PROPOSER
Name: Jeffery Morton
Academic Classification: Ph.D. Student **Department: Botany**
E-mail Address: jefferymorton@yahoo.com
Postal Address: P.O. Box 118526, Campus **Phone Number: 392-1891**

Relevant Experience (also see Appendix I, Morton CV):

- **Conducted forest inventories for academic and professional purposes.**
- **Laboratory Instructor for "Plant Ecology" (PCB 3601C), Spring 2005, University of Florida.**
- **Studied general fire ecology with The Forest Trust, Santa Fe, NM.**
- **Teaching assistant for the field course components of "Patterns and Processes of Terrestrial Ecosystems," a graduate level ecology course offered through Yale University.**
- **Studies the "Nature and Property of Soils" under Drs. Tom Siccama and Dan Vogt at Yale University's School of Forestry and Environmental Studies.**

SPONSOR
Name: Francis E. "Jack" Putz
Department: Botany
E-mail Address: fep@botany.ufl.edu
Postal Address: P.O. 118526, Campus

Title: HISTORICAL ECOLOGY OF UNIVERSITY OF FLORIDA'S NATURAL AREA TEACHING LABORATORY

Project Summary:
This study will use a variety of methods to propose a site history for the Natural Area Teaching Laboratory at the University of Florida. Specifically, increment cores will be taken from selected trees to determine ages, episodes of release, and fire histories of individual trees. Historic aerial photographs will be studied to identify land cover changes over time. Plow horizons will be mapped and charcoal density measured to determine which areas were cultivated and/or burned. Established permanent plots will be remeasured and the data analyzed. The various sorts of data obtained will be complemented with general landscape interpretation (e.g., tree form, understory composition) to assemble an ecological history and to identify current trends of vegetation change for the NATL site. A manuscript for publication in a peer reviewed journal will be prepared as well as text and graphics for the NATL website and interpretative signs for the area.

Starting Date: 4 January 2005
Completion Date: 29 April 2005

Signatures
Student: _____20 November 2004

Sponsor: _____20 November 2004

Project Description

HISTORICAL ECOLOGY OF UNIVERSITY OF FLORIDA'S NATURAL AREA TEACHING LABORATORY

Objective: To describe the history of the Natural Area and Teaching Laboratory (NATL) on the University of Florida campus.

Methods:

Dendrochronology: Tree cores will be taken from the larger (and presumably older) pines (*Pinus palustris, P. taeda, and P. elliottii*) and from the thin-barked oaks (mostly *Quercus hemisphaerica* and *Q. nigra*) that have colonized sand hill areas. These cores will be used to establish the time of their colonization of the site and, by evaluation of episodes of release, to generate an understanding of the conditions under which they grew. Cross referencing these data with climatic records will help to determine the extent to which variation in growth rates can be explained by climatological factors. These data will also be used to determine the ages of tree cohorts and whether there were stand-wide release events triggered by storms.

Increment cores will be scrutinized for the presence of fire scares. Information about the presence or absence of fire scars and the years in which fires occurred will be aggregated to recreate a fire history of the area that includes the years of the fires, there extents, and their likely intensities. Cores or sections from snags and downed logs will be taken in order to build a more complete dendrochronological database for the area.

Land cover change: Historical aerial photographs will be studied to establish a chronological progression of vegetation cover and, to the degree possible, species composition. Old fence lines and roads found in historical photographs will aid matching current site characteristics with those depicted in the historical photographs.

Soils: Sites for study will be selected using the existing detailed soil map, historical aerial photographs, and former fence lines as guides. Soil cores will be examined to determine the presence and distribution of soils with a plow horizon (Ap), an indication of past farming. The presence or absence of soil charcoal will also be noted and can serve as an indication of naturally ignited fires or site preparation and maintenance fires associated with past agricultural activities.

Permanent plots: I will build on existing data sets from six 20x20 m permanent plots established in the NATL in 1997 by the Department of Botany. The current database includes basic information about the recent treatment history of the plots, a basic stand inventory (species, diameter at breast height, health, canopy status and the presence of any damage to inventoried trees), and an inventory of sampled ground and understory species. The data are currently in a raw state and need analsysis. Current conditions will be compared to past data to detect any trends and to predict future conditions. The data recorded for this study will also contribute to the longer term monitoring effort at NATL.

Landscape Interpretation: To complement the data resulting from the above methods, both micro and macro-level site characteristics will be incorporated into a landscape-wide narrative

for the site. For instance, trees with asymmetrical branching can indicate that one side of the tree experienced different light regimes than the other, thus suggest that there was at some point in the tree's life an edge or gap adjacent to one side. Low branches or branch scars similarly indicate former open conditions. This type of tree morphology interpretation, in addition to other landscape interpretation methods, will be added to other data collected to create a comprehensive narrative for the ecological history of the site.

Deliverables:

1. A manuscript prepared for publication in a scientific journal (e.g., Florida Scientist, Restoration Ecology, or Castanea).
2. Text and supporting graphics (e.g., scanned photographs and data figures) to supplement the materials already on the NATL website.
3. Text about the site's history and clues to reading the landscape for an interpretive sign to be posted on NATL grounds.
4. Data on forest composition and structure compatible with that of previous studies to contribute to the long-term monitoring effort of the site.

Some Relevant Literature

Bowman, D.M.J. 2001. Future eating and country keeping: what role has environmental history in the management of biodiversity? Journal of Biogeography 28: 549-564.

Egan, D. and E. A. Howell. 2001. The Historical Ecology Handbook: A Restorationist's Guide to Reference Ecosystems. Island Press, Washington, D.C.

Fritts, H.C. and T.W. Swetnam. 1989. Dendroecology: a tool for evaluating variations in past and present forest environments. Advances in Ecological Research 19: 111-188.

Gavin, D.G. 2001. Estimation of inbuilt age in radiocarbon ages of soil charcoal for fire history studies. Radiocarbon 43: 27-44.

Heckenberger, M.J., A. Kuikuro, U. T. Kuikuro, J.C. Russell, M. Schmidt, C. Fausto, and B. Franchetto. 2003. Amazonia 1492: Pristine forest or cultural parkland. Science 301: 1710-1714.

Willis, K.J., L. Gillson, and T.M. Brncic. 2004. How "virgin" is virgin rainforest? Science 304: 402-403.