Adaptive Management Project
Gator Stands Block 2
Tate’s Hell State Forest
Conserved Forest Ecosystems: Outreach and Research (CFEOR) is a consortium of public land management agencies, the University of Florida, private companies and non-profit groups.

Our mission is to develop and disseminate knowledge needed to conserve and manage Florida’s forests as healthy, working ecosystems that provide social, ecological and economic benefits on a sustainable basis.

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Cover photo by Google Earth (C). 2012 Google aerial photo of treatment plots of CFEOR Signature Project: Developing Adaptive Management Strategies for Ecosystems in Transition, located at Tate’s Hell State Forest in Carrabelle, FL.
To CFEOR members:

As the CFEOR cooperative enters its seventh year, I am amazed at our accomplishments and the dedication of our participants and staff. Membership and research funding continues to be tight in these difficult economic times, so CFEOR is focusing its efforts on proving its worth, especially to the leaders of members who handle the purse strings. To that end, we are working on two initiatives to measure our outreach and research value.

In April, we conducted a web survey to gauge the impact CFEOR programs have had on participants concerning their land management decisions. Based on the preliminary results of the survey (see page 7, Outreach Success), the answer is a resounding YES with positive responses scoring 70 percent or more in a wide range of areas. How’s that for a positive outreach and research impact! The second initiative will occur this fall, so I want to encourage each of you to invite the leader of your agency, organization or business to attend CFEOR’s September Steering Committee meeting/field trip at Tate’s Hell State Forest. Understanding CFEOR’s vital outreach and research missions/programs are critical to their understanding of the cooperative’s worth, especially given the recent change in leadership at state land management agencies and water management districts. More importantly, leaders that attend will get a firsthand look at focused research in action; see where their research dollars are being spent on CFEOR’s signature Adaptive Management Project (AMP); and network with their peers to get a better understanding of the value CFEOR can provide to their organization. Make sure you bring your rubber boots for the field trip! Tropical Storm Debby’s recent deluge may have extinguished the fire at Tate’s Hell, but it has not extinguished this cooperative’s flame to conserve and manage forest ecosystems on a sustainable basis!

Bill Cleckley,
Steering Committee Chair
Nokuse Plantation is a 51,000 acre private preserve in the Florida Panhandle conceptualized and funded by M. C. Davis and Sam Shine. It is designed to be both a model and a catalyst for future landscape level conservation and restoration projects and consists of a rich compilation of upland, wetland and freshwater communities. These communities provide habitat for a myriad of plants and animals, including threatened and endangered species, and serve as a reservoir of historic biodiversity of the Panhandle. Lands that were historically converted to pine plantations and agriculture are being restored back to longleaf pine ecosystems with over 22,000 acres replanted in longleaf pine since 2004. Since 2006, over 3000 gopher tortoises were translocated to Nokuse Plantation from development sites. Specific research includes a long-term study of site fidelity, enclosure requirements, movement patterns, growth rates, and reproduction of translocated tortoises.

Gilchrist Club is a private hunting and sporting club in Gilchrist County that offers members hunting, fishing and recreational opportunities on nearly 27,000 acres of diverse woodlands. The property contains pine forest, oak hammock, grassy flats and wetlands with habitat for native bobwhite quail, Osceola turkey, deer, wild boar and alligator. The Gilchrist Club is a strong advocate for forest conservation and restoration. Their management activities include the planting of native wiregrass, controlled burns and habitat restoration which have been vital in restoring native bird populations on the property as well as creating habitat and food resources for all native animals. The club has also collaborated with University of Florida School of Forest Resources and Conservation students working on their senior capstone project to develop long range multiple-use management plans as well as hosted experimental plots for UF/SFRC for silvicultural and biometric studies with Eucalyptus trees.
Florida Forest Service
Recently completed a CFEOR Sponsored project that quantified and assessed the economic values of four ecosystem services provided by Florida’s working forests including water quality, carbon storage, timber production, and wildlife conservation (learn more on page 10).

Florida Park Service
The Florida Park Service has twice been honored as being the nation’s best state park system, not only for its progressive land management and historic preservation programs, but for its comprehensive recreation and interpretation/education programs.

Northwest Florida Water Management District
Through cooperative efforts with private individuals and the Florida Fish and Wildlife Conservation Commission, we enhanced wiregrass groundcover restoration activities with enhanced donor site acreage and increased wiregrass seed collection capability, while utilizing the most current research on wiregrass reproduction conducted by CFEOR fellow, Emily Rodriguez (learn more on page 10).

St Johns River Water Management District
Recently worked with private home owner associations near Canaveral Marsh Conservation Area to better communicate to the community why frequent prescribed fire and mowing is important to both safety of the neighborhood and the ecology of the conservation lands, and to improve agency/community relations.

Suwannee River Water Management District
Conducting an ongoing large-scale hydrologic and natural community restoration of a 30,000 acre perched wetland, Mallory Swamp, through the use of water control structures to reconnect wetlands and slow discharge as well as vegetation management aimed at restoring the balance of herbaceous and woody species after a wildfire in 2001.

USFS National Forests in Florida
Increasing the pace of restoration through our “Accelerating Longleaf Pine Restoration in Northeast Florida” project on the Osceola National Forest, a ten-year collaborative effort with 16 State, Federal, and private partners to restore the longleaf pine ecosystem on 568,000 acres in northeast Florida using over 20 different land management and restoration activities.

Normandeau Associates
Trained volunteers to become educators about groundwater and springs protection. Educational climate change project with several southeast aquaria. New Fire in Florida’s Ecosystems (FIFE) beginning with an expansion into Georgia. Many projects completed for wind energy to assess potential impacts to birds and bats and addressing power line impacts on birds. Opening up a new department for water quality and quantity projects.
Outreach Highlights

CFEOR related research was presented at multiple conferences nationwide! Highlights include:

- Melissa Kreye, awarded a blue ribbon for her research poster on the economic value of forests that protect water quality, presented at the SAF National Conference in Honolulu, HI.

- Holly Ober, presented CFEOR’s success in collaboration at the 38th Annual Natural Areas Conference, Tallahassee, FL.

- CFEOR PhD students: Brenda Thomas, Shelly Johnson and Ajay Sharma presented posters at multiple conferences this year. See their posters at www.sfrc.ufl.edu/CFEOR/Outreach-Workshop-1.

Workshops and Symposiums 2011-2012

- A Symposium on Groundcover Restoration in Forests of the Southeastern US at the Natural Areas Association Annual Meeting, - November 2011, Tallahassee, FL.

  Six speakers from FL, GA, LA, and SC discussed how to maximize wiregrass reproduction and lessons learned from case studies in three different forest ecosystems. Also organized a field trip to Torreya State Park and Apalachicola Bluffs.

- Workshop on Landscape-scale mechanical fuels reduction treatments effects on fire behavior, fuel loads, and forest ecology - September, 2011 at Osceola National Forest.

  Workshop provided a tour and discussion of new research on fire severity in pine flatwoods and how fuel reduction treatment effectiveness changes over time. See the data results in our workshop booklet (left).
In April 2012 CFEOR conducted a web survey with 89 individuals who participated in CFEOR (in one or more areas over the last three years) to measure the impact that CFEOR made in their land management decisions.

“I shared the Updates newsletter with my supervisor to demonstrate a new technique we could possibly utilize for our upcoming large-scale restoration project.”

- Meghan Knapp, Environmental Specialist, Pumpkin Hill Creek Preserve & Talbot Islands State Parks

CFEOR Workshops!
- Over 83% of participants said they have already made or intend to make changes in their land management as a result of the information they received.
- Most frequently reported areas where changes have been made or will be implemented include:
  - Groundcover Restoration
  - Biodiversity Enhancement
  - Forest Management
  - Fuels Management

Groundcover Restoration in Forests of the Southeast Handbook!
- 83% who received a copy said they made or intend to make changes in their management practices as a result.
- 75% said their efforts were more successful.
- 55% said their efforts were less costly.

Download the handbook for free at http://www.sfrc.ufl.edu/cfeor/Shorterm2008

Survey Demographics

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<td>1-10,000 acres</td>
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CFEOR Updates Newsletter and Website!
- 58% of survey respondents who regularly receive the Updates Newsletter read every issue (every 2-3 weeks). Visit our newsletter archive at www.sfrc.ufl.edu/cfeor/newsletter.
- 71% of respondents agreed that the Updates provided detailed summaries of recent research.
- 80% agreed that the Updates provided information on short and long term restoration.
- 73% agreed that the Updates provided exposure to new resources.
- The CFEOR website www.sfrc.ufl.edu/CFEOR had over 1,100 unique visitors this year and 50% were new to the site.
(S-001) Signature Project (AMP)

Developing Adaptive Management Strategies for Ecosystems in Transition- Year 4

Principal Investigators: Kimberly Bohn, University of Florida, West Florida Research and Education Center and Ajay Sharma (Ph.D. student), University of Florida, School of Forest Resources and Conservation

Project Funders: Florida Forest Service, Northwest Florida Water Management District, Suwannee River Water Management District, UF School of Forest Resources and Conservation

Project Summary: Increasingly, uneven-aged forest management is considered an ideal strategy for managing for multiple ecosystem services, however little is known about this strategy in mesic to hydric, predominantly slash pine ecosystems.

Objective: To evaluate various harvesting strategies (traditional even-aged thinning methods as well as two-aged and uneven-aged methods) to convert plantations to sustainable uneven-aged sustainable longleaf/slash pine ecosystems in terms of species composition (both overstory and understory), forest structure, and productivity (timber yield and carbon sequestration potential).

2011 Project Activities: Harvesting of all 3 research blocks at Tate’s Hell State Forest was completed in December 2011. The principal investigators surveyed the plots and verified that the cutting treatments were implemented as planned. Ground cover responses were already observed in June 2012. Formal measurements of groundcover and trees and stands will be prescribe-burned in fall/winter 2012, and a regeneration study in the group selection gaps will be installed in January 2013.

An additional component of the project included a modeling study using the U.S. Forest Service’s Forest Vegetation Simulator to simulate various cutting treatments over a 100 year time frame. Input data for the model utilized tree data collected at plots at Tate’s Hell before harvesting. The two main initial cutting treatments tested to convert plantations were low thinning vs a traditional uneven-aged ‘BDq’ selection system, at two residual basal areas (93.2 or 37.2 ft²/acre) and two cutting cycles (10 or 20 yrs). The “thinning” treatment to 37.2 ft²/acre is similar to the “irregular shelterwood” method implemented in the Tate’s Hell field sites, while the thinning to the higher residual basal area is similar to the 3rd row thinning in the field sites.

Preliminary results suggest that different cutting strategies optimized different objectives. The BDq method at any residual basal area or cutting cycle reached a maximum structural diversity in tree sizes sooner than any other treatment, though structural diversity between all scenarios were within 10% of each other by year 50 and may not be statistically different. On the other hand, using thinning to a high residual basal to convert stands resulted in the greatest annualized timber production (ft²/acre/year) and carbon sequestration (metric tons/acre/yr) over the simulation period. Final analyses and interpretation of outputs will be finalized by September 2012. The full 2011 report is available at www.sfrc.ufl.edu/CFEOR/Longterm2008.

Skidder removing trees inside AMP experimental treatment plots at Tate’s Hell State Forest. Photo by Ajay Sharma.
(S-006) Signature Project

Ground Cover Restoration in Flatwood Longleaf Pine Communities: Assessment of seed bank and its implications

Principal Investigators: Kimberly Bohn, University of Florida, West Florida Research and Education Center and Ajay Sharma (Ph.D. student), University of Florida, School of Forest Resources and Conservation

Project Funders: CFEOR Members

Project Summary: Successful restoration of groundcover in longleaf pine-slash pine ecosystems following decades of suppression may depend on soil seed banks because they contain propagules of species which may be desirable for site colonization after activities such as thinnings, burning, or other mechanical treatments are carried out.

Objective: To quantify and compare vegetation and seed banks in various sites under longleaf pine restoration in the hydric and mesic flatwood habitats as affected by restoration and management activities.

Outcomes: Soil cores were excavated from degraded (unthinned plantations), partially restored (thinned and burned once) and fully restored (burned regularly) slash pine ecosystems at Tate’s Hell State Forest. Germination from those soil cores over 10 months resulted a total of 26, 39, and 64 species from degraded, partially restored, and restored sites respectively. The seed bank was rich in sedges and rushes with no exotic invasive species present. Several species in the seed bank of the degraded and partially restored site were not present in the existing ground cover. Seed density in the degraded site was greater at a depth of 5-10 cm in soil, which suggests that a form of management that exposes this layer could help speed recovery of understory species richness. A full report of this study will be made available by Spring 2013.
Research Reports

(P-006) Sponsored Project

Stewardship Ecosystem Services Survey Project

Principal Investigators: Francisco Escobedo, Damian Adams, Amr Abd-Elrahman, and Taylor Stein, School of Forest Resources and Conservation, University of Florida

Project Funder: Florida Forest Service

Project Summary: Quantifying and assessing ecosystem services allows for a systematic accounting of the environmental benefits people receive from forests. Florida’s non-industrial private lands provide many ecosystem services to society, so recognizing the values of these services in land use planning (especially at the county planning level) could be important for the long-term sustainability of Florida’s forest lands, and well-being of Florida’s citizens. Researchers on this project include folks from the CFEOR Administrative Team, Damian Adams, Taylor Stein and Melissa Kreye and CFEOR Affiliated Faculty, Francisco Escobedo.

Objective: We quantified and assessed the economic values of four ecosystem services, including water quality, carbon storage, timber production, and wildlife conservation, provided by forest land enrolled in the Florida Forest Stewardship Program (FSP).

Outcomes: Results found that on average a typical acre of forest enrolled in FSP provides ecosystem services with a present value of $5,030. Altogether, the present value of ecosystem services from 437,823 acres of FSP forests is more than $2.07 billion. Overall, water provided the largest share of the value (66%), followed by carbon stocks (25%), timber production (7%) and wildlife (2%). Results are a conservative estimate but can be used to inform the public and policy-makers about the benefits of programs such as the FSP that maintain and conserve working forests. A full report is available at www.sfrc.ufl.edu/cfeor/SESS.

CFEOR Graduate Fellow Master’s Thesis

Maximizing Wiregrass Reproduction for Restoration Purposes

Principal Investigators: Emily Rodriguez (Masters Student), Kimberly Bohn, University of Florida, West Florida Research and Education Center, University of Florida.

Project Funders: Northwest Florida Water Management District, USDA National Needs Fellowship Grant

Project Summary: Maximizing viable seed yields of wiregrass (Aristida stricta) is an important goal of land managers attempting to restore large landscapes. This study examined environmental effects on wiregrass seed production and viability as well as the effects of mechanized seed cleaning and coating on germination and establishment.

Objective: To measure the effects of burn month and harvest date on the number of culms per plant, number of seeds per culm, percent filled seed, percent viable seed, and percent germinating seed, as well as the effects of mechanized seed cleaning and coating on germination and establishment.

Outcomes: Overall, May and June burns resulted in the greatest seed quantity and quality, while viability and germination rates were highest from seed collected in early December. Optimal viable seed yields were obtained after June burns in north Florida and May burns in Central Florida. Harvesting in early to mid-November, prior to peak seed rain, may result in greater overall gains in the amount of viable seed obtained. In the greenhouse study we found that cleaned seeds should not be broadcast without taking additional steps to bury the seed, such as seed bed cultivation and that there was no benefit to germination or seedling establishment of a super-hydrating polymer coating on cleaned seeds. For the full thesis go to www.sfrc.ufl.edu/CFEOR/USDA NNF Grant.
Recent graduate Emily Rodriguez has been working as a program assistant this summer in the Family, Youth & Community Sciences Department at UF to improve the quality of Extension programming on climate change in the Southeast. She was recently offered a position as a Park Services Specialist at Ravine Gardens State Park and will begin her career with the Florida Park Service in the fall. Read a summary of Emily’s masters thesis on maximizing wiregrass reproduction on page 10.

“The CFEOR fellowship provided me with the foundation and support I needed to begin a career in adaptive forest management. As a graduate student I particularly enjoyed the relationships I developed with the people associated with CFEOR, from my faculty advisor, to my professional mentor, to the support staff. Thank you CFEOR!”

-Emily Rodriguez

Shelly Johnson has advanced to candidacy status as she finishes the second year of her PhD. Her dissertation is investigating: how management for native ecosystems and gopher tortoise habitat provides habitat for other species of wildlife; the value of wildlife diversity as an ecosystem service; and the tradeoffs among diversity of habitat, wildlife service values, and other ecosystem services in the Florida longleaf pine ecosystem. This coming year she will compile data from existing surveys of wildlife and analyze wildlife-habitat relationships, as well as conduct a survey to evaluate ecosystem services of wildlife in Florida.

Brenda Thomas completed the work for USFWS reconstructing fire history on Wassaw National Wildlife Refuge that began last summer and will begin fieldwork for her dissertation in December. As part of her work, she will be coring cypress trees from tidal freshwater forested wetlands in coastal rivers along the Atlantic Coast to examine the growth response of the trees across a salinity and latitudinal gradient. She will be finishing her second year of coursework this fall and taking qualifying exams at the end of the fall semester.
Structure & Governance

Figure 1. Structure of CFEOR


![Income and Expenses Pie Charts]

- **Income**
  - $94,000 (Membership)
  - $40,000 (UF/IFAS)
  - $34,000 (Research/Outreach)
  - $18,000 (Graduate Fellowship)

- **Expenses**
  - $94,000 (Operations)
  - $5,400 (Research/Outreach)
  - $45,200 (Graduate Fellowship)
  - $33,800 (Personnel)
CFEOR Steering Committee

**Bill Cleckley**
Steering Committee Chair
Director, Division of Land Management and Acquisition, Northwest Florida Water Management District

**Susan Matthews and Teri Cleeland**
Steering Committee Vice-Chair
Director and Deputy Forest Supervisor, Region 8, National Forests in Florida, USDA Forest Service

**Dana Bryan**
Environmental Policy Coordinator, Department of Environmental Protection/Florida Park Service

**Bob Heeke**
Sr. Land Resources Manager, Suwannee River Water Management District

**Jim Karels**
Director, Florida Forest Service

**Steve Miller**
Director, Division of Land Management, St Johns River Water Management District

**Joe Quinn**
Manager, Land Management, Southwest Florida Water Management District

**Wayne Zipperer**
Research Forester, Southern Research Station, USDA Forest Service

CFEOR Supporting Members

**Nokuse Plantation**
M.C. Davis, Owner and Matthew Aresco, Director

**Gilchrist Hunt Club**
Richard (Dick) Brubaker, Asset Manager,

**Normandeau Associates, Inc.**

Christian Newman, Principal Ecologist and Peter Colverson, Environmental Communications Specialist

UF Administrative Team

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School of Forest Resources and Conservation

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School of Forest Resources and Conservation

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**Leda Kobziar, Co-Director**
Associate Professor, Fire Science and Conservation, School of Forest Resources and Conservation

**Holly Ober, Co-Director**
Associate Professor, Wildlife and Understory Habitat, North Florida Research & Education Center

**Melissa Kreye, Coordinator**
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**Tim White**
Professor and Director, School of Forest Resources and Conservation

**Mark Hostetler**
Professor and Interim Chair, Wildlife Ecology and Conservation

CFEOR Science Committee

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Program Coordinator, Florida Plant Conservation Program, Florida Forest Service

**Dana Bryan**
Environmental Policy Coordinator, Department of Environmental Protection/Florida Park Service

**Cindi Gates**
Sr. Land Management Specialist, Southwest Florida Water Management District

**Carl Petrick**
Ecosystems Staff Officer, Ocala National Forest, USDA Forest Service

**Beau Wilsey**
Environmental Scientist, Suwannee River Water Management District

CFEOR Outreach Committee

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Environmental Communications Specialist, Normandeau Associates, Inc.

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**Charlie Houder**
Assistant Executive Director, Suwannee River Water Management District

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Public Affairs Officer, National Forests in Florida, USDA Forest Service

**Bonnie Stine**
Cooperative Forestry Assistance Supervisor, Florida Forest Service
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**Francisco Escobedo**  
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**William Giuliano**  
Professor and Extension Specialist, Department of Wildlife Ecology and Conservation, University of Florida

**Shibu Jose**  
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**Martha Monroe**  
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**Carrie Reinhart-Adams**  
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**Jason Smith**  
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**Collaborative Partners**

**Natural Areas Training Academy**  
Holly Ober, Coordinator, Department of Wildlife Ecology and Conservation, University of Florida

**Florida Natural Resource Leadership Institute**  
Laila Racevskis, Director, Food and Resource Economics Department, University of Florida

**University of Florida, IFAS Extension**  
John Hayes, Dean for Research