Logic Model: Regional Approaches to Climate Change: Southern Conifer CAP

SITUATION	INPUTS	ACTIVITIES
Protecting planted southern pine forests from losses due to changing climate is vital to the economic, social and environmental health of the region & nation Private forest owners need knowledge & options to make informed management decisions that increase resilience & mitigation potential of planted southern pine forests Scientists need trans-disciplinary research to develop new options that increase resilience & C mitigation potential of planted southern pines Foresters, county Extension agents, & other natural resource professionals need training on management practices that address climate change risks to help private owners maintain productive planted southern pine forests Community leaders need knowledge about potential climate change mediated economic & environmental impacts to planted southern pine & concomitant effects on resources (e.g., water) K-12 students need exposure to this important career option, knowledge about changing ecosystems, & tools to participate in consumer decision making regarding climate change & pine systems	Federal, state & private funds Faculty, staff, & students at southern 1862 & 1890 Land Grant institutions. Climate & forest scientists with federal, state, industry, NGO & other agencies Research facilities, regionwide trial network, southern pine germplasm, equipment, & supplies Industrial cooperator expertise, historical soils & productivity data & existing decision support systems such as growth & yield, climate models Traditional & new technology transfer & science delivery systems for disseminating knowledge & decision-making tools Land-grant extension network (e.g. county agents) K-12 education networks (e.g. PLT), public schools Industrial and non-industrial private planted southern pine forestland owner opinions Needs assessment to efficiently guide technology transfer material development and grant resources	Establish regionwide monitoring network based on existing cooperative field trials of planted southern pines Measure C, water & nutrient baselines using standardized methods Apply multi-scaled modeling to assess forest management alternatives under climate change Analyze genetics of breeding & natural populations to ID genes controlling mitigation & adaptation traits Integrate genotype performance with climate records to develop response functions Conduct LCA and multi-scale economics and policy analyses to evaluate tradeoffs and interactions among management and climate Assess audience needs Develop audience-based educational materials & programs for education & extension use (traditional & new technology) Integrate forestry & climate science research, education & extension professions that can be sustained after project completion Conduct train-the-trainer workshops for key educators Implement undergraduate research & teaching internship program Evaluate impact of education materials & training efforts (e.g., K-12 & extension)

ASSUMPTIONS – Understanding climate change factors will affect adaptation, mitigation & other activities *(see narrative for more details). Best science transferred to owners/educators/students in a usable form will lead to adaptive management*

OUTPUTS	OUTCOMES		
	Knowledge	Actions	Conditions
Regional C, H_2O, & N baselines Improved growth & yield models with climate variables, C balance Improved process & hybrid models parameterized from network measurements Regional market impacts modeled based on business-as-usual assumptions with risks of increased disturbance and altered management that increases mitigation and resilience Complete LCA of C, H_2O, nutrient, & energy footprint of alternative management scenarios under varying sub regional, ownership & climate conditions Open source decision support system with C management, economics, genetics res. results "One stop" web presence for info. on southern pine climate change mitigation & adaptation Graduated students & postdocs prepared to address trans-disciplinary forestry & climate sciences issues Environmental ed. curriculum provides accessible info. to teachers, youth and general public	Audiences learn new feedstock selection, moisture & nutrient management strategies, & market options Stakeholders learn new DSS & stand level management strategies Leaders learn new life cycle analyses & the economic, social, & resources compromises associated with climate change & southern pine management policies & practices. Youth (via informed teachers) learn new climate science, planted southern pine adap-tation/mitigation information & how consumers affect forests & climate. Educators gain competence in climate & forest science & LCA Scientists learn important details about the planted southern pine ecosystem from field application & experiences Scientists learn how to better conduct trans-disciplinary research	Practitioners adopt new guidelines, techniques, & technologies & disseminate these to clientele Private forest owners establish & manage using new guidelines, technologies, & adaptive strategies for short- and long- term , which in-cludes enhanced management, species selection or better adapted germplasm Teachers increase their competence & teaching related to climate, carbon & planted southern pine ecosystems Community leaders & consumers utilize LCA, economic analyses & other research results in decision making Southern planted pine & climate science research, education & outreach professionals & communities become integrated Teachers/environmental educators deploy new materials related to climate adaptation & mitigation in the region	Improved economic return or reduction of loss from catastrophic events, and/or conservation of planted pine forests Increased forest carbon sequestration and N use efficiency Enhanced capacity for regional, trans-disciplinary collaboration among climate and forest scientists, extension & education professionals Increased capacity for NIPF participation in C markets or to deploy adaptive strategies to insure the sustainability of planted southern pines in advance of climatic changes Climate-smart audiences making informed decisions relating to the planted southern pine system & consumption of forest products Landowners/K-12 Teachers/students have a clearer idea of adaptive strategies and their role in climate change mitigation in the southeastern US

EXTERNAL FACTORS – Availability & interest of key participants who are not directly funded by the project *(see narrative for more details) Unforeseen geo-political events that may advance or diminish the goals of this effort.*