Fertilizer, Density, and Weed Management Practices to Optimize Poplar Productivity in Coastal North Carolina, U.S.A.

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The continued expansion of the wood pellet industry in coastal North Carolina provides opportunities for short rotation woody biomass silviculture to meet future woody biomass demand. Randomized trials of cottonwood and hybrid poplars were planted at two coastal sites. Both sites are former agricultural lands but vary by soil marginality. Planting density, fertilization, and weed control were evaluated for four poplar clones (n=4) at both sites. The fertilization trials involved three replicate blocks of three fertilizer treatments with two planting densities. The weed management trials involved two replicate blocks of four weed management treatments at three planting densities. Fertilizer treatments included no fertilization, 100 diammonium phosphate (DAP), and 200 DAP at 2500 and 5000 trees per hectare. Weed management methods included no management, chemical suppression at 45% glyphosate, chemical eradication at 100% glyphosate, and mechanical mowing for poplars planted at 2500, 9800, and 20000 trees per hectare. At both sites, 100 DAP fertilizer treatment yielded greater stem heights for all four clones. For weed control, chemical eradication (100% glyphosate) yielded the greatest stem heights for all four clones. Year 2 stem heights and volume by treatment and genotype will be reported with expected profitability based on enterprise budgets.

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Biography:

Dr. Elizabeth Nichols: Elizabeth Guthrie Nichols is an Associate Professor in the Environmental Technology and Management Program, Department of Forestry and Environmental Resources at North Carolina State University. She is also associate faculty with the NCSU Department of Environmental and Molecular Toxicology. She has a M.Sc. and Ph.D. in Environmental Sciences and Engineering from the University of North Carolina at Chapel Hill. Her research interests are focused on contaminant cycling and bioavailability in forest systems. Her key interests are the protection of surface waters and groundwater quality point and non-point sources. Key to this research is the use isotopic tracers to understand water resource use by trees, fate of contaminants in vegetated systems, and the use of trees to monitor and track subsurface contamination. She also manages a research program to integrate biomass/bioenergy production with environmental protection on marginal lands. Current external funds support research for *Populus* for bioenergy in North Carolina and Sustainable Water for Agriculture (USDA). As an educator, she teaches undergraduate courses in Environmental Monitoring and Analysis, Environmental Forensics, Assessing Lands for Bioenergy, and the Practice of Environmental Technologies, a capstone senior undergraduate course. She teaches a graduate online, distance education course in Environmental Monitoring for NC State's online Masters of Environmental Assessment. She directs NC States online undergraduate certificate and minor in Renewable Energy Assessment.

Alexander L. Ewald: Graduate of North Carolina State University's Environmental Technology and Management B.S. program in 2015, currently pursuing a Masters of Natural Resources at North Carolina State University (first year graduate student). Has had past work experience as a contractor in the Environmental Health and Safety (EHS) field and is currently a Research Assistant at North Carolina State University in Forestry and Environmental Resources. Three time recipient of the American Society for Quality Scholarship which is awarded to students who incorporate quality concepts, technology, and tools to improve the workplace, products, and themselves.