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## Using Seasonal Climate Variability Forecasts to Plan Forest Plantation Establishment <sup>1</sup>

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### Introduction

Atmospheric scientists are now able to predict seasonal climate variations, with a relatively high level of skill. Knowledge of climatic conditions allows us to develop a seasonal management strategy for forest plantations and managed natural forests. Areas of application include seedling establishment, preparing for pests and diseases, fire management, harvest schedules and inventory management. This publication provides strategies to consider for pine plantation establishment in Florida and southern Alabama and Georgia. Seasonal climate conditions can be better predicted for this region because it is affected by the El Niño Southern Oscillation (ENSO) phenomenon.

Unlike weather prediction, where our time frame is no more than the up-coming week, climate forecasting can predict a wet, cool summer or a hot, dry winter. These types of forecasts refer to seasonal climate variability. Oscillations of the Pacific Ocean's sea surface temperature above and below normal are a major contributing factor in determining seasonal climate in the Southeastern United States.

Generally, the effect is stronger further south than north, and stronger in winter-spring than in summer-fall. Table 1 summarizes seasonal variations in the Southeast.

It is important to distinguish that this fact sheet proposes forest management options in light of improved *climate* prediction, and as such has implications for the six-month to one year planning horizon. Management options described here are not pertinent to the daily or weekly operational planning as may be influenced by weather prediction.

Information about the current El Niño/La Niña status and the implications for Florida climate are provided by The Southeast Climate Consortium and can be found on the Web at <[www.agclimate.org](http://www.agclimate.org)>, and at a related weather site, <<http://fawn.ifas.ufl.edu>>.

### Plantation Establishment

There are three main types of regeneration: natural regeneration, direct seeding and planting. (See EDIS CIR759 for more information about these regeneration techniques.) As most forest regeneration

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in the Southern U.S. is planted, we focus on the implications of climate prediction on forest plantation establishment (planting), though the concepts are likely to apply to natural regeneration and direct seeding as well.

Successful plantation establishment is critical to profitable forestry. In 1999-2000 plantings, a drought in many areas of the Southeast caused by La Niña led to high seedling death and disease. Losses were large and are reflected in the poor quality of those stands today. In contrast, 1998 (El Niño-rainy) plantings were well established.

Aspects of plantation establishment that may be adjusted according to seasonal climate prediction include:

- *Planting Scheduling*: A landowner might schedule plantings to coincide with El Niño (wet) winters. With prediction of a La Niña (dry) winter when seedlings are more likely to die, a landowner could choose to reschedule planting to another season or plant in low areas where soil moisture is more available.
- *Planting Density*: With prediction of a moderate La Niña (dry) winter, a landowner could plant at a higher density to compensate for anticipated seedling mortality.
- *Weed control*: Following planting during an El Niño winter, increased growth of competing vegetation could call for weed control (see Campbell and Long 1998).

For complete information about plantation establishment in the Southeast U.S., see:

- Campbell, P., A. Long. 1998. Vegetation Management in Florida's Private Non-Industrial Forests. IFAS Publication SS-FOR-10, available on the Web at:  
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<http://edis.ifas.ufl.edu/pdffiles/FR/FR04400.pdf>>
- Duryea, M. 2000. Forest Regeneration Methods: Natural Regeneration, Direct Seeding and Planting. IFAS Publication CIR759, available on the Web at:  
<  
<http://edis.ifas.ufl.edu/pdffiles/FR/FR02400.pdf>>

- Duryea, M.L. and J.C. Edwards. 1997 (Revised). Planting Southern Pines. IFAS, University of Florida, Cooperative Extension Service. Circular 767. 14p. Available on the Web at:  
<  
<http://edis.ifas.ufl.edu/pdffiles/FR/FR02500.pdf>>
- USDA Forest Service. 1989. A Guide to Care and Planting of Southern Pine Seedlings. USDA Forest Service Management Bulletin RB-MB39. 44p.

**Table 1.** How ENSO Phases Influence Conditions in Alabama, Florida and Georgia

Phase	Region				
		Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep
<b>El Niño</b>	Peninsular Florida	Wet - cool	Wet-Cool	Slightly Dry	Slightly dry to none
	Panhandle-tri state area	Wet	Wet	Slightly Wet	None
	Western Panhandle	None	Wet	Slightly Dry	None
	Central and North AL, GA	None	None	None	Slightly dry
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<b>La Niña</b>	Peninsular Florida	Dry Slightly Warm			
	Panhandle-tri state area	Weak dry	Dry	Dry	None
	Western Panhandle	Slightly Dry	Dry	Dry	None
	Central and North AL, GA	Dry	Dry in South, wet in NW AL	None	Wet in NW AL
<b>Neutral</b>		None	None	None	None