

Title: The Southeastern Conservation Adaptation Strategy: A Conservation Landscape for the Future

Greg Wathen, Gulf Coastal Plains & Ozarks Landscape Conservation Cooperative, Tennessee Wildlife Resources Agency, Nashville, Tennessee

Bill Bartush, Gulf Coast Prairie Landscape Conservation Cooperative, U.S. Fish and Wildlife Service, Lafayette, Louisiana

Tim Breault, Peninsular Florida Landscape Conservation Cooperative, U.S. Fish and Wildlife Service, Tallahassee, Florida

Ed Carter, Tennessee Wildlife Resources Agency, Nashville, Tennessee

Cindy Dohner, U.S. Fish and Wildlife Service, Atlanta, Georgia

William Gould, Caribbean Landscape Conservation Cooperative, US Forest Service , International Institute of Tropical Forestry, Rio Piedras, Puerto Rico

Ken McDermond, South Atlantic Landscape Conservation Cooperative, U.S. Fish & Wildlife Service, Raleigh, North Carolina

Gerard McMahon, DOI Southeast Climate Science Center, U. S Geological Survey, Raleigh, North Carolina

Bill Uihlein, U.S. Fish and Wildlife Service, Atlanta, Georgia

“The world we’re in today is undergoing as rapid a change as any in the history of mankind. Everything necessary to support the world’s population is changing at incredible rates causing increased pressure on the planet, environment, society and individuals in general,” (quote by Admiral Samuel J. Locklear, Commander Allied Joint Force Command, Naples. Sept 2011)

The lands and waters of the southeastern United States have experienced tremendous change over the centuries, and yet have remained remarkably resilient in their capacity to sustain some of the most diverse populations of fish and wildlife found on the North American continent (Master et al. 1998, White et al. 1998). At the start of the 21st Century, transformational changes ongoing in society, in technology, and in global economics suggest that sustaining fish and wildlife for the remainder of the century will require a re-thinking of our conservation processes and priorities, and very likely a realignment in how the conservation community responds to the conservation issues of tomorrow and sustains North American landscapes.

The Southeast Conservation Adaptation Strategy (SECAS) was initiated in 2011 at the request of the Directors of the Southeastern Association of Fish & Wildlife Agencies (SEAFWA), in recognition of the ongoing transformational changes that are shaping southeastern landscapes, and which are likely to continue at an accelerated pace during the 21st century. SECAS also recognizes that effective landscape conservation will need to meet the following challenges:

- Political and jurisdictional boundaries can impede conservation, and conservation decisions involve multiple stakeholders with sometimes competing objectives, and must account for complex scientific information;

- The operational reach of individual programs, agencies, and organizations is insufficient to reach large-scale goals and objectives for sustaining fish, wildlife, and other natural resources;
- Complex management decisions heighten the need for collaborative approaches to develop new techniques, share resources and expertise, and leverage capacity; and
- The business approach of conservation organizations will have to evolve from a model of competition for resources to one of collaboration in developing and pursuing desired future conditions.

The over-arching goal of SECAS is to define a “Future Conservation Landscape in the Southeast United States”. SECAS will focus on large landscapes and ecosystems as primary units for conservation planning. Large landscapes and their ecosystems represent the foundation on which the vast majority of fish and wildlife species rely for healthy existence, but many of these systems are in peril of becoming non-functional during the 21st century. As these systems fail, many rare species will further decline to near extinction or be extirpated, relatively common species today will become rare tomorrow, and ecosystem services that species provide will be lost. Therefore, prominent objectives of SECAS will be increasing the understanding of these complex ecological systems, and creating a more robust institutional framework for making public and private decisions that determine the sustainability of these ecosystems.

Skating to where the puck will be...

Hockey great Wayne Gretzky is reported to have once said, “I skate to where the puck is going to be, not where it has been.”, which helps to explain the secret of Gretzky’s success as a

hockey player. “Skating to where the puck will be” also represents an excellent paradigm for the purpose of SECAS, which is to define a future conservation landscape in the southeast United States. Our timeframe is 2060. Why 2060? A 50 year planning framework provides a look into the future – far enough to predict large stresses on the landscape and to assess their effects on system functionality. Projections of global change - climate, land use, and other stressors - provide managers with a context of long-range trends in environmental stressors, and align well with other long-range planning sectors such as transportation, community planning, and forest planning. Understanding these trends, and where on the landscape stresses are likely to occur, will be immensely useful to conservation organizations when laying the important groundwork today that will prepare the way for tomorrow's conservationists to take effective actions.

Knowledge of ecological systems and how they function, and understanding how future changes are likely to impact them, will enable conservation organizations to make decisions that will protect those systems, promote system resilience, and maintain system functionality.

Planning for the future is a fundamental activity in many industries; assessments of future conditions and their impacts on other sectors of conservation have already been done, most notably in the areas of forestry and climate change. The Southern Forest Futures Project (Wear et al. 2009) arrived at a number of key findings, which centered on a combination of four primary factors (population growth, climate change, timber markets, and invasive species) that will interact to reshape the South's forests between now and 2060. The interactions of these four factors are projected to result in forest losses, increased carbon emissions, potentially higher timber production levels, decreased water availability and degradation, increased wildfire-related

hazards, increased threats to species of conservation concern, and increased demand for forest based recreation on a diminishing land base.

More recently, the Third Draft National Climate Assessment (<http://www.globalchange.gov/what-we-do/assessment/draft-report-information/public-review>) was released for public comment, following previous assessments in 2009 (Global Climate Change Impacts in the United States, 2009) and 2001 (National Assessment Synthesis Team, 2001). For the southeast region, the following key messages were reported: “1) Sea level rise poses widespread and continuing threats to both natural and built environments, and to the economy; 2) Rising temperatures and the associated increase in frequency, intensity, and duration of extreme heat events are already and will continue to affect public health, the natural and urban environments, energy, agriculture, and forestry; 3) Decreased water availability exacerbated by population growth and land-use change will continue to increase competition for water and impact the region's economy and unique ecosystems.” According to the Assessment, the scientific case for climate change is unequivocal; since the early 1970's, observations indicate warming temperatures on the order of 2°F average, with projected increases of 2-6°F regionally during this century (10°F increase in interior southeastern states, 2-4°F increase in the Caribbean). These temperature increases will be manifested with a significant increase in the number of days above 95°F, and nights over 75°F in summer, with fewer extremely cold days in winter. Projections for precipitation patterns are less certain, although tropical storms are expected to be fewer in number, but stronger in force, with an increase in Category 4 and 5 storms. Sea level rise is expected to have a significant impact on coastal ecosystems and

communities, and virtually the entire Gulf Coast, the southern Atlantic Coast, and the Caribbean Islands are moderately to highly vulnerable to sea level rise in the 21st century.

Some state fish and wildlife agencies have developed long-range plans that incorporate global change factors into their conservation planning. Notably, Florida Fish and Wildlife Conservation Commission developed a long-range planning document, *Wildlife 2060*, which was based in part on a study by a partners group called *1000 Friends of Florida*, and incorporated anticipated changes in urbanization and other changes during the next 50 years (Florida Fish and Wildlife Conservation Commission, 2008). Florida has also developed a *Critical Lands and Waters Identification Project (CLIP)*, which identifies priority lands and waters for future conservation, in support of the state's Florida Forever land acquisition program (T. Eason, personal communications, 2012).

SECAS is patterned after a similar effort ongoing in the northeast United States, the Northeast Regional Conservation Framework (A. Milliken, personal communication: 2012). This Framework seeks to establish a regional conservation strategy that builds upon the State Wildlife Action Plans of the northeastern states, and the regional conservation needs that were identified by the states, and incorporated into the newer conservation planning efforts, such as Landscape Conservation Cooperatives (LCC). SECAS is also building on an earlier effort, the Southeast Regional Assessment Project (SERAP; Dalton and Jones, 2010), which was funded by the Southeast Climate Science Center to assess global change in the southeast landscape, and to evaluate the vulnerabilities of key ecosystems in the region. SERAP projects include the following: 1) Regionally downscaled probabilistic climate change projections; 2) Integrated coastal assessment; 3) Integrated terrestrial assessment; 4) Multi-resolution assessment of

potential climate change effects on biological resources: aquatic and hydrologic dynamics, and;

5) Optimal conservation strategies to cope with climate change. SERAP seeks to formally integrate these tasks to facilitate conservation planning and design, to enable optimal conservation decisions and produce desirable outcomes across a range of species and environments.

It is important that SECAS aligns itself with planning efforts in other sectors of society. Organizations planning for community development and urban growth, transportation, energy development, water resource, flood control hydro-power and national defense needs, are all examples of potential outreach and alignment for SECAS. Each of these sectors brings its own needs to the planning process, and each carries the potential for significant impacts on natural resources in the southeast region. Therefore, it's important that these sectors be at the table when SECAS is being formulated and implemented.

A collaboration of partnerships.....

Given that the goals and objectives for sustaining natural resources exceed the operational reach of individual programs, agencies and organizations, a collaborative approach involving multiple levels is of paramount importance to the ultimate success of SECAS. The six Landscape Conservation Cooperatives (Appalachians, Caribbean, Gulf Coast Prairie, Gulf Coastal Plains & Ozarks, Peninsular Florida, and South Atlantic) with geographic responsibilities for the southeast region have been asked to provide leading roles in the planning for SECAS, with other landscape scale partners, such as Joint Ventures and Fish Habitat Partnerships, playing an integral role. State fish and wildlife agencies and federal agencies are providing primary

points of contact (POCs), who will act as liaisons between their respective organizations and SECAS, provide direction, and help to ensure that SECAS remains relevant to their organization.

The history of collaborative partnerships in the southeast region is particularly strong, thanks to consistently effective leadership from the states, federal agencies, and partnerships. Shining examples of groundbreaking, landscape level, conservation planning have been provided through the Joint Ventures such as the Lower Mississippi Valley, Atlantic Coast, Gulf Coast, Central Hardwoods, East Gulf Coastal Plain, Oaks and Prairies, Rio Grande, and Appalachian Mountains. Likewise, the Southeast Aquatic Resources Partnership, Reservoir Fish Habitat Partnership, and Eastern Brook Trout Fish Habitat Partnership, have all provided exceptional leadership in conservation planning for aquatic species, and are considered critical partners for SECAS.

On the Gulf Coast, new conservation opportunities emerging from the disastrous Deepwater Horizon oil spill of 2010, and the devastating hurricane seasons in 2005 and 2008, have given rise to the establishment of partnerships such as the Gulf of Mexico Alliance, and the development of the Gulf Coast Ecosystem Restoration Plan (Gulf Coast Ecosystem Restoration Task Force, 2011). Four LCCs (Gulf Coast Prairie, Gulf Coastal Plains & Ozarks, Peninsular Florida, and South Atlantic) with Gulf Coast responsibilities, are partnering to develop a Gulf Coast Conservation Framework that will be directly linked to the larger SECAS endeavor. This framework will be useful and informative to other Gulf Coast conservation efforts, such as the Gulf of Mexico Alliance Governor's Action Plan, and the implementation of the *Resources and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act* (RESTORE Act) through the Gulf Coast Ecosystem Restoration Council, and NOAA Habitat

Blueprint. The four Gulf LCCs and the National Oceanic and Atmospheric Administration (NOAA) have partnered to establish a Gulf Coast Landscape Conservation Liaison position to help coordinate the conservation planning framework on the Gulf, with the following key components: 1) Regional Assessment; 2) Vulnerability Assessment; 3) Impacts Assessment; 4) Adaptation Strategy; and 5) Conservation Plan. The Gulf Coast Conservation Framework may serve as a model for implementation of the larger SECAS initiative.

To ensure a sustainable conservation landscape in the Southeast, SECAS climate adaptation decisions will rely on sound science that is clearly linked to conservation objectives that society cares about. LCCs are working closely with their partners in the regional Climate Science Centers (CSC) to identify key conservation problems and decisions that need to be made in the Southeast, to understand the priority concerns of public and non-public parties whose decisions shape the landscape, and to generate the science needed to assess the effects of proposed adaptation strategies on these priority concerns. Land use change, growing human populations, and climate change all pose significant challenges to the southeast region over the next century, and coupled with the uncertainties inherent in the projected changes and ecological responses to those changes, our science needs to be up to the challenge of providing meaningful solutions to these issues. CSCs, working in partnership with LCCs, offer the opportunity to take a fresh look at these problems, apply new scientific approaches to them, such as structured decision making and Bayesian techniques, to arrive at new ways of thinking about the problem, and new approaches to implement adaptation strategies. The Southeast Climate Science Center (SECSC) has already taken a leading role in identifying some of the science needed for SECAS,

and we expect that similar participation from the Northeast and South Central Climate Science Centers will occur as well.

LCCs and CSCs were established in 2009 as part of the nation's response to climate change (Secretarial Order No. 3289, September 14, 2009). Specifically, LCCs represent an approach to conservation that reflects the emergence of Conservation Science (Meffe et al. 2006) as the 21st century conservation paradigm, recognizing that the scope and scale of our challenges represent a force of change more far-reaching and consequential than any previously encountered. The Conservation Science paradigm seeks sustainability, and recognizes the need for both dimensions of science: science as a body of knowledge, and science as a method of discovery. Furthermore, the Conservation Science paradigm requires 4 over-arching capacities: 1) capacity to characterize, assess, and predict population and habitat sustainability at landscape scales; 2) competencies in geospatial planning and modeling, assessing and predicting population and habitat sustainability, and assessing and characterizing environmental sensitivity of landscapes; 3) an approach to partnering that enables a region's private, state, and federal conservation infrastructure to operate as a networked, leveraged system; and 4) assume a role in the Public Square that extends beyond the operational footprint of its programs.

A way of working....

As much as anything, SECAS envisions a collaborative process in which the conservation community comes together to establish a common understanding of systems in the southeast and the way they function, a common approach to establishing conservation targets that define functional systems, a shared vision of sustainable lands and waters, and shared

responsibility for action to implement that vision. To facilitate the process, the authors have identified a number of actions and benchmarks that should characterize SECAS:

- Define and assess the ecological systems of the Southeast US.

It is important that we (the conservation community) operate from the same song sheet. Currently, habitat classification systems across the southeast are diverse; some states have the capacity to develop elaborate classification systems, while other states lack these capabilities, thus creating a patchwork of mapping systems and classification systems. However, habitat systems developed by NatureServe (Comer et al. 2003) and Southeast GAP analysis (<http://www.basic.ncsu.edu/segap/>) programs provide a basis for a consistent classification system that should meet the needs of SECAS. Similar lacks of consistency in classifying habitats have plagued other conservation planning programs such as State Wildlife Action Plans, and is recognized as a national need (Meretsky et al. 2012). Thus, SECAS can facilitate significant action towards developing consistency in habitat classification systems and how they are mapped across the region. The goal is to develop a geospatially explicit map of ecological systems throughout the southeast, which will be used as the basis for conservation assessment, establishing conservation targets, development of models, and design of sustainable systems.

- Define and assess the institutional setting within which the SE conservation community, and other communities of practice (e.g., community planning organizations) make conservation decisions.

While significant scientific challenges remain in the southeast to gain a better understanding of the vulnerability and adaptability of species and landscapes to global change-related stresses, it can be argued that two larger challenges to the sustainability of natural and

cultural resources exist: understanding the institutional/governance context within which management decisions are made and how to bring scientific knowledge effectively into the decision making process. The conservation community of the southeast is large and complex, and is organized into multiple scales and layers, which makes coordination across the community and its various sectors perhaps one of our largest hurdles. Even within a single organization, we are often segregated programmatically, which can impede effective communication, and sometimes make conservation action less than strategic or coordinated. An important benchmark for SECAS is to define and characterize the governance processes and priorities of the southeast conservation communities, and to devise processes and mechanisms that can bring science to bear on making decisions that account for key conservation priorities. We can characterize the conservation community in the following classifications:

- Organizational: federal, private, state, university
- Functional: enforcement, land management, research, outreach
- Programmatic: water, forestry, fish, wildlife, recreation, cultural, wildlife diversity

Within these organizational constructs, we need to find mechanisms to identify the various sectors, and develop strategies to work across the sectors and bridge communications within and among them. Though a daunting task, it is one which the authors consider vitally important to the ultimate success of SECAS. In today's digital age, our capacities to develop communication platforms that can reach out to strategic sectors of the conservation community are both achievable and necessary.

While it is important for us to better understand and communicate with our traditional partners within the conservation community, SECAS also provides the conservation community

a way to think about and engage with other sectors of society that are interested in sustainability as an outcome of their planning and policies. Groups interested in developing sustainable communities, sustainable agriculture, sustainable transportation systems, alternative energy systems, and the development of ecosystem service markets, are all examples of communities that should be engaged in developing SECAS.

Advances in planning for sustainable communities are particularly relevant for SECAS, as we explore coupled human-natural systems, and plan for future changes to those systems. Water resources in the southeast are particularly vulnerable to both climate change and increased human demands, and would benefit greatly from better planning for sustainable communities. Groups such as the American Planning Association have considered sustainability in their planning processes, and have established objectives to promote sustainable communities: 1) Reduce dependence upon fossil fuels, extracted underground metals and minerals; 2) Reduce dependence on chemicals and other manufactured substances that can accumulate in Nature; 3) Reduce dependence on activities that harm life-sustaining ecosystems; 4) Meet the hierarchy of present and future human needs fairly and efficiently (American Planning Association, 2000).

Another model of sustainable communities is the concept of Eco-municipalities, initiated in Sweden in 1983, which relies on a systems approach that involves raising widespread community awareness and integrated municipal involvement, using a common language to identify what sustainability means, such as the four APA sustainability objectives (James and Lahti 2004). These approaches have been instrumental in creating an extensive track record of success in Sweden, where 25% of all municipalities in the country have adopted a common set of

sustainability principles and have implemented these ideas widely and systematically throughout their municipal operations and larger communities. In the US, a number of municipalities have adopted the APA's sustainability principles, and thus are considered Eco-municipalities.

- Define the process

The authors envision an adaptive process for defining the future conservation landscape of the southeast, in which the outcome is not a final product or a static map of priorities, but rather a decision-based conservation framework that is dynamic, incorporates learning into the framework, and encourages science-based evaluation and refinement over time. Within that context, the following components will help define the process:

1. Build a decision framework, allowing for adaptive responses to alternative futures
2. Develop conceptual models which demonstrate system functionality, including drivers and stressors on system integrity.
3. Establish measurable outcomes of system sustainability and viability (conservation targets).
4. Incorporate global change (urbanization, climate, etc.) processes, and assess vulnerability of systems – alternative scenarios.
5. Establish thresholds for systems, and assess system vulnerability to stressors.
6. Design spatially explicit, sustainable systems.
7. Incorporate social sciences into the process (decision theories, value of ecosystem services, etc.).

8. Focus on both natural systems, and coupled human-natural systems, engaging other communities of practice (community planning, transportation, energy, etc.) into the conservation planning process.

Conclusion

While SECAS moves forward as a regional conservation planning effort, it is important to recognize the needs and opportunities to integrate SECAS into larger, national conservation efforts. Meretsky et al. (2012) recognized the need for a national conservation-support program that "supports and coordinates a national conservation network and landscape - to national-scale conservation efforts", which would be based upon and build on the State Wildlife Action Plans. This national network of wildlife habitats was envisioned in the Wildlife Habitat Policy Research Program (National Council for Science and the Environment, 2010), and recommended increased conservation funding of approximately \$3 billion annually (from current funding of \$9 billion, up to \$12 billion annually) to achieve that objective (Casey et al. 2008). The effort recognizes that the need is urgent, with the next 30 years considered to be a critical period for protecting U.S. wildlife habitat and biodiversity. The effort also recognizes the need for a landscape-level approach to conservation, and suggests that "an integrated approach across federal, state, tribal, and local government boundaries will require a nationwide set of coordinated strategies – ones that reflect regional differences but add up to a comprehensive approach that can bridge the gap between current efforts and a completed system" (National Council for Science and the Environment, 2010).

Likewise, the Draft National Fish, Wildlife and Plants Climate Adaptation Strategy (Strategy; <http://www.wildlifeadaptationstrategy.gov/public-review-draft.php>) represents another

SECAS alignment to a national scale effort. The Strategy was developed as the first joint effort of three levels of government (state, tribal, and federal), which have primary responsibility for managing the nation's natural resources, in determining actions that should be taken to ensure that those resources become more resilient, adapt to, and survive a warming climate. The Strategy identifies 7 major goals: (1) conserving and connecting habitat; (2) managing species and habitats; (3) enhancing management capacity; (4) supporting adaptive management; (5) increasing knowledge; (6) Increasing awareness and motivating action; and (7) reducing stresses not caused by climate change. The Strategy also recognizes the need to plan for and implement actions at the landscape scale, and that collaborative efforts across jurisdictions reflects the best way to achieve successful adaptation outcomes. Landscape Conservation Cooperatives, Migratory Bird Joint Ventures, and National Fish Habitat Partnerships are specifically mentioned as potential vehicles to achieve a national scale adaptation strategy.

In closing, the authors offer the following quote from the Wildlife Habitat Policy Research Program's Synthesis Report, *Our Nation's Wildlife Habitats: completing an integrated system for conserving their values and benefits in a changing world* (National Council for Science and the Environment, 2010), as a call to action in defining a future conservation landscape in the Southeastern United States:

"The most fundamental challenge to achieving this goal will not be resources but a 'new way of working' challenge that can ramp up implementation fast enough to halt the loss of fish and wildlife habitats to development. The conservation business models of most wildlife agencies and organizations are not a good match for the problems confronting wildlife conservation in this century – problems that transcend the boundaries of

individual programs, agencies, and organizations and challenge traditional ways of thinking and doing. If we are to respond effectively to 21st Century challenges, transformational change will be needed in how wildlife agencies and organizations work, individually and collectively."

Literature Cited

American Planning Association. 2000. Policy Guide on Planning for Sustainability. <http://www.planning.org/policy/guides/pdf/sustainability.pdf>. 15 pp.

Casey, F., A. McMurray, T. Kroeger, J. Michalack, and Paula Manalo. 2008. The Cost of a Comprehensive National Wildlife Conservation System: A Project Completion Report for the Wildlife Habitat Policy Research Program. Defenders of Wildlife. Conservation Economics Program. Washington DC

Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*. NatureServe, Arlington, Virginia.

Dalton, M.S., and Jones, S.A., compilers, 2010, Southeast Regional Assessment Project for the National Climate Change and Wildlife Science Center, U.S. Geological Survey: U.S. Geological Survey Open-File Report 2010–1213, 38 pp.

Florida Fish and Wildlife Conservation Commission. 2008. Wildlife 2060: What's at Stake for Florida? <http://myfwc.com/media/129053/FWC2060.pdf>

Global Climate Change Impacts in the United States, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009.

Gulf Coast Ecosystem Restoration Task Force. 2011. Gulf of Mexico Regional Ecosystem Restoration Strategy. 119 pp.

James, S., and T. Lahti. 2004. *The Natural Step for Communities: How Cities and Towns can Change to Sustainable Practices*. Gabriola Island, British Columbia: New Society Publishers

Master, Lawrence L., Stephanie R. Flack and Bruce A. Stein, eds. 1998. *Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity*. The Nature Conservancy, Arlington, Virginia.

Meffe, G. K., C. R. Carroll, and M.J. Groom. 2006. What is conservation biology? Pages 3-26 in Groom, M.J., G.K. Meffe, and C.R. Carroll, editors. *Principles of conservation biology*. 3rd Edition. Sinauer, Sunderland, Massachusetts, USA.

Meretsky, V.J., L.A. Maguire, F.W. Davis, D.M. Stoms, J.M. Scott, D. Figg, D.D. Goble, B. Griffith, S.E. Henke, J. Vaughn, and S.L. Yaffee. 2012. A State-Based National Network for Effective Wildlife Conservation. *BioScience*. 62(11):970-976.

National Assessment Synthesis Team. 2001. *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*, Report for the US Global Change Research Program, Cambridge University Press, Cambridge UK, 620pp.

National Council for Science and the Environment. 2010. Our Nation's Wildlife Habitats: completing an integrated system for conserving their values and benefits in a changing world. *A Synthesis of Research Findings and Recommendations by the Wildlife Habitat Policy Research Program*.

Wear, D.N.; Greis, J.G.; Walters, N. 2009. The Southern Forest Futures Project: using public input to define the issues. Gen. Tech. Rep. SRS-115. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 17 p..

White, P. S., S. P. Wilds, and G. A. Thunhorst. 1998. Southeast. Pages 255-314 in M. J. Mac, P. A. Opler, C. E. Puckett Haecker, and P.D. Doran, Editors. Status and trends of the nation's

biological resources. United States Department of the Interior, U.S. Geological Survey, Reston, VA. 986 p.