blue Ridge ecoregion	486

List of Figures

FIGURE 1a-1. Relationship and process flow of the statewide forest resource assessment, the goals/objectives/strategies, and the priority maps.	6
FIGURE 1b-1. Relationship between the <i>Statewide Forest Resource Assessment</i> , the goals/objectives/strategies, and the priority maps.	9
FIGURE 1b-2. Conserving Working Forestlands map.	11
FIGURE 1b-3. Protecting Forests and Communities from Wildfire Risk map.	11
FIGURE 1b-4. Forest Health Priority map.	12
FIGURE 1b-5. Maintaining Viable Urban Forests map.	12
FIGURE 1b-6. Rural Forest Priority Landscapes map.	13
FIGURE 1b-7. Urban Forest Priority Landscapes map.	14
FIGURE 2a-1. Classification of land area in North Carolina, 2007.	26
FIGURE 2a-2. Physiographic regions of North Carolina based upon survey unit (county) boundaries (data collected in the coastal plain units is cumulative throughout this section).	26
FIGURE 2a-3. Trends in timberland area in North Carolina by survey unit.	27
FIGURE 2a-4. Public land, private forest land, and private non-forest land in North Carolina, 2006.	28
FIGURE 2a-5. Trends in area of timberland in North Carolina for surveys completed in 1938, 1956, 1964, 1974, 1984, 1990, 2002, and 2007.	30
FIGURE 2a-6. Area of timberland by ownership in North Carolina for the 2007 survey.	32
FIGURE 2a-7: Ownership trends for timberland in North Carolina.	33
FIGURE 2a-8: Ownership trends for public agencies in North Carolina.	34
FIGURE 2a-9. Acres of forestland by ownership class in North Carolina.	35
FIGURE 2a-10. Forest-type groups of North Carolina.	37
FIGURE 2a-11. Trends in area of timberland by forest-type groups and stand origin for North Carolina.	37
FIGURE 2a-12: Timberland trends for the longleaf–slash pine type group.	39
FIGURE 2a-13. Area of timberland by forest-management type.	39
FIGURE 2a-14. Volume of live softwood trees on timberland by stand origin and survey year.	41
FIGURE 2a-15. Volume of live trees on timberland by species and survey year.	42
FIGURE 2a-16. Volume of live softwood trees on timberland by diameter class.	42
FIGURE 2a-17. Volume of live hardwood trees on timberland by stand origin and survey year.	43
FIGURE 2a-18. Volume of live trees on timberland by species and survey year.	43
FIGURE 2a-19. Volume of live hardwood trees on timberland by diameter class.	44
FIGURE 2a-20. Average net annual growth and removals of softwood live trees by survey period.	45
FIGURE 2a-21. Components of change for softwoods by survey period.	46
FIGURE 2a-22. Average net annual growth and removals of hardwood live trees by survey period.	47

FIGURE 2a-23. Components of change for hardwoods by survey period.....	47
FIGURE 2b-1. North Carolina longleaf pine forest distribution in 2008 versus historic range... 53	53
FIGURE 2b-2. Acres of longleaf establishment by federal and state cost-share programs, 1997 – 2007.....	54
FIGURE 2b-3. North Carolina shortleaf pine forest distribution in 2008 versus historic range.. 58	58
FIGURE 2b-4. Area of shortleaf pine in acres for geographical regions of North Carolina from analysis of the 2007 forest inventory data.	58
FIGURE 2b-5. Area of shortleaf pine from 1990, 2002, 2007 forest inventory data for the shortleaf pine and shortleaf pine–oak forest types.....	59
FIGURE 2b-6. Percentage of total shortleaf pine area that shifted to older stands from analysis of the 2007 Forest Inventory Analysis data for North Carolina.....	59
FIGURE 2c-1. North Carolina farmland at risk of development.....	64
FIGURE 2c-2. Minority landholders and working forests in the South.....	65
FIGURE 2c-3. Minority population density in North Carolina by Census block group.	67
FIGURE 2d-1. North Carolina population level for urban and rural populations from 1980 to 2008.....	70
FIGURE 2d-2. Population projections by 10-year period for North Carolina and the United States from April 2000 to July 2030.	70
FIGURE 2d-3. Population by census tract (square mile) in North Carolina.	72
FIGURE 2d-4. Average number of acres per housing units in North Carolina in 2010.....	72
FIGURE 2d-5. Average number of acres per housing units in North Carolina in 2030.....	73
FIGURE 2d-6. Percent of land developed in North Carolina, 2010.....	73
FIGURE 2d-7. Development changes in North Carolina, 1990 – 2010.	74
FIGURE 2d-8. Estimated changes in development in North Carolina, 2010 to 2030.....	75
FIGURE 2e-1. Acres reforested in North Carolina by cost-share programs (1970 – 2008)	85
FIGURE 2e-2. Total number of acres treated with herbicides for forestry purposes involving NCDFR, 1996 – 2006	90
FIGURE 2f-1. Approximate wetland and stream mitigation site opportunities for private landowners.....	107
FIGURE 2f-2. Approximate nutrient offset bank opportunities for private land owners.....	107
FIGURE 2f-3. Federally-listed species occurrences in North Carolina.....	109
FIGURE 2f-4. Estimated forest carbon biomass (above- and below-ground) in North Carolina.	110
FIGURE 3a-1. Map of North Carolina’s major insect and disease threats by risk level.....	115
FIGURE 3a-2. Southern pine beetle hazard map.	118
FIGURE 3a-3. European gypsy moth quarantine map, 2008.....	119
FIGURE 3a-4. Imminent forest health threats map; includes emerald ash borer, Asian longhorned beetle, redbay ambrosia beetle, and sirex woodwasp.....	124
FIGURE 3a-5. Major non-native invasive imminent threats.....	127
FIGURE 3b-1. North Carolina acreage at moderate to extreme risk of wildfire by risk level.. 131	131

FIGURE 3b-2. Fire occurrences in North Carolina, 2000 – 2008.....	132
FIGURE 3b-3. Presumed mean interval (years) between fire return in NC under a presumed historical regime.....	133
FIGURE 3b-4. Smoke-sensitive areas in North Carolina, 2009.....	133
FIGURE 3b-5. Percentage of NC homes vacant in 2000.	135
FIGURE 3b-6. Wildland-urban interface areas in North Carolina based on vegetation and housing density, 2000.	136
FIGURE 3b-7. NC communities at risk of wildfire, 2009.....	137
FIGURE 3b-8. North Carolina CWPPs, 2009.	137
FIGURE 3c-1. Historic and projected changes in sea level based on the Canadian and Hadley model simulations.	143
FIGURE 3c-2. NC coastal areas within 6 feet of sea level.....	144
FIGURE 3c-3. Tropical storms and hurricanes, 1950 – 2008. A storm was counted if its eye passed within 50 miles.	146
FIGURE 3c-4. Annual freezing rain event frequency, 1948 – 2003.	148
FIGURE 4a-1. North Carolina forest industry related and private industry jobs, 1990 – 2008.	155
FIGURE 4a-2. Forest industry related employment trends by NAICS sector, 1990 – 2008.	155
FIGURE 4a-3. Total number of logging establishments in North Carolina by year, 1990 – 2008.	158
FIGURE 4a-4: North Carolina certified prologgers by county.	158
FIGURE 4a-5. Forestry industry related and private industry wages in North Carolina by year, 1990 – 2008.....	159
FIGURE 4a-6. Forest industry related wage trends in North Carolina by NAICS sector and year, 1990-2008.	159
FIGURE 4b-1. Southeastern timberland sales, weighted average price per acre, 1996 – 2007.	163
FIGURE 4c-1. Pine sawtimber stumpage price history, 1999 – 2008.....	167
FIGURE 4c-2. Average pine sawtimber stumpage prices by NC region and statewide, 1976- 2008.....	167
FIGURE 4c-3. Pine pulpwood stumpage price history, 1976 – 2008.	168
FIGURE 4c-4. Eastern versus western NC pine pulpwood prices.	169
FIGURE 4c-5. Pine pulpwood stumpage price history, 1999 to 2008.	169
FIGURE 4c-6. Hardwood pulpwood stumpage prices history, 1976 to 2008.....	170
FIGURE 4c-7. Eastern versus western NC hardwood pulpwood prices.	170
FIGURE 4c-8. Hardwood pulpwood stumpage price history, 1999 to 2008.....	171
FIGURE 4c-9. Average mixed hardwood sawtimber stumpage prices by NC region and statewide, 1976-2008.	171
FIGURE 4c-10. Mixed hardwood sawtimber stumpage price history, 1999 to 2008.	172
FIGURE 4c-11. Eastern NC pulpwood price comparison, pine versus hardwood, 1976 – 2008.	173

FIGURE 4c-12. Western NC pulpwood price comparison, pine versus hardwood, 1976 – 2008.	173
FIGURE 4c-13. NC 8-year average of total stumpage value by county and wood-using mills, 2001 – 2008.....	174
FIGURE 4d-1. NC primary wood-using mills, 2007.....	177
FIGURE 4d-2. Wood-using facilities and total roundwood production by year in North Carolina, 1990 – 2007.....	178
FIGURE 4d-3. Number of North Carolina wood-using facilities and total roundwood sawlog production by year, 1990 –2007.	179
FIGURE 4d-4. Number of NC wood-using facilities and total roundwood pulpwood production by year, 1990 – 2007.....	180
FIGURE 4d-5. Number of NC wood-using facilities and total roundwood composite panel productions by species and year, 1990 – 2007.	181
FIGURE 4d-6: Number of NC wood-using facilities and total roundwood veneer log production by year, 1990 – 2007.....	182
FIGURE 4e-1: Perceived distribution of non-timber forest products enterprises in the Southeast, 2003.....	186
FIGURE 4f-1. River basins of North Carolina.	190
FIGURE 4f-2. North Carolina annual precipitation.....	191
FIGURE 4f-3. North Carolina annual runoff.....	191
FIGURE 4f-4. Key subbasins for freshwater conservation: Subbasins impaired for aquatic life use support.	192
FIGURE 4f-5. Forest and/or natural cover trends in relation to impervious cover.	193
FIGURE 4f-6. Piedmont Crescent.	194
FIGURE 4f-7. Forecast of water demand growth 2005 – 2030 (all sectors included).	195
FIGURE 4f -8a. Priority forest watersheds in North Carolina for water quality and quantity illustrating a subwatershed relative value.....	196
FIGURE 4f-8b. Priority forest watersheds in North Carolina for water quality and quantity illustrating a 30-meter pixel display.	196
FIGURE 4g-1. Ecoregions of North Carolina.	201
FIGURE 4g-2. River Basins of North Carolina.....	235
FIGURE 4h-1. NC energy consumption, 2002.....	243
FIGURE 4h-2. NC Forest industry residues by product class.....	244
FIGURE 4h-3. U. S. Environmental Protection Agency tracked sites in North Carolina with biorefinery facility site potential.....	245
FIGURE 4i-1. Popularity of recreational activities in North Carolina in 2006 based on percent of respondents.	249
FIGURE 4i-2. North Carolina open space and conservation land.....	250
FIGURE 4j-1. Location map of current NC “State Historic Sites.”	255
FIGURE 4j-2: Projectile points of the NC piedmont.....	256

FIGURE 4k-1. North Carolina urban housing density in 2000 and designation of urban areas and urban clusters, representing land area included within the analysis.	259
FIGURE 4k-2. Priority ranking of urban areas identifying areas that would increase urban forest health and viability.....	262
FIGURE 4k-3. Priority ranking of named places plus associated ETJ, identifying municipalities experiencing rapid growth but currently forested.	262
FIGURE 4k-4. Priority areas index identifying where urban forest areas and their associated values are most at risk from catastrophic events.	265
FIGURE 4k-5. Priority ranking of named places identifying municipalities where urban forests and their associated values are most at risk from catastrophic events.....	265
FIGURE 4k-6. Priority areas index identifying areas with poor air quality, but with opportunities for tree conservation.	267
FIGURE 4k-7. Priority ranking of named places identifying municipalities with poor air quality, but with opportunities for tree conservation.	267
FIGURE 4k-8. North Carolina Electricity consumption by sector in million kWh.....	268
FIGURE 4k-9. Priority areas index identifying areas where urban tree canopy has potential to reduce energy demands.....	270
FIGURE 4k-10. Priority ranking of municipalities with the greatest potential to reduce energy demand by increasing urban tree canopy.....	270
FIGURE 4k-11. Priority ranking of named places identifying municipalities missing one or more of the components required to be classified as a managing urban forestry program.....	272
FIGURE 4k-12. Priority areas identifying areas with greatest potential to improve urban forest health and viability.....	273
FIGURE 4k-13. Priority ranking of named places identifying municipalities with greatest potential to improve urban forest health and viability.	273
FIGURE C-1.—North Carolina Forest Legacy Areas.....	416

Chapter 1. Assessment Process and Outcomes

1. Assessment Process and Outcome

1.a.

Background and Approach

The USDA Forest Service and state forestry agencies have enjoyed an effective and unique partnership of assistance and outreach to private landowners, communities, tribes, and other partners for several decades under the State and Private Forestry (S&PF) organization. A component of this partnership involves financial support from the USDA Forest Service to support state programs and efforts in sustainable forest management, urban and community forestry, wildland fire management, forest health protection, and conservation education. The Food, Conservation, and Energy Act of 2008, also known as the 2008 Farm Bill, directed the USDA Forest Service to implement a “Redesigned” State and Private Forestry organization. The purpose of this new approach to S&PF is to shape and influence forestland use on a scale, and in a way, that optimizes public benefits from trees and forests for both current and future generations. The Redesign approach involves (1) an examination of current conditions and trends affecting forestland and (2) a review of S&PF programs to see if technical, financial, and other resources are being most effectively applied. The goal of this approach is to proactively address forestry challenges by developing and delivering an up-to-date set of programs, skills, and opportunities.

As part of the Redesign effort, each state must complete a statewide assessment of forest resources and a strategy for their management to receive federal funding. Each assessment is to provide a

comprehensive analysis of forest-related conditions, trends, threats, and opportunities within a state. The resource strategies developed along with the assessment define long-term plans for investing state, federal, and other resources where they can most effectively stimulate or leverage desired action and engage multiple partners.

Federal Redesign guidance directs states to develop statewide forest resource assessments that do the following:

- Provide an analysis of present and future forest conditions, trends, and threats on all ownerships in the state using publicly available information.
- Identify forest-related threats, benefits, and services consistent with the S&PF Redesign national themes.
- Delineate priority rural and urban forest landscape areas to be addressed by the state resource strategy. States can also identify linkages between terrestrial and aquatic habitat, as appropriate.
- Work with neighboring states and governments to identify any multistate areas that are a regional priority.
- Incorporate existing statewide plans, including wildlife action plans and community wildfire protection plans. Address existing S&PF program planning requirements. States can also draw upon relevant national and regional assessments as appropriate.

Building on the findings in the statewide forest resource assessments, federal Redesign guidance directs the development of statewide forest resource strategies. The guidance requires each state to outline long-term strategies for addressing (1) priority landscapes identified in the state forest resource assessment and (2) the following national themes and associated management objectives:

- Conserve working forestlands: Conserve and manage working forest landscapes for multiple values and uses.
- Protect forests from harm: Protect forests from threats, including catastrophic storms.
- Enhance public benefits from trees and forests: Conserve and enhance air and water quality, soil, biological diversity, carbon storage, forest products, forestry-related jobs, production of renewable energy, and wildlife habitat.
- Describe how the state proposes to invest federal funding, along with other resources, to address state, regional, and national forest management priorities.
- Include a long-term timeline for project and program implementation.
- Identify partner and stakeholder involvement.
- Identify strategies for monitoring outcomes within priority forest landscape areas and how action will be revised when needed.
- Describe how the state's proposed activities will accomplish national S&PF objectives and respond to

specified performance measures and indicators.

- Describe how S&PF programs will be used to address priority landscape and management objectives.
- Incorporate existing statewide plans, including wildlife action plans and community wildfire protection plans, and address existing S&PF program planning requirements.

Developing North Carolina's Statewide Forest Resource Assessment and Strategy

Issue Identification and Formulation

During the fall of 2008, the NC Division of Forest Resources (NCDNR) formed a task force to guide the development of the statewide forest resource assessment and strategy. Task force members first reviewed current and previously conducted assessments and plans. This review helped us to identify key focus points for our assessment efforts. Although numerous resources were reviewed and contributed to the issues addressed by the working groups, six documents stand out as primary references. These documents and others used to identify critical issues can be found in Appendix A.

The *North Carolina Wildlife Action Plan*, completed in 2005, is a comprehensive management tool developed by the NC Wildlife Resources Commission to help conserve and enhance the state's fish and wildlife and their habitats. A masterwork of state leaders in research, conservation, and education, the *NC Wildlife Action Plan* identifies diverse management strategies, research studies, and conservation efforts to ensure that all of our wildlife resources have healthy habitats where they can thrive. The

1. Assessment Process and Outcome

forest sustainability work group drew heavily upon this resource in documenting (1) forests with high conservation value and (2) other prime wildlife habitat on which to focus appropriate conservation strategies. http://www.ncwildlife.org/Plan/WSC_WAP_Downloads.htm

The *Southern Forest Resource Assessment (SFRA) Summary Report* was published in 2002 to address concerns raised by natural resource managers, the science community, and the public regarding the status and likely future of forests in the South. Specifically of interest were changes to the region's forests brought about by rapid urbanization, increasing timber demand, increasing numbers of satellite chip mills, forest pests, and changing air quality. In response to these issues, leaders of three of the region's federal natural resource agencies (USDA Forest Service, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service) and the Tennessee Valley Authority worked together to assess the overall condition and changes of southern forests. More than 25 scientists and analysts from the above agencies as well as southern universities compiled the *SFRA Summary Report*. More than 100 scientists from universities, state and federal agencies, industry, and conservation organizations peer-reviewed the report for accuracy and completeness.

<http://www.srs.fs.usda.gov/sustain/>

The Southern Forest Futures Project (SFFP) is a multiyear effort by the USDA Forest Service, Southern Research Station and Southern Region, in partnership with the Southern Group of State Foresters. The SFFP builds directly on the Southern Forest Resource Assessment to examine how the forces of change identified in the SFRA, along with other emerging factors, could reshape forests over the next half century and beyond. Meta-issues identified during two public scoping sessions held in Raleigh

and Asheville, NC, during 2008 helped further synthesize the key issues (topically and geographically) addressed here in *North Carolina's Forest Resource Assessment*. An active project as of June 2010, a draft SFFP report is expected to be completed by the end of 2010.

<http://www.srs.fs.usda.gov/futures/>

North Carolina's Forests, 2002, a publication by the USDA Forest Service, Southern Research Station (SRS), released in 2006, describes the principal findings of the seventh inventory of North Carolina's forest resources. Data from this publication helped us to identify current status and key trends associated with North Carolina's forest resources.

<http://www.srs.fs.usda.gov/pubs/26000>

Forest Statistics for North Carolina, 2002, another publication by the USDA Forest Service SRS, likewise helped us to identify current status and key trends. Although fieldwork for the eighth inventory of North Carolina's forest resources was completed in late 2008, the updated data were not available as we developed most of the current assessment. Therefore, we used predominantly 2002 data. The exception occurs in Chapter 2.a., "North Carolina's Forests, 2007," which does incorporate data from the eighth inventory released in February 2010.

<http://www.srs.fs.usda.gov/pubs/6274>

Report of the Governor's Task Force on Forest Sustainability, 1996, identified 79 recommendations supporting sustainability of North Carolina's forest resources and the economic viability of its forest-based economy. Most of the recommendations have since been implemented.

http://www.ncforestassessment.com/pdf/Report%20of%20the%20Governor's%20Task%20Force%20on%20Forest%20Sustainability_June%201996.pdf

Working Groups

During the issue identification process, we established six “assessment themes.” The themes helped us to identify threats to NC forests and the benefits and opportunities the forests provide: Socioeconomic Threats to Working Forests, Ecosystem Services, Forest Sustainability, Threats to Forest Health, Protecting Forests and Communities from Wildfire Risk, and Maintaining Viable Urban Forests. Based on these themes, the task force organized six working groups.

The working groups shared a common vision: to combine the collective wisdom of their members as they identified priority areas for focusing programs and future efforts. Each working group consisted of 10 to 20 members, including interested partners, stakeholders, and agency personnel, with subject matter expertise and a commitment to seeing the assessment through to completion. Each working group established a structure that included a leader or co-leader. Non-NCDFR partners led two working groups: Forest Sustainability and Threats to Forest Health. Each working group designated one or more NCDFR liaisons, one or more GIS coordinators, and a scribe. Based on each group’s assessment theme, working group members analyzed the forest resource trends and conditions and assigned priority rural and urban landscape areas. Each group also helped to develop appropriate strategies for dealing with the threats and opportunities that its members unveiled. These strategies helped form the basis for recommended program efforts in the coming 5 years.

Partner and Stakeholder Involvement

The NC Division of Forest Resources worked collaboratively with more than 40 key partners and hundreds of stakeholders to develop this statewide forest resource

assessment. Partners helped to ensure that federal and state resources focus management and outcomes on important priority landscapes. This statewide assessment represents a comprehensive analysis of the forest conditions, trends, threats, and opportunities within North Carolina. We give special thanks to professionals from the NC Wildlife Resources Commission (NCWRC) and the U. S. Fish and Wildlife Service for their unwavering assistance and editorial comments and for their critical roles on various working groups. Members of the State Stewardship Committee and NRCS State Technical Committee, who were briefed on the process, progress, and review of drafts of the assessment and strategies during the development process, received frequent updates and suggestions. The USDA Forest Service and USDI Fish and Wildlife Service are the two primary federal land management agencies involved in both assessment and strategy development. A complete list of partners and stakeholders is included in the Acknowledgements section of this assessment.

Partner Meetings and Review Periods

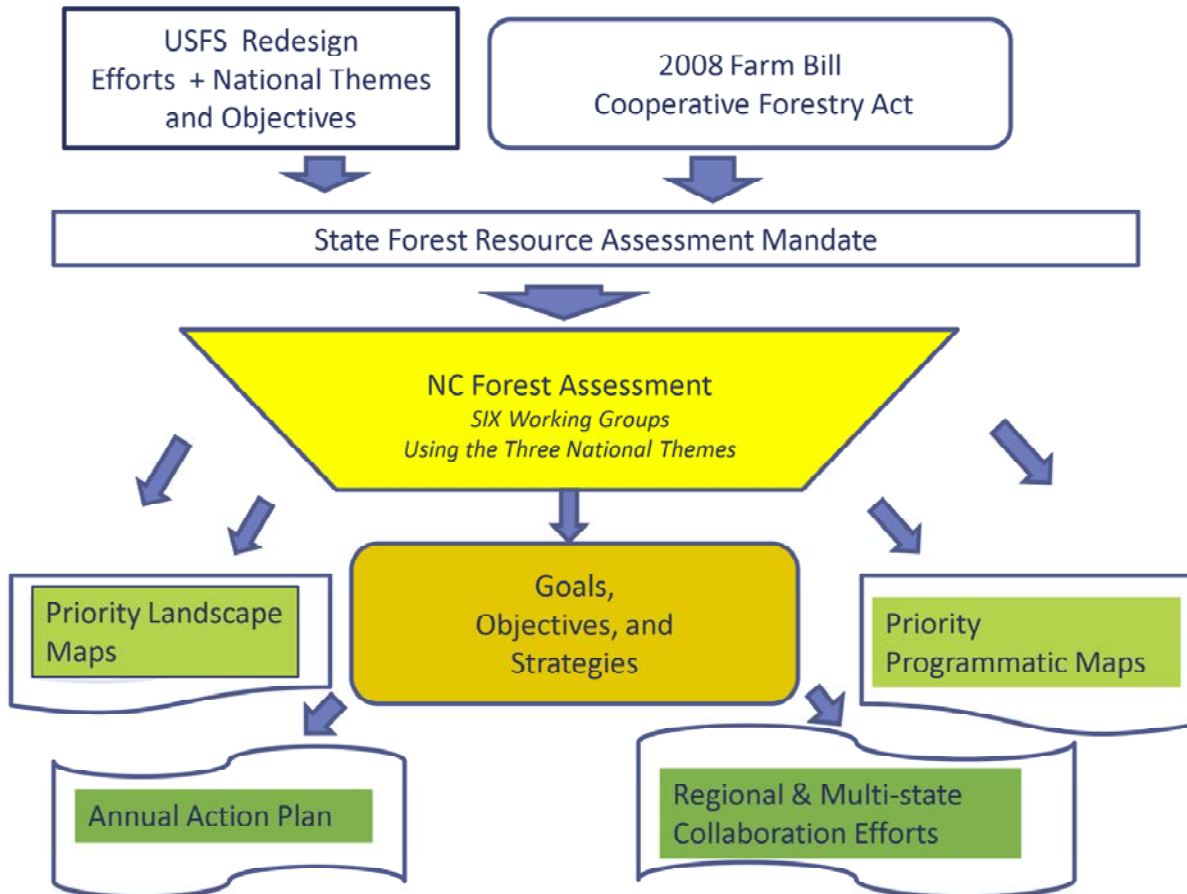
A central tenet of North Carolina’s approach has been the involvement of partners in designing and implementing the statewide forest resource assessment and strategy. This began early in the process when partners were asked to critique a design and implementation strategy in late 2008 (FIGURE 1a-1). At that meeting, partners asked for a detailed strategy and a website through which to track progress. The first formal meeting of partners was used to break stakeholders into separate working groups to draft the assessment. The final meeting’s purpose was to conclude the assessment portion and move into the strategy portion of the project. A formal

1. Assessment Process and Outcome

review process was then implemented, and much of the interaction took place via email

and Web postings. Two separate review periods were initiated, and comments were

FIGURE 1a-1. Relationship and process flow of the statewide forest resource assessment, the goals/objectives/strategies, and the priority maps.



received automatically by e-mail. Corrections and edits were made, and then final drafts were sent to an outside reviewer for style and usage changes. Those final edits were reflected in the final document submitted for approval by the USDA Secretary in June of 2010.

An initial meeting of key partners and stakeholders was held November 28, 2008, at the NC Wildlife Resources Commission headquarters in Raleigh. This meeting served to introduce the partners and stakeholders to the purpose of the statewide forest resource assessment and strategy, to

introduce a draft plan of work, and to solicit feedback and support.

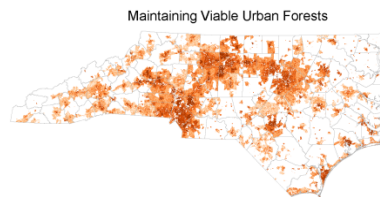
A second meeting of key partners and stakeholders was held February 26, 2009, at the Wake County Agricultural Center Commons in Raleigh. This was a participatory planning session designed to provide an update on progress since the October 2008 meeting and to recruit partner and stakeholder participation in six working groups. Breakout sessions were held to further synthesize key issues to be addressed within the six broad working group themes during the assessment phase.

A third meeting of key partners and stakeholders was held December 9, 2009, at the NCSU McKimmon Center in Raleigh. The purpose was to release draft findings of the six working groups from the Assessment phase and solicit input and support for a plan to transition to the strategy development phase.

Assessment Website

The assessment website was a communication tool that captured input and detailed the progress and effort of NCDFR staff and partners in completing the project. Everything from reference materials, federal guidance, presentations, and meeting minutes were captured and shared there. A calendar of events documented all activities that took place within the public settings and efforts for the process. The website was a crucial link among agencies, partners, and the public in the implementation of this nearly 2-year process:
<http://www.ncforestassessment.com>

1. Assessment Process and Outcome



1.b.

Priority Map Development

Mapping Rationale

The identification of urban and rural priority areas is a requirement of all statewide assessments of forest resources, as specified in the S&PF Redesign guidance developed by the USDA Forest Service:

“State forest resource assessments will identify, describe, and spatially define forest landscape areas where forestry program outreach and activity will be emphasized and coordinated. Establishment of these priority areas is intended to (1) enable the efficient, strategic, and focused use of limited program resources; (2) address current state and national resource management priorities; and (3) produce the most benefit in terms of critical forest resource values and public benefits. This component of a state’s assessment should be geospatially based.”

Mapped priority areas provide a method for focusing on areas where federal investment can most effectively stimulate or leverage desired action and engage multiple partners. Mapping must enable the discovery of multistate areas in which collaboration can lead to stronger outcomes.

Accomplishments using federal funds may be evaluated against priority areas to determine the effectiveness of S&PF program implementation.

Mapping Approach

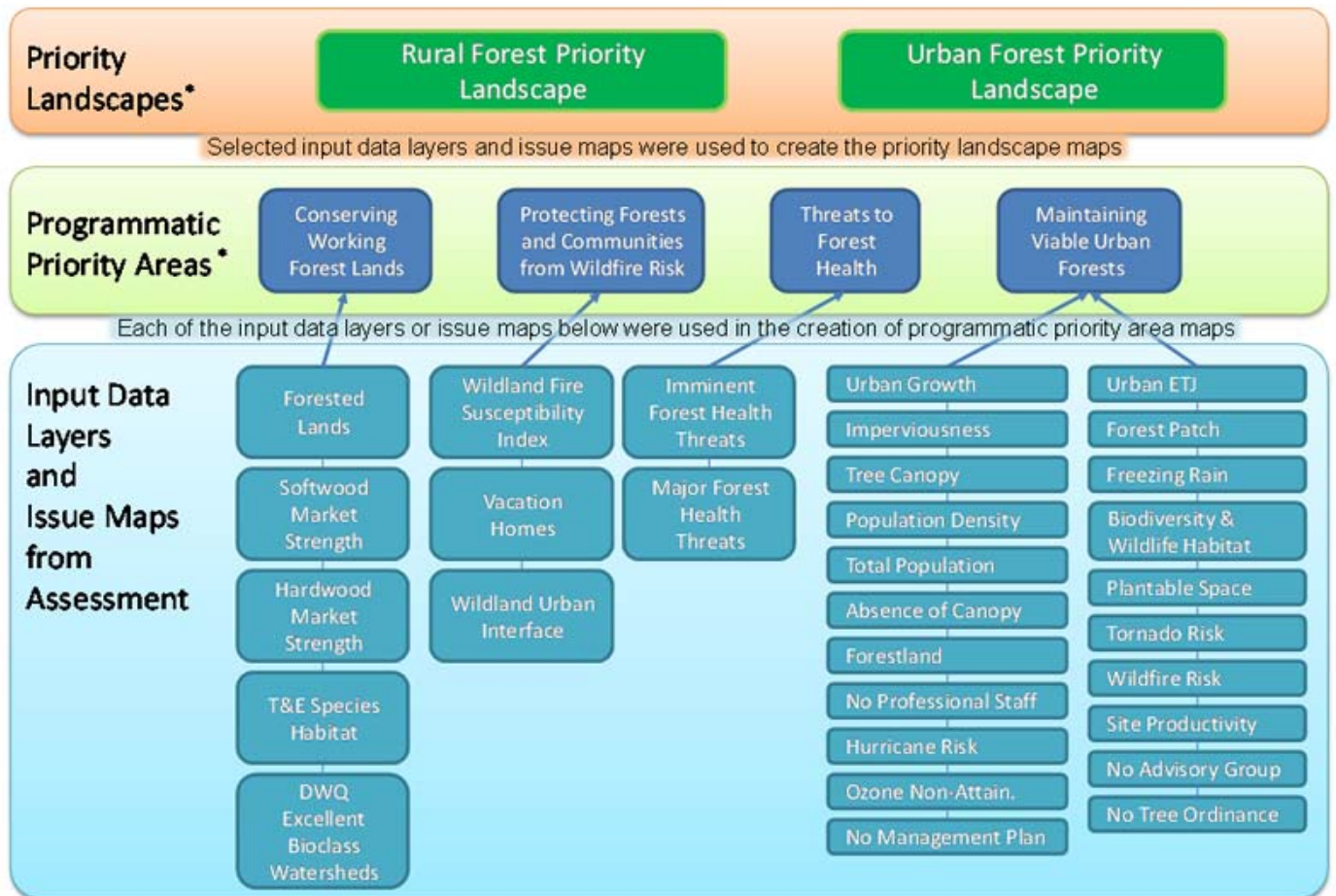
Two sets of priority maps were developed for North Carolina. The first set (1) shows areas of specific emphasis in North Carolina according to themes identified during the

assessment process and (2) aligns with programmatic funding available from USDA Forest Service S&PF. These maps show areas of emphasis for these assessment themes: Conserving Working Forestlands, Protecting Forests and Communities from Wildfire Risk, Threats to Forest Health, and Maintaining Viable Urban Forests. The second set of maps shows overall urban and rural forest priority landscapes.

Each map is the result of overlay analysis, which is achieved by adding data layers with particular relevance to the map topic. Wherever possible, the input layers were straightforward datasets rather than complex models; this results in maps that are easier to interpret. Input layers were chosen based on their importance in the assessment and their ability to clearly represent a component of interest. The rural and urban landscape priority maps are not simple stacks of the thematic priority maps, but are the result of a separate consideration of layers relevant to urban and rural forested landscapes. FIGURE 1b-1 shows the relationships between each priority map and the data layers that were used for creating the map. Layer weights, if used, are noted in the bottom right corner of the layer’s box.

Wherever possible, existing datasets were used, including datasets developed for the Forest Stewardship Spatial Analysis Project, Forest Legacy Assessment of Need, and *NC Wildlife Action Plan*. North Carolina has several statewide datasets surpassing anything available at a national level that were incorporated as part of the mapping process, including the NCDENR One NC Naturally project and NC Natural Heritage

FIGURE 1b-1. Relationship between the *Statewide Forest Resource Assessment*, the goals/objectives/strategies, and the priority maps.



* For details on input layers and weighting (if any), see the individual maps. Further details can also be found in the mapping and GIS analysis appendix.

Program database. Certain other environmental and social factors, such as cultural resources, demographic data, poverty, public health, recreation, and air quality were included as needed. Certainly, there are datasets that could benefit from improvement, and there are datasets that do not exist at the extent and scale necessary for use in a comprehensive assessment. Where these data gaps were encountered, they were documented to help focus future data development work at the state, regional, and national level.

Programmatic Maps

Conserving Working Forest Lands (FIGURE 1b-2)

The Conserving Working Forest Lands map shows areas of North Carolina that should be targeted to prevent the loss of working forestlands from development and conversion to other nonforestry uses. These lands have high values for connectivity with other forestlands, water quality protection in existing high-quality waters, habitat for wildlife, and strong markets for hardwood and softwood products. The final component in the map is development risk. With active and informed forest management, these

1. Assessment Process and Outcome

lands can provide economic and ecosystem benefits; in the absence of involved and informed management, they are at higher risk of succumbing to development pressure.

Protecting Forests and Communities from Wildfire Risk (FIGURE 1b-3)

The Protecting Forests and Communities from Wildfire Risk map shows areas of North Carolina where wildfire mitigation and preparedness efforts can reduce loss of life and property, and prevent degradation of the forest resource due to intense fires typical of southern forests. These lands rank high for wildfire susceptibility in the Southern Wildfire Risk Assessment System (ArcGIS software). Many of these areas are considered to be within the wildland-urban interface, and many are owned by individuals who may be unfamiliar with the role of fire in southern forests and firewise building principles.

Threats to Forest Health

(FIGURE 1b-4)

The Forest Health Priority map shows areas of North Carolina currently at a moderate to high risk of damage from insects and diseases, both native and/or established and imminent invasive threats. The specific pests used to develop this map are as follows: southern pine beetle, littleleaf disease, annosus root rot, fusiform rust, hemlock woolly adelgid, balsam woolly adelgid, beech bark disease, redbay ambrosia beetle–laurel wilt, emerald ash borer, Asian longhorned beetle, and sirex woodwasp. As the map shows, both rural and urban landscapes across the state will likely see negative impacts from these pests. Although climate change is an important factor in modeling future impacts to forest health, much of the data is very coarse and was consequently left out of this analysis.

Maintaining Viable Urban Forests

(FIGURE 1b-5)

The Maintaining Viable Urban Forests map shows areas of North Carolina that are essential for restoring, conserving, and maintaining healthy urban trees and forests. These lands are experiencing rapid urbanization, increased amounts of impervious surface, and a higher number of catastrophic storm events, while also having tree canopy potential to offset the negative impacts of land-use change. These urban forestlands also have high values for energy conservation and improved air quality. Many municipalities within the priority areas manage their urban forests with limited resources and lack one or more of the components necessary for a sustained community forestry program. Coordinated planning and management of urban forests across jurisdictional boundaries will require new partnerships and initiatives at municipal, county, and statewide levels.

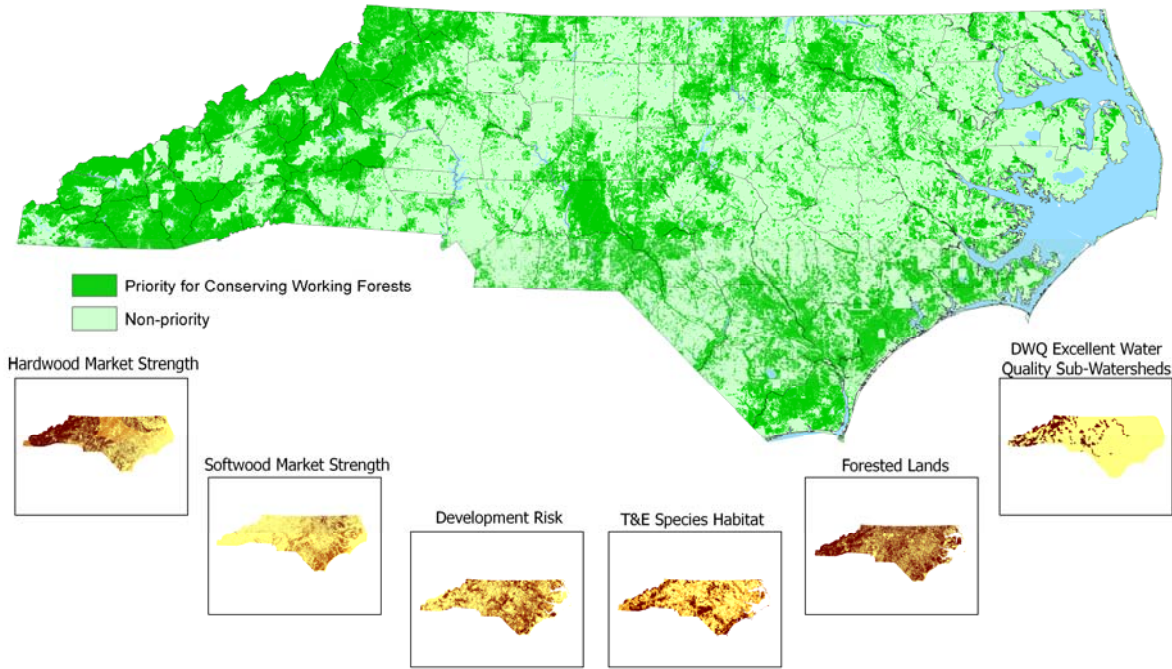
Landscape Maps

Rural Forest Priority Landscapes

(FIGURE 1b-6)

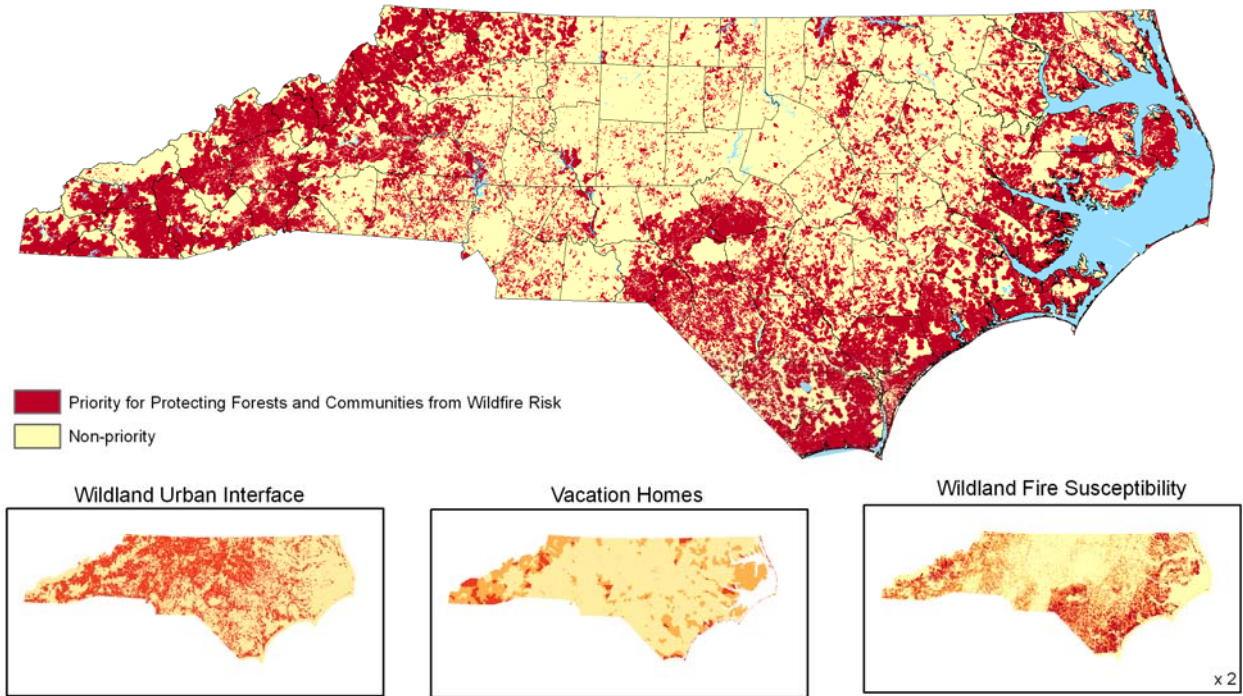
The “Rural Forest Priority Landscapes” map shows areas of North Carolina where forestry is an especially significant part of the rural landscape. Forestlands in these areas provide valuable benefits, such as the protection of critical water quality resources, wildlife habitat for threatened and endangered species, and viable economic options for landowners. Threats to forest health and productivity through insect and disease pests and wildfire are especially significant in these areas. Threats here have the potential to disrupt ecological systems depended upon by all NC inhabitants. Much of the priority rural forest acreage is in the NC coastal plain and mountains, though significant priority area exists in the Uwharrie Mountains, sandhills, and “northern tier” areas of the piedmont.

FIGURE 1b-2. Conserving Working Forestlands map.



Created by: A. Bailey, NC DFR, 2010

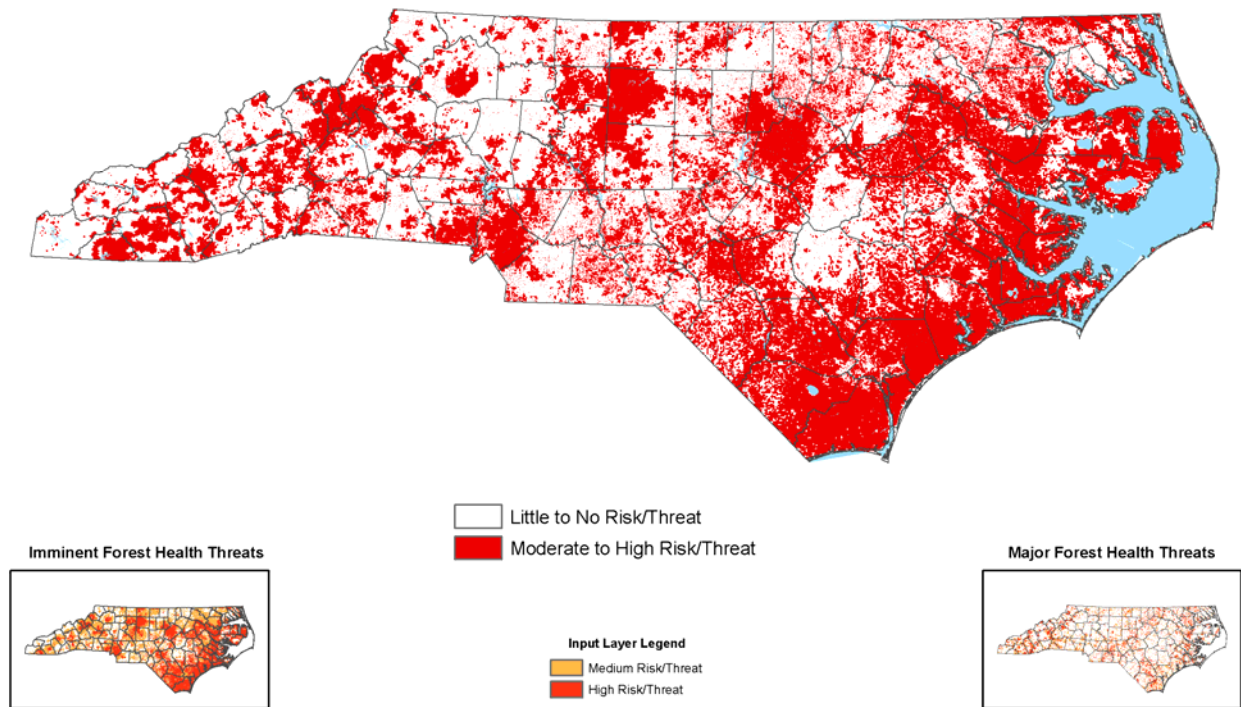
FIGURE 1b-3. Protecting Forests and Communities from Wildfire Risk map.



Created by: A. Bailey, NC DFR, 2010

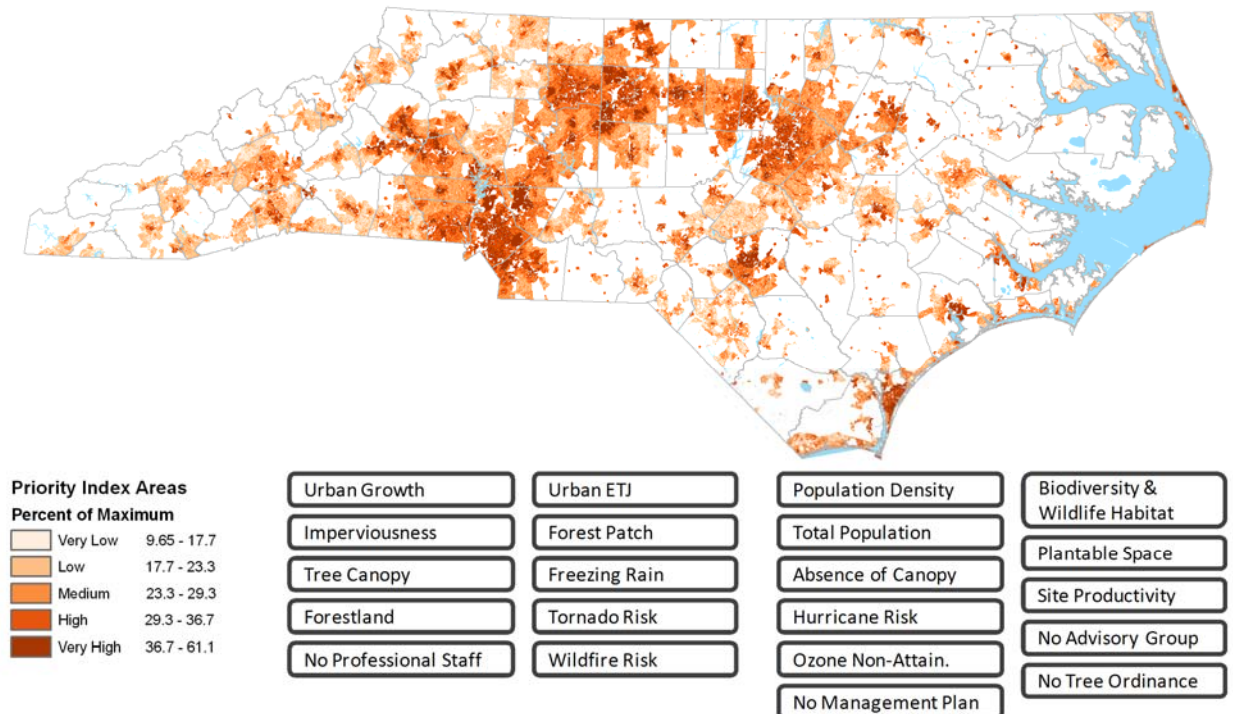
1. Assessment Process and Outcome

FIGURE 1b-4. Forest Health Priority map.



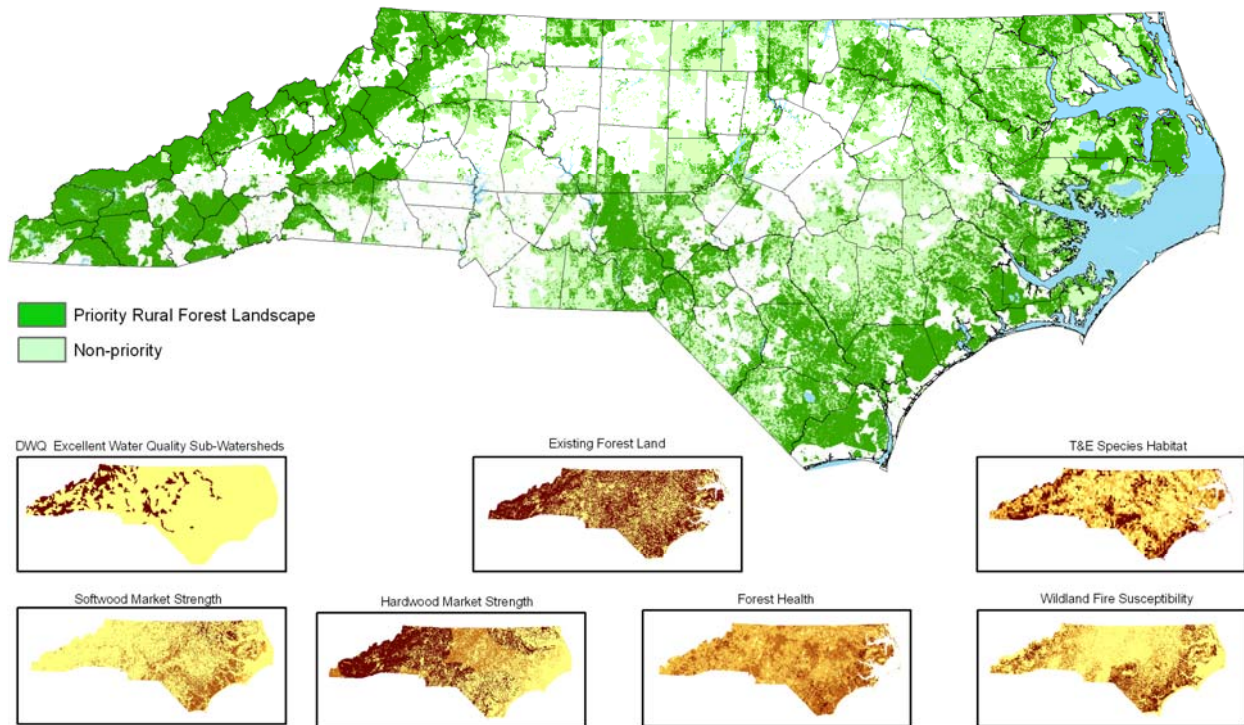
Created by: J Moan, NC DFR, 2010

FIGURE 1b-5. Maintaining Viable Urban Forests map.



Created by: A. Bailey, NC DFR, 2010

FIGURE 1b-6. Rural Forest Priority Landscapes map.



Created by: A. Bailey, NC DFR, 2010

Urban Forest Landscape Priority
(FIGURE 1b-7)

The Urban Forest Landscape Priority map complements the Maintaining Viable Urban Forests map (FIGURE 1b-5) by adding layers from these maps that have an urban component: Conserving Working Forestlands (FIGURE 1b-2), Protecting Forests and Communities from Wildfire Risk (FIGURE 1b-3), and Forest Health Priority (FIGURE 1b-4). Wildland-urban interface areas have inherent urban components, and many of these areas need intervention to reduce wildfire risk. Improving water quality is a commonly cited reason for maintaining urban tree canopy. Forest insects and diseases spread regardless of what is urban forest and what is rural; indeed, many invasive pests become established first in urban areas due to the easy movement afforded by dense

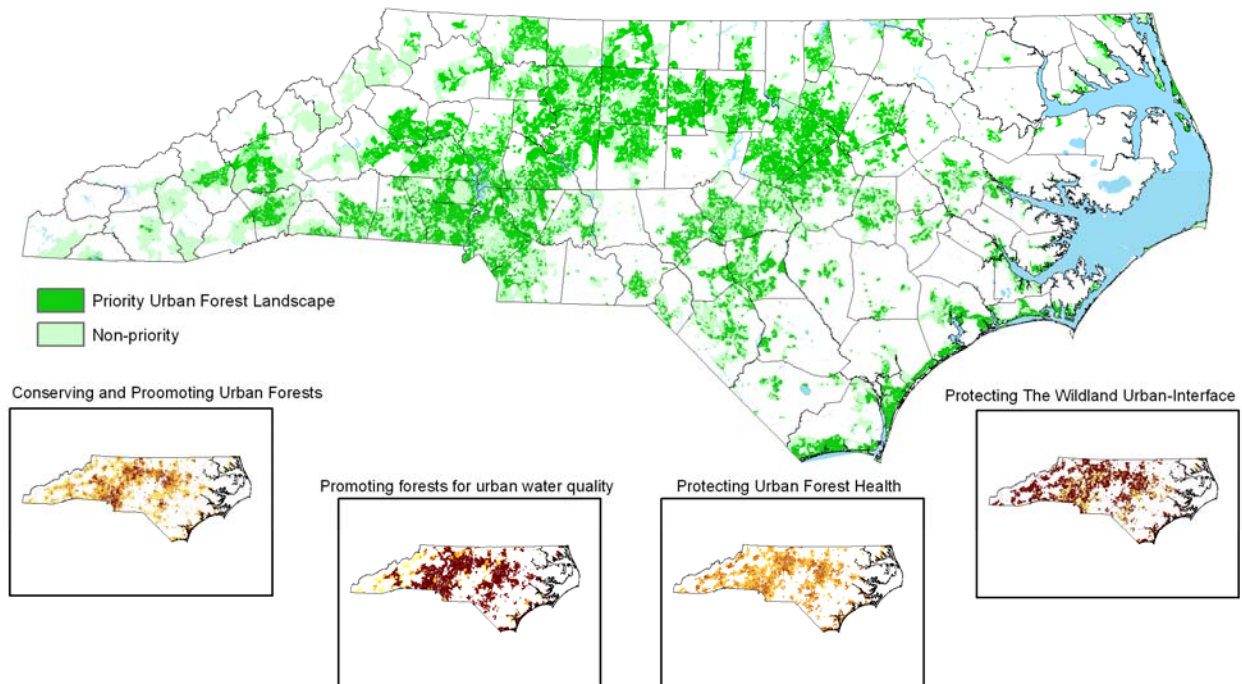
transportation networks. Much of the forestland delineated as priority in this map are tracts of less than 14 acres. Parcelization and fragmentation are issues that must be addressed to effectively manage these forests.

How Priority Maps Can Be Used

These maps were developed to meet the needs of the NC statewide assessment of forest resources, to facilitate the effective implementation of the USDA Forest Service S&PF programs, and to provide a foundation for interagency partnerships. Priority areas are expected to be used for accomplishment reporting between the NC Division of Forest Resources and the USDA Forest Service, as well as for the formation of multistate partnerships to pursue funding. Priority areas provide a way to tell the story of forests in North Carolina, to educate and

1. Assessment Process and Outcome

FIGURE 1b-7. Urban Forest Priority Landscapes map.



Created by: A. Bailey, NC DFR, 2010

inform, and to build constituencies to effect positive change. Priority areas are not intended to restrict the delivery of certain programs or to exclude citizens from state-provided services. Certain functions, such as firefighting and response to insect and disease outbreaks, do not lend themselves to prioritization—imminent threats to life and property will always take precedent. The delivery of forestry programs and services will ideally strike a balance between activities conducted in priority areas and maintaining program access to all citizens of the state.

Wherever possible, existing datasets were used, including datasets developed for the Forest Stewardship Spatial Analysis Project, Forest Legacy Assessment of Need, and *NC Wildlife Action Plan*. North Carolina has several statewide datasets surpassing anything available at a national level that were incorporated as part of the mapping

process, including the NC DENR One NC Naturally project and NC Natural Heritage Program database. Certain other environmental and social factors, such as cultural resources, demographic data, poverty, public health, recreation, and air quality were included as needed. Certainly, there are datasets that could benefit from improvement, and there are datasets that do not exist at the extent and scale necessary for use in a comprehensive assessment. Where these data gaps were encountered, they were documented to help focus future data development work at the state, regional, and national levels. Further explanation of the GIS process and data sources used in development of the maps can be found in the Appendix B.

1.c.

Multistate and USFS Redesign Efforts



The USDA Forest Service Redesign effort seeks to focus State and Private Forestry resources and funding on high-priority areas at a multistate landscape level. The purpose of the Redesign is to encourage collaboration among states to identify common forestry issues for maximum impact. Current Redesign projects address significant geographic issues at the landscape level. All of the projects are guided by three broad national themes (TABLE 1c-1). The Redesign’s guiding principles emphasize landscape-scale projects that feature collaborative planning and implementation; prioritization of outcomes; and innovative use of technology, multistate involvement, and collaboration.

A number of forestry issues identified in North Carolina’s statewide assessment are common to other states within the Southeast. For some of these issues, projects are already underway with multistate collaboration. Outcomes from NCDFR projects may provide information or program ideas that other states can apply. Many issues will need to be addressed with future projects, many of which will cross state borders.

Future Multistate and Regional Collaboration Opportunities

Forest resource issues, threats, and opportunities that cross state boundaries or that address regional priorities provide opportunities for multistate collaboration. In some instances these opportunities may be tied to a specific S&PF program area or a

well-defined issue or need common to one or more states. In other cases, collaborative opportunities may be best identified and addressed geospatially, where watersheds, ecoregions, commodity markets, population centers, or other factors converge.

We anticipate that future planning and communication efforts will occur at the regional level to more fully explore collaborative opportunities regionally and among the states. One avenue to beginning these discussions is within the existing committee and task force structure of the Southern Group of State Foresters (SGSF). An early attempt to identify multistate collaborative needs occurred at the SGSF Summer Meeting held in Wilmington, NC, in June 2009. Now that states have completed their state forest resource assessments and strategies, it is time to revisit these opportunities and collectively plan strategies to effect positive change. Listed below is only a sample of the many priority opportunities for multistate or regional collaboration identified during the development of North Carolina’s statewide forest resource assessment and strategy.

- Forest resource market changes. Changes in traditional markets and emergence of new markets, such as carbon trading, bioenergy, and ecosystem services, may change supply and demand and our management of forests.
- Climate change impacts. This meta-issue influences many other issues

c. Multi-State and USFS Redesign Efforts

TABLE 1c-1.—Current USFS Redesign Grant projects managed by the NC Division of Forest Resources

Funding Years	Project Name	Project Description	States Involved	NC Assessment Objectives Addressed
2008/ 2009	Enhancement of NCDFR's Fire Environment Program	Expands NC Remote Automated Weather System: Adds new RAWS stations, updates data collection and continues training of personnel.	NC	2.1, 3.1, 3.2, 3.3
2008	Landowner's Link to Virtual Forest Management Phase 1	Creates a "Link to Virtual Forest Management" website that enables landowners to develop their own forest management plans.	NC	1.2, 1.3, 5.2,
2008	North Carolina Firewise-Urban Intermix Community Grant Program	A directed effort to prevent wildfires and improve urban forest health by combining firewise and urban forest management concepts.	NC	2.1, 3.1, 3.2, 7.1
2008	North Carolina's Longleaf Pine Initiative and Action Plan	Sustains and promotes the restoration of longleaf pine in North Carolina via new stand establishment, conserving existing stands, and promoting total resource management.	NC	3.1, 3.2, 3.3, 5.2, 5.3
2008	Woodland Owner Short Course (WOSC), Regional Expansion	Expands the current curriculum of innovative forest management concepts to small landowners in the NC piedmont and coastal plain.	NC	1.2, 1.3, 3.1, 3.2, 3.3, 4.4, 5.2, 5.3, 5.4, 6.4, 7.1
2008	Student Intern Assessment SCA Crews	Employs Student Conservation Association (SCA) crews to complete community wildfire protection plans, urban forest assessments, forest pest and disease assessments and other valuable forest management data.	NC	2.1, 2.2, 2.3, 7.2
2008	Forest Health Information, Education, and Outreach	Funds brochures, posters and webpages to address hemlock woolly adelgid, gypsy moth, bark beetles, oak decline, storm damage to timber, storm damage to urban trees, defoliators, urban pests, and emerging issues.	NC	2.2, 7.3
2008	Digital Aerial Sketch-Mapping Technology	Funds acquisition of mapping technology and training in forest health, forest management, water quality, fire control, emergency management, and law enforcement.	NC	1.1, 2.1, 2.2, 3.3, 5.2, 5.3, 6.1, 6.2, 7.2
2008	Landowner Survey	Funds a survey of landowners to determine advice and services they need from natural resource professionals.	NC	1.2, 3.3
2009	Strategic Planning Tool to Assess Wood Energy Demands on Timber Market	Funds the development of a regional tool to assess the potential impact of demand for wood as an energy feedstock on product inventories, markets, and traditional wood-based industries.	NC, AL, GA, MS	1.2, 4.1, 4.2
2010	Shortleaf Pine Initiative	Sustains and promotes the restoration of shortleaf pine across the region through collaborative research and information and education efforts.	OK AR, NC, TX	3.1, 3.2, 5.2, 5.3

1. Assessment Process and Outcome

Funding Years	Project Name	Project Description	States Involved	NC Assessment Objectives Addressed
2010	Fire Activity and Emissions Tracking System (FAETS)	Develops a computer-based tracking system to enhance and collaborate with other resource databases.	NC, SC, VA, GA, LA, TN, OH, PA	2.1, 3.1, 3.2, 3.3

and strategies as well as program deliveries by all states.

- Threatened species and longleaf pine restoration. Loss of specific species across landscapes will require strategies and efforts that include all interested stakeholders.
- Invasive species. Aggressive action and cooperation will be needed to control and manage the continuing spread of numerous invasive species.
- Fire-smoke modeling and emissions. Pooling resources and databases will help to develop modeling tools and standards for smoke data collection and management.
- Forests and water quality. Identification of priority watersheds for forest conservation and coordination of strategies and management to improve conditions could produce regional effects.
- Urban and WUI. Canopy cover monitoring, land-use change predictive models, and storm damage rapid assessment are several potential areas for multistate cooperation.

- Forest health, Insects and diseases that threaten rural and urban forests spread regardless of state or national boundaries. Coordinated strategies are critical in areas of prevention, monitoring, control, data management, education, and enforcement.
- Outreach, information, and education. Collaboration and sharing of ideas, products, and resources to reach common audiences can be efficient and effective uses of limited resources.
- Research and technology transfer. Investigation, discovery, and the sharing and transfer of science-based knowledge to those who can use it is a classic example of activities well-suited to coordinated efforts.
- Data collection, management, analysis. Opportunities exist in all program areas to more effectively collect, manage, share, and analyze data.

1. Assessment Process and Outcome



Annual Action Plans and Investment of Financial and Other Resources

The S&FP Redesign effort directs states to develop an annual action plan that will identify specific strategies to be addressed in the coming year. This action plan is to include a component describing how federal funding, along with other resources, will be invested. States are also directed to describe the capabilities and limitations within the state for addressing the threats and opportunities identified in the strategy plan, including capacity (such as legal, financial, staffing, and partner resources).

The inclusion of matrices for each strategy (see Chapter 5, “Goals, Objectives, and Strategies”) was a deliberate proactive attempt to capture the critical components that will be needed to develop annual action plans and partner/stakeholder collaboration, and to implement strategies. In the near term, a series of additional relational matrices will be developed to more clearly identify strategic associations by priority area, NCDFR program, and partners/stakeholders who will aid in developing annual action plans and facilitate strategy implementation and service delivery on the ground.

Integration with the North Carolina Wildlife Action Plan

Although numerous opportunities exist for integration of *North Carolina’s Forest*

1.d.

Implementation and Next Steps

Resources Assessment and the *North Carolina Wildlife Action Plan* (WAP), integration of common objectives and strategies is most readily apparent in the four statewide conservation strategies of the WAP listed below, along with the forest resource assessment objectives that most closely correlate.

1. WAP Urban Wildlife Management Strategies correlate to SFRAS Objectives 1.4, 5.4, 7.1, 7.2, 7.3, and 7.4.
2. WAP Private Lands Habitat Management Strategies correlate to SFRAS Objectives 1.2, 1.3, 3.1, 3.2, 4.1, 5.2, and 6.1.
3. WAP Land Conservation Strategies correlate to SFRAS Objectives 1.1, 3.3, 5.1, 5.3, and 6.2.
4. WAP Education, Outreach and Recreation Strategies correlate to SFRAS Objectives 3.1, 5.4, and 6.3.

Federally funded Programs Already Using Assessments and “Priority Maps”

A number of federally funded forestry programs already use information derived from forestry assessments. Most notably, this includes the use of priority maps that highlight areas of North Carolina where resources (such as funding and man-hours) can deliver the greatest benefits. Primary examples include the Forest Stewardship Program and the Forest Legacy Program.

The Forest Stewardship Program

Distinct as our forests are, they have one common denominator—they are extremely valuable to the citizens of North Carolina. Forests provide habitat for birds, deer, bears, and other animals. The headwaters of most of the state’s rivers and streams are in forests, and forests thus ensure a steady supply of clean water. They offer solitude and aesthetic experiences for NC residents and for tourists. They provide raw materials for the state’s manufacturing industry, which produces lumber, plywood, particleboard, paper, furniture, and hundreds of other products made from wood. They furnish an abundance of other miscellaneous forest products—such as Christmas trees, ornamental shrubbery, longleaf pine needles for mulch, mosses, herbs, and floral and edible plants—that contribute millions of dollars to the state’s economy. They give landowners opportunities for additional income through leasing lands for hunting.

North Carolina’s forests are diverse, insofar as both the benefits derived from them and the many private landowners who own them. These details will be examined and discussed throughout this document. Many of these landowners have different values, different levels of knowledge about forests, and different goals for using their forestlands. Public lands are being pressured to provide recreation, aesthetics, wildlife and fisheries, as well as timber products. Because these public lands are limited, the only way to meet this ever-increasing demand is to provide opportunities for some of these activities on private lands. The Forest Stewardship Program is a way to provide the technical assistance needed by landowners to meet personal objectives, and to improve all aspects of the forest environment for the state’s citizens. This is applicable whether landowners seek to generate income through timber harvesting;

manage for wildlife or fish habitat; maintain the soils and waters; or provide recreation or aesthetic opportunities for themselves, their families, or visitors to their land.

The Forest Stewardship Program helps to coordinate the various publicly supported assistance programs for forestland owners. It has been developed as a partnership among representatives of the following agencies or institutions: NC Division of Forest Resources; NC Wildlife Resources Commission; USDA Forest Service, Natural Resources Conservation Service, and Farm Service Agency; U.S. Fish and Wildlife Service; Cooperative State Research, Education and Extension Service; Duke University; and North Carolina State University. Many members of the above-mentioned organizations functioned as working group participants and chapter authors for this document. In general, the collaboration and oversight of this State Stewardship Committee, coupled with on-the-ground management plan assistance to landowners, has helped to increase the effectiveness and efficiency of other federal and state forestry programs. The cooperative planning by wildlife, soils, forestry, recreation, and other natural resource professionals has also served to keep landowners informed of regulatory requirements that must be met as well as best management practices that may be utilized on their lands.

The Forest Stewardship Program reports its annual accomplishments to the USDA Forest Service (TABLE 1d-1). Since 2008, the Southern Group of State Forester’s Southern Forest Land Assessment (SFLA) GIS project has been used by the Forest Stewardship Program as a way of reporting how many stewardship plans were being carried out in “Important Forest Resource Areas.” Future Forest Stewardship Program accomplishments will likely use this document’s Conserving Working Forest

1. Assessment Process and Outcome

Lands priority map (FIGURE 1b-1) rather than that SFLA priority map. The Conserving Working Forest Lands map is an example of a visual and spatial tool that can be used by management and field personnel to plan their efforts and assess their accomplishments.

TABLE 1d-1.—NC Forest Stewardship Program accomplishments

Measure	Accomplishment
Number of stewardship plans and acres addressed (1990 – 2009)	21,928 plans, 645,311 acres
Number of tracts and acres certified under the stewardship program (1990 – 2009)	720 tracts, 132,069 acres
Number of trained stewardship plan writers, external to NCDFR (1990 – 2009)	64 writers
Percentage of stewardship plan acres that were located in spatially defined “Important Forest Resource Areas*” (1999 – 2009)	48% (213,445 acres out of a total of 446,154 acres covered by stewardship plans)
*As defined by the Southern Forest Land Assessment GIS Project	
Percentage of stewardship plans where the plan recommendations were being implemented by landowners (Based on 2008 –2009 Monitoring Results)	70%

The Forest Legacy Program

The Forest Legacy Program, authorized in the 1990 Farm Bill—Section 2103c, authorizes the USDA Forest Service or state governments to purchase permanent conservation easements on private forestlands. The program acquires certain land-use rights that both promote effective forestland management and protect the land from conversion to nonforest uses.

Threatened forestlands receive priority that (1) contain important scenic, cultural, and recreation resources; fish and wildlife habitats; water resources; and other ecological values; and (2) will support continuation of traditional forest uses. To be considered for the program, an NC landowner must have a Forest Stewardship Plan that addresses the multiple resource management of their property. Activities consistent with the Forest Stewardship Plan—including timber harvesting and recreational activities, such as hunting, fishing, and hiking—are allowed under the program and encouraged. The federal government may fund up to 75 percent of program costs, with at least 25 percent coming from private, state, or local sources. In addition to gains associated with the sale or donation of property rights, many landowners may also benefit from reduced taxes associated with limits placed on land use.

Former Governor James Hunt designated the NC Division of Forest Resources as the lead agency to oversee and implement the Forest Legacy Program. Participation in the Forest Legacy Program is entirely voluntary from both state and landowner perspectives. Titles to lands or interests in lands (conservation easements) acquired are held by the state of North Carolina. Tracts enrolled in the NC Forest Legacy Program between 2000 and 2009 are summarized in TABLE 1d-2.

Private forestland owners are eligible to participate in the Forest Legacy Program if their property is located within the program’s designated area of eligibility. These areas of eligibility were reassessed and revised in 2008 using GIS technology. Many of the GIS layers used to identify the Forest Legacy eligibility areas were later used to help create other priority maps in

TABLE 1d-2.—NC Forest Legacy Tracts (enrolled from 2000 – 2009)

FY	Project	Acres	FLP Funding	Appraised Value
2000	Town Creek Phase I: Davis Farm (Brunswick County)	1,082	\$1,400,000	\$2,288,000
2001	Town Creek Phase II: Boise & Duckhead (Brunswick County)	1,508	\$2,694,060	\$2,650,000
2002	Blue Ridge Parkway Buffer: TCF (Haywood County)	328	\$1,500,000	\$550,000
	Blue Ridge Parkway Buffer: Roy Taylor (Jackson County)	864		\$2,420,000
	Blue Ridge Parkway Buffer: TCF	222		\$1,000,000
2003	RPM (Carteret County)	841	\$1,490,000	\$4,711,000
2004	Cool Springs (Craven County)	1,670	\$1,481,209	\$2,668,000
2007	Whitehurst Forest (Craven County)	181	\$1,000,000	\$2,047,500
2008	Clarendon Plantation (Brunswick County)	741	\$1,485,000	\$4,681,000
2009	Alliene LLC (Landowner = Fred Taylor)	812	\$0.00 (Donation)	Not Appraised
TOTAL=		8,249	\$11,050,269.00	\$22,016,500.00

this document. This is particularly true of the Conserving Working Forestlands (FIGURE 1b-2) and Rural Forest Priority Landscape (FIGURE 1b-6) maps. The Forest Legacy Program’s “Assessment of Need” (AON) document extensively outlines additional details of the program. A copy of the AON document, which was revised in 2010, can be found in Appendix C.

The Assessment’s Impact on Future Forestry Programs

A tremendous amount of effort has gone into creating *North Carolina’s Forest Resources Assessment*. The resulting information will help to shape the future of many forestry and natural resource management programs. Priority maps and the Goals/Objectives/Strategies matrix (see Chapter 5) will be used as both planning tools and assessment measures. These sources of information will help guide the

decisions made by upper management personnel, and they will need to be presented to and used by field personnel if true on-the-ground impacts are to be achieved. A working example of how this could be accomplished involves an NCDNR district forester and county ranger. These two positions meet at least annually to discuss and set goals for forest management activities that are to be accomplished in a certain county. The district forester could very easily reference the Goals/Objectives/Strategies matrix, then review applicable priority maps for a county. A goal would then be set that incorporated this information. An example goal for that county might be either of the following:

- Write eight Forest Stewardship Plans this year, with at least four occurring in priority areas as designated by the Conserving Working Forest Lands priority map.

1. Assessment Process and Outcome

- Deliver six community wildfire protection plans, with three of them occurring in priority areas as designated by the Protecting Forests and Communities from Wildfire Risk priority map

These types of field-level goals could be established, implemented, and assessed with many forestry programs (such as Forest

Health, Urban and Community Forestry, Forest Legacy), as well as with organizations beyond NCDFR. Priority maps could also be used for ranking or weighting purposes in terms of setting cost-share program rates, determining strength of applications, and other such goals.