

FOR 4934/6934 Longleaf Pine: Ecology, Management and Restoration

**Course Title:** Forestry 6934/4934 - Longleaf Pine: Ecology, Management and Restoration (2 credits)

Taught as a "Maymester" course at the Jones Ecological Research Center  
May 10-15, 2015

**Desired Prerequisites:** Students should have a background course in ecology, soils, silviculture

**Instructor:** Dr. Eric J. Jokela, Professor  
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**Text:** Assigned readings from the primary literature and textbooks such as:

The Longleaf Pine Ecosystem. 2006. (S. Jose, E.J. Jokela, D.L. Miller, eds.) Springer. 438 p.

The Art of Managing Longleaf: A Personal History of the Stoddard-Neel Approach. 2010. (Leon Neel, P.S. Sutter and A.G. Way). Univ. Georgia Press. 211 p.

**Purpose and Objectives:**

- 1) Knowledge of fundamental ecological, silvicultural and habitat management concepts used in the management and restoration of longleaf pine communities;
- 2) To provide field examples and practical experience in the design, prescription, and implementation of applied silvicultural techniques for managing longleaf pine forests for conservation and restoration objectives;
- 3) To read and critically analyze the primary literature in longleaf pine management and ecology.

**Methods of Instruction:**

- 1) Lectures Major source of theory and technical information  
Discussion: To emphasize important topics  
Answer questions  
Provide information from recent research  
Read and discuss assigned papers

- 2) Laboratory Major source of practical and applied information;
- 3) Textbook - **REQUIRED READINGS** - assigned pages in texts and supplemental papers.
- 4) Field trips -to observe habitat management practices and meet with natural resource management professionals working in longleaf pine ecosystems.

#### Evaluation:

- 1) Final Essay
- 2) Discussion participation (readings, assignments, daily Quizzes, field exercises)
- 3) Grade Assignments - The boundaries for each grade (% of total points) are:

Percent (%)	Grade
93.4 - 100	A
90.0 - 93.3	A-
86.7 - 89.9	B+
83.4 - 86.6	B
80.0 - 83.3	B-
76.7 - 79.9	C+
73.4 - 76.6	C
70.0 - 73.3	C-
66.7 - 69.9	D+
63.4 - 66.6	D
60.0 - 63.3	D-
Less than 60%	E (Fail)

#### ACADEMIC HONESTY

#### Plagiarism will not be tolerated!

The University of Florida requires all members of its community to be honest in all endeavors. Cheating, **plagiarism**, and other acts

diminish the process of learning. When students enroll at UF they commit themselves to honesty and integrity. Your instructor fully expects you to adhere to the academic honesty guidelines you signed when you were admitted to UF. As a result of completing the registration form at the University of Florida, every student has signed the following statement: "*I understand the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.*" Furthermore, on work submitted for credit by UF students, the following pledge is either required or implied: "*On my honor, I have neither given nor received unauthorized aid in doing this assignment.*" It is to be assumed all work will be completed independently unless the assignment is defined as a group project by the professor. Examples of academic dishonesty would include, but not be limited to taking of information, tendering of information, plagiarism, conspiracy and bribery. When you use information from a source, provide a full literature citation. Copying information from other documents (whether they are websites, newspaper articles, or anything) is plagiarism and will not be tolerated. This policy will be vigorously upheld at all times in this course.

### **Software Use**

All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

### **UF Counseling Services**

Resources are available on-campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal counseling;
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault/Abuse Recovery Education, Student Health Care Center, 392-1161 x231, assist with sexual assault issues;
4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

**Accommodations for Students with Disabilities:**

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

**LECTURE OUTLINE**

Sunday, May 10

Jones Center introduction, course overview

Monday, May 11

Longleaf Pine (LLP) History and Conservation Status

LLP Natural History

LLP Communities

Fire Ecology

LLP Soils

Disturbance Ecology

Field Tour - Ichauway LLP Communities  
(moisture gradient, mixed LLP/HW, wetlands, stocking structure, ground cover, soils, etc.)

Prescribed Fire Management

Natural Regeneration

Silvicultural Systems

Stoddard-Neel Approach (concepts)

Tuesday, May 12

Artificial Regeneration  
    Old Field  
    Cutover

Planting Stock

Understory Restoration

Ichauway Restoration Sites Field Tour

Carbon Cycling Overview

LLP Wetlands

Field Tour (*Rhexia Pond and Red Dirt Tower*)  
 Wetlands/Plant Diversity  
 Carbon Research/Modeling/Towers  
 Carbon Policy and Science

Wednesday, May 13

LLP Wildlife - Non-herps overview, game management

LLP Wildlife - LLP herpetofauna overview

Wildlife Management Tour  
 Gopher Tortoise  
 Quail Management  
 RCW biology and Management

Depart for Overnight Field Tour

Greenwood Plantation Old Growth LLP  
 Depart for St. Marks

Thursday, May 14

Meet with USFWS personnel for St. Mark's NWR field tour

Meet USFS personnel for Apalachicola NF field tour

Depart for Ichauway

Friday, May 15

Economics -

Stoddard-Neel Approach (application), overview of marking

Marking Exercise -

Review Marking Exercise

Field Tour  
 Species Conversion  
 LLP plantation management - thinning and groundcover restoration  
 Vegetation Management  
 Herbicides  
 Mechanical  
 Invasives

**NOTE: THERE WILL BE A \$150 FEE PAID DIRECTLY TO THE JONES ECOLOGICAL RESEARCH CENTER FOR LODGING, LUNCHES, TRANSPORTATION AND COURSE MATERIALS. YOU WILL BE RESPONSIBLE FOR BRINGING YOUR OWN FOOD (BREAKFASTS/DINNERS), SLEEPING BAG, AND TOWEL.**

ADDITIONAL REQUIRED READINGS

**Preliminary Readings Prior to Course**

- America's Longleaf. 2009. Range-wide conservation plan for longleaf pine. Prepared by the Regional Working Group for *America's Longleaf*.
- Brockway, D.G., K.W. Outcalt, and W.D. Boyer. 2006. *In: Longleaf Pine Regeneration Ecology and Methods*. Jose, S., E.J. Jokela, and D.L. Miller (eds.). *The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration*. Springer, New York, New York. Chapter 4.
- Guldin, J.M. 2006. *In: Uneven-Aged Silviculture of Longleaf Pine*. Jose, S., E.J. Jokela, and D.L. Miller (eds.). *The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration*. Springer, New York, New York. Chapter 7.
- Johnson, R., and D. Gjerstad. 2006. *In: Restoring the Overstory of Longleaf Pine Ecosystems*. Jose, S., E.J. Jokela, and D.L. Miller (eds.). *The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration*. Springer, New York, New York. Chapter 9.
- Kirkman, L.K., R.J. Mitchell, M.J. Kaeser, S.D. Pecot, and K.L. Coffey. 2007. The perpetual forest: using undesirable species to bridge restoration. *Journal of Applied Ecology* 44:604-614.
- McIntyre, R.K., S.B. Jack, R.J. Mitchell, J.K. Hiers, and W.L. Neel. 2008. Multiple Value Management: The Stoddard-Neel Approach to Ecological Forestry in Longleaf Pine Grasslands. Miscellaneous publication of the J. W. Jones Ecological Research Center.
- McIntyre, R.K., S.B. Jack, B.B. McCall, and R.J. Mitchell. 2010. Financial feasibility of selection-based multiple-value management on private lands in the South: a heuristic case study approach. *Journal of Forestry* 108:230-237.
- Mitchell, R.J., J.K. Hiers, J.J. O'Brien, S.B. Jack, and R.T. Engstrom. 2006. Silviculture that sustains: the nexus between silviculture, frequent prescribed fire, and conservation of biodiversity in longleaf pine forests of the southeastern United States. *Canadian Journal of Forest Research* 36:2724-2736.

## Readings During Course

### Jokela:

- Boyer, W.D. 1958. Longleaf pine seed dispersal in South Alabama. *Journal of Forestry* Apr 1958:265-268.
- Boyer, W.D. 1979. Regenerating the natural longleaf pine forest. *Journal of Forestry* Sept 1979:572-575.
- Boyer, W.D. 1987. Annual and geographic variations in cone production by longleaf pine. *Proceedings of the Fourth Biennial Silvicultural Research Conference* 73-76.
- Boyer, W.D. 1993. Regenerating longleaf pine with natural seeding. *Proceedings of the Tall Timbers Fire Ecology Conference* 18:299-309.
- Crocker, Jr., T.C., and W.D. Boyer. 1975. Regenerating longleaf pine naturally. *USDA Forest Service, Research Paper SO-105*.
- Dennington, R.W., and R.M. Farrar, Jr. 1983. Longleaf pine management. *USDA Forest Service, Forestry Report R8-FR 3*.
- Kalisz, P.J., and E.L. Stone. 1984. The longleaf pine islands of the Ocala National Forest, Florida: a soil study. *Ecology* 65(6):1743-1754.
- Maple, W.R. 1977. Planning longleaf pine regeneration cuttings for best seedling survival and growth. *Journal of Forestry* Jan 1977:25-27.
- Schmidtling, R.C., and T.L. White. 1989. Genetics and tree improvement of longleaf pine. *Proceedings of the Symposium on the Management of Longleaf Pine. USDA Forest Service, GTR SO-75:114-127*.

### McIntyre:

- Carter, M.C., and C.D. Foster. 2004. Prescribed burning and productivity in southern pine forests: a review. *Forest Ecology and Management* 191:93-109.
- Dunleavy, L. (ed.). 2008. Pine ecosystem conservation handbook for the gopher tortoise in Georgia: a guide for family forest owners. *Miscellaneous publication of American Forest Foundation*.
- James, F.C., C.A. Hess, B.C. Kicklighter, and R.A. Thum. 2001. Ecosystem management and the niche gestalt of the red-cockaded woodpecker in longleaf pine forests. *Ecosystem Applications* 11:854-870.
- Jones, P.D., B. Hanberry, and S. Demarais. 2009. Stand-level wildlife habitat features and biodiversity in southern pine forests: a review. *Journal of Forestry* Dec 2009:398-404.

- Jose, S., S. Ranasinghe, and C.L. Ramsey. 2008. Longleaf pine (*Pinus palustris* P. Mill.) restoration using herbicides: overstory and understory vegetation responses on a Coastal Plain flatwoods site in Florida, U.S.A. *Restoration Ecology*.
- Kush, J.S., R.S. Meldahl, C.K. McMahon, and W.D. Boyer. 2004. Longleaf pine: a sustainable approach for increasing terrestrial carbon in the southern United States. *Environmental Management* 33:S139-S147.
- Lauer, D.K., and J.S. Kush. 2011. A variable density stand level growth and yield model for even-aged natural longleaf pine. Special Report No. 10. A miscellaneous publication of Alabama Agricultural Experiment Station.
- Mills, S.D., and C.T. Stiff. 2008. Financial performance of loblolly and longleaf pine plantations. Miscellaneous publication of FORSight Resources, LLC.
- Moser, W.K., S.M. Jackson, V. Podrazsky, and D.R. Larsen. 2002. Examination of stand structure on quail plantations in the Red Hills region of Georgia and Florida managed by the Stoddard-Neel system: an example for forest managers. *Forestry* 75(4):443-449.
- Outcalt, K.W., and R.M. Sheffield. 1996. The longleaf pine forest: trends and current conditions. USDA Forest Service Resource Bulletin SRS-9.
- Rathbun, S.L., and N. Cressie. 1994. A space-time survival point process for a longleaf pine forest in southern Georgia. *Journal of American Statistical Association* 89(428):1164-1174.
- Raymond, P., S. Bédard, V. Roy, C. Larouche, and S. Tremblay. 2009. The Irregular Shelterwood System: review, classification, and potential application to forests affected by partial disturbances. *Journal of Forestry* 405-413.
- Shoch, D., T. Pearson, S. Grimland, and S. Brown. 2005. An assessment of carbon sequestration potential of longleaf pine restoration on existing production timberland in Northwest Florida. Report to The Nature Conservancy Conservation Partnership Agreement. Miscellaneous publication of Winrock International.
- Stanturf, J.A., S.L. Goodrick, and K.W. Outcalt. 2007. Disturbance and coastal forests: a strategic approach to forest management in hurricane impact zones. *Forest Ecology and Management* 250:119-135.
- Trusty, J.L., and H.K. Ober. 2009. Groundcover restoration in forests of the Southeastern United States. CFEOR Research Report 2009-10. Miscellaneous publication of the University of Florida.
- US Forest Service. 2008. How do hurricanes affect forest resources? Lessons from Katrina and Rita. *COMPASS* 12:1-45.



**Mitchell:**

- Battaglia, M.A., P. Mou, B.J. Palik, and R.J. Mitchell. 2002. The effect of spatially variable overstory on the understory light environment of an open-canopied longleaf pine forest. *Canadian Journal of Forest Research* 32:1984-1991.
- Battaglia, M.A., R.J. Mitchell, P.P. Mou, and S.D. Pecot. 2003. Light transmittance estimates in a longleaf pine woodland. *Forest Science* 49:752-762.
- Franklin, J.F., R.J. Mitchell, and B.J. Palik. 2007. Natural disturbance and stand development principles for ecological forestry. General Technical Report NRS-19. USDA Forest Service, Northern Research Station.
- Gresham, C.A., T.M. Williams, and D.J. Lipscomb. 1991. Hurricane Hugo wind damage to southeastern U.S. coastal forest tree species. *Biotropica* 23(4a):420-426.
- Hedman, C.W., S.L. Grace, and S.E. King. 2000. Vegetation composition and structure of southern coastal plain pine forests: an ecological comparison. *Forest Ecology and Management* 134:233-247.
- Johnsen, K.H., J.R. Butnor, J.S. Kush, R.C. Schmidting, and C.D. Nelson. 2009. Hurricane Katrina winds damaged longleaf pine less than loblolly pine. *Southern Journal of Applied Forestry* 33(4): 178-181.
- Kupfer, J.A., A.T. Myers, S.E. McLane, and G.N. Melton. 2008. Patterns of forest damage in a southern Mississippi landscape caused by Hurricane Katrina. *Ecosystems* 11:45-60.
- Liu, K., H. Lu, and C. Shen. 2008. A 1200-year proxy record of hurricanes and fires from the Gulf of Mexico coast: Testing the hypothesis of hurricane-fire interactions. *Quaternary Research* 68:29-41.
- Mitchell, R.J., J.K. Hiers, J. O'Brien, and G. Starr. 2009. Ecological forestry of the southeast: understanding the ecology of fuels. *Journal of Forestry* 107:391-397.
- Myers, R.K., and D.H. van Lear. 1998. Hurricane-fire interactions in coastal forests of the south: a review and hypothesis. *Forest Ecology and Management* 103:265-276.
- Outcalt, K.W. 2008. Lightning, fire, and longleaf pine: Using natural disturbance to guide management. *Forest Ecology and Management* 255:3351-3359.
- Palik, B.J., R.J. Mitchell, and J.K. Hiers. 2002. Modeling silviculture after natural disturbance to sustain biodiversity in the longleaf pine (*Pinus palustris*) ecosystem: balancing complexity and implementation. *Forest Ecology and Management* 155:347-356.

- Palik, B.J., R.J. Mitchell, S.D. Pecot, M.A. Battaglia, and P.P. Mou. 2003. Spatial distribution of overstory retention influences resources and growth of longleaf pine seedlings. *Ecological Applications* 13:674-686.
- Pecot, S.D., R.J. Mitchell, B.J. Palik, E.B. Moser, and J.K. Hiers. 2007. Competitive responses of seedlings and understory plants in longleaf pine woodlands: separating canopy influences above and below ground. *Canadian Journal of Forest Research* 37:634-648.
- Franklin, J. F., Mitchell, R. J. and Palik, B. J. *Natural Disturbance and Stand Development Principles for Ecological Forestry*. Newton Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station; 2007. General Technical Report NRS-19. 44 p.
- Pecot, S. D., Mitchell, R. J., Palik, B. J., Moser, E. B. and Hiers, J. K. Competitive responses of seedlings and understory plants in longleaf pine woodlands: separating canopy influences above and below ground. *Canadian Journal of Forest Research* 2007 Mar; 37:634 - 648.
- Jose, S., Jokela, E. J. and Miller, D. L., editors. *The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration*. New York, NY: Springer Science+Business Media; 2006. 438 p.
- Franklin, J.F., T.A. Spies, R. Van Pelt et al. 2002. Disturbances and structural development of natural forest ecosystems with silvicultural implications, using Douglas-fir forests as an example. *Forest Ecology and Management*, 155:399-423.