FLORIDA NATIVE PLANT SOCIETY
30TH ANNUAL CONFERENCE PRESENTERS

ABSTRACTS AND BIO SKETCHES

KEYNOTE PRESENTATIONS

JUNE BAILEY WHITE
The Joys and Horrors of Inheriting an Old Family Garden
June Bailey White will read several essays about the pleasures, sorrows, duties and responsibilities of inheriting a generations-old family garden, and her attempts during her stewardship to balance respect for the environment with the vision of the garden's original planner.
BIO SKETCH *June Bailey White taught school in Thomasville, Georgia for many years. She has written two books of essays and a novel. Her latest book is a collection of short stories,* Nothing With Strings*. She is now working on a series of essays about gardening. Bailey White has been a popular commentator on National Public Radio, where her unique voice and gift for finding the wit and humor in everyday people provided the fodder for many NPR driveway moments.*

VASSILIKI BETTY SMOCOVITIS, PhD
Plant Blindness: Historical and Cultural Perspectives on a Peculiar Disease
This presentation explores the phenomenon recently recognized as "plant blindness," or the inability to see plants or failure to appreciate them. It takes a long-term historical perspective and examines the roles that plants played in the history of classification, the age of exploration, in medical practice and in artistic movements in western culture. It culminates with the recognition of native vs. non-native plants and offers some tentative prescriptives for dealing with the disease. The historic exploration of Florida and the American Southeast is considered, as well as the special problems confronting the preservation of Florida's native flora.
BIO SKETCH *Vassiliki Betty Smocovitis received her PhD in Ecology and Evolutionary Biology in the Program for the History and Philosophy of Science and Technology at Cornell University. She joined the History Department at UF in 1988 and has been teaching a range of courses in the history of science since then. Dr. Smocovitis' research efforts are focused on gaining a greater understanding of the historical event known as the "evolutionary synthesis" from the perspective of the new intellectual/cultural history of science. Her areas of expertise include the history of modern evolutionary biology, genetics, systematics, paleontology and ecology, and the history of American botany in the twentieth century. In 1996. she published* Unifying Biology: the Evolutionary Synthesis and Evolutionary Biology *with Princeton University Press, designated as an Outstanding Academic Book of 1997. She has been the recipient of grants and fellowships from the National Science Foundation, the National Endowment for the Humanities and the American Philosophical Society. Dr. Smocovitis is an avid traveler, has delivered lectures all over the world, and has held formal appointments at Stanford University, the Department of the History and Philosophy of Science (MITHE) at the University of Athens in Greece, and the National Museum and Art Gallery in Papua New Guinea.*

DARREL MORRISON
Overcoming Faceless/Placeless Landscape Design
Landscape design can reach the level of "ecological art" with the synthesis of ecological understanding and artistic spatial design. Since the living, dynamic landscape is the medium for this art, we can be informed and inspired by naturally-evolving landscapes in the regions where we work. Hence, it is important to spend time in those landscapes, where we can learn much about natural patterns and processes. Other sources of inspiration include music and art. The goals of landscape design as "ecological art" would be to create landscapes that are experientially rich, with such elements as mystery, complexity, coherence and legibility; ecologically-sound or "sustainable" in that they do not require excessive inputs of resources such as water and energy and which protect natural diversity where it exists and restore it where it has been diminished; "of the place," i.e. expressing the region and the local environment so that people have clues and cues as to where they are; dynamic — that is, which change over time — within the spatial framework established. Natural growth and reproduction, as well as a certain amount of plant migration, may be permitted to enrich these landscapes over time. Examples from the speaker's work will be used to illustrate these ideas,
BIO SKETCH *Darrel Morrison is a long-time advocate of the use of native vegetation in landscape design and restoration. He received his MS in Landscape Architecture from the University of Wisconsin in 1969, and taught there until 1983, with an emphasis on native plant communities as a basis for designed-and-managed landscapes. The tallgrass prairie was a primary source of inspiration. Darrel was Dean of the School of Environmental Design at the*

University of Georgia from 1983 until 1992, and continued to teach there until 2002. He developed courses in native plant communities and taught three-week field courses in which students combined scientific and artistic methods to analyze and interpret native plant communities. Currently, Darrel lives in New York City, teaches part-time in the Master of Science degree program at Columbia University, and continues to consult on ecologically-based landscapes. His on-going projects include Storm King Art Center (sculpture park) in Mountainville, New York; the Native Wisconsin Garden at the University of Wisconsin Arboretum in Madison; and a private ranch in Montana in which totally indigenous plantings are being incorporated.Among his awards are an ASLA Award of Merit for the design of the Lady Bird Johnson Wildflower Center in Austin, TX (1996); the American Horticultural Society Teaching Award (1996); the AHS Design Award (2006); and the Council of Educators in Landscape Architecture (CELA) Outstanding Educator Award in 1994.

CONFERENCE PRESENTERS

LORAN C. ANDERSON, PhD --
Botanical Treasures of the Florida Panhandle
The flora of the Florida Panhandle is extremely rich in species diversity and endemism (several species are found here exclusively, growing no where else in the world). The Apalachicola River region has long been known for its tremendous number of rare or endangered species. More recently the western portion of the panhandle (i.e., Eglin Air Force Base) has been intensely surveyed and found to be very rich in its flora. Most recently, the St. Marks National Wildlife Refuge has been studied in detail. Images of some of the richness of this flora will be shown and commentary will be provided.
BIO SKETCH *Loran Anderson is Professor Emeritus of Biological Science and former Curator of the Godfrey Herbarium, Florida State University. He received his BS and MS degrees at Utah State University and PhD in plant taxonomy at Claremont Graduate University in California. He has conducted many floristic surveys over the past 30 years for private companies and government agencies (mostly in the panhandle, some in peninsular Florida, but also in adjacent Georgia and Alabama), and has named and described several species from Florida previously unknown to science. Dr. Anderson has served as a member of the Endangered Plant Advisory Council (Florida Department of Agriculture and Consumer Services) for over 20 years and remains active in field surveys and herbarium studies.*

JEFF CASTER
Conservation and Beautification along Florida Roadsides
Nearly five hundred years ago, in the spring of 1513, Juan Ponce de Leon named this place la Florida, “land of flowers.” Native wildflowers are part of the state’s natural and cultural heritage. New opportunities, challenges and rewards grow on the foundation of the Florida Department of Transportation’s 45-year tradition of planting and caring for native wildflowers. Since 1998, FDOT invested $300 million in highway beautification, becoming one of the state’s largest consumers of nursery, landscape and landscape architectural goods and services. Over 20 years, more than $500 million will be allocated. What can be accomplished with $500 million, 20 years, 12,000 miles of highway, and 186,000 acres of right of way? In February 2007, Florida’s Transportation Secretary signed our first Highway Beautification Policy. Significant is the increased emphasis on conservation and recognition of its investment value. Like other investments, when planned carefully and managed wisely, meaningful dividends are returned over a very long term. Through development and implementation of the policy, the entire agency has taken shared ownership of the program, with everyone recognizing that, like safety, every employee and consultant is responsible for conservation of natural resources and scenic beauty.
BIO SKETCH *Jeff Caster is a founding member and Chair of the Florida Wildflower Foundation. He is a Florida Registered Landscape Architect and has been with the Florida Department of Transportation since 1993; his current position is State Transportation Landscape Architect. He received a BS in Community Development from Purdue University, a BS in Landscape Design from Florida A&M University and a Master of Landscape Architecture at Cornell University. Jeff served as Adjunct Assistant Professor of Landscape Architecture at Florida A&M University School of Architecture from 1997 to 2007. He is a Fellow with the American Society of Landscape Architects; a Trustee and Past President of the Florida Chapter of the American Society of Landscape Architects; a member of the Transportation Research Board (TRB) Landscape and Environmental Design Committee; a member of the American Association of State Highway Transportation Officials (AASHTO) Technical Committee on Environmental Design; a member of the Magnolia Chapter of the Florida Native Plant Society; an allied member of the Association of Florida Native Nurseries; and a life member of the Florida Federation of Garden Clubs. Jeff is a lifelong conservationist and has lived in Florida 33 years.*

DAVID COPPS, MLA
Habitat Landscaping with Native Plants
This presentation introduces the principle of ecological succession as the basis for designing and managing wildlife habitat in the urban landscape. Native plant groupings that mimic meadows, thickets, hedgerows, woodlands and wetlands are described and illustrated as well as techniques for creating habitat patterns that are attractive to wildlife and humans alike. While songbird habitats are emphasized in this presentation, the principles and practices that are described should apply to many other types of wildlife as well.
BIO SKETCH *David Copps has a Masters Degree in Landscape Architecture with an emphasis on ecological design*

and management. He has worked with a variety of public and private organizations on conservation projects ranging from regional to backyard scales. As a naturalist, conservationist and landscape designer, his goal is to create appealing gardens that bring nature closer to people. David provides consultation, design and management services aimed at reducing the size of high-maintenance lawns with sustainable plantings that save energy, attract wildlife and protect water quality. He may be contacted at 850.385.6548 or meadowman3@yahoo.com (www.coppslandscape.com).

KRISTIN DOZIER, GLENN ACOMB and ERIC LIVINGSTON
Green Roof Design
[Abstract]
[Bio]
[Bio]
[Bio]

RUSSEL FRYDENBORG and NIA WELLENDORF
The Lake Vegetation Index and Biocriteria
The Lake Vegetation Index (LVI) is a multimetric index of the biological integrity of Florida aquatic plant communities. Data from 95 lakes were used to establish a relationship between a human disturbance gradient (HDG) and four metrics of plant community composition (% native taxa, % sensitive taxa, % invasive exotic taxa, and the coefficient of conservatism of the dominant taxa). Two index validations, using data from 230 lakes, strongly supported the correlations between the HDG and the LVI. In an independent exercise, 20 field botanists from Florida with extensive experience with lakes assessment demonstrated that the LVI strongly correlated with the Biological Condition Gradient (BCG) model in 30 test lakes, and assisted FDEP in establishing thresholds of impairment and excellence for lake plant communities. The BCG exercise clearly showed that the index responded consistently and predictably according to accepted ecological principles, meaning LVI scores accurately reflect the biological integrity of plant communities. FDEP believes the LVI is an important tool for Florida lake managers, providing a reliable measure of biological health to assess the effectiveness of lake management strategies.
BIO SKETCH *Russ Frydenborg was born in Miami, Florida, graduated from Florida State University with a degree in Biological Science, and has been working for the Florida Department of Environmental Protection since 1979, performing ecological assessments. His emphasis is on the objective evaluation and interpretation of environmental data and development of water quality standards to protect Florida's aquatic systems. He can be reached at Russel.Frydenborg@dep.state.fl.us.*
BIO SKETCH *Nia Wellendorf is an environmental scientist with the Florida DEP Standards and Assessment Section. For the past eight years, she has worked on biocriteria development and quality assurance, including the development and implementation of the Lake Vegetation Index. She currently works on water quality standards development toward better management and protection of Florida's surface waters. Nia has a Master's degree in Aquatic Ecology from the University of Alabama. She is an active member of the Magnolia Chapter of FNPS.*

CRAIG N. HUEGEL, PhD
Florida Wildflowers and Wildlife
Florida has the third greatest diversity of native plants in the nation. Approximately 3,500 native species have been described. After subtracting the ferns, graminoids and woody species, approximately 2,000 others remain, most of which could be construed as "wildflowers." Of these, only about 120 species are regularly offered for sale to the public through nurseries affiliated with the Association of Florida Native Nurseries (AFNN). The use of native wildflowers in home landscaping has gained neither the acceptance nor the popularity seen in many other parts of the country. There may be many reasons tied to this fact, but it is certain that the market would expand its offerings if there was sufficient demand and that there are countless numbers of species not currently offered that have ample aesthetic qualities. One problem may be that wildflowers are often considered only for their beauty; not their ecological utility. Wildflowers can be a critical component of wildlife habitat. This talk will focus on the most significant functions wildflowers provide in a landscape designed for wildlife and provide a list of those most useful.
BIO SKETCH *Craig Huegel, PhD, is a founding member of the Pinellas Chapter of FNPS and has been active at both the state and local level for more than 20 years. He has spent much of his professional career working with issues associated with conservation and the creation of wildlife habitat at the urban interface. He helped co-found the Cooperative Urban Wildlife Extension program at the University of Florida and has managed conservation lands for Pinellas County. Dr. Huegel has written two books on native plants and wildlife for FNPS. His new book on landscaping for wildlife with Florida's native woody plants is scheduled for publication in 2010 by the University of Florida Press.*

RICK JOYCE and JEFF NORCINI
Plant Provenance: What Landscape Designers and Nursery Growers Need to Know About Specifying Native Plants — Who's Your Daddy with Native Plants? The Importance of Tree Provenance
All plants and trees have a naturally occurring growing range. Some plants native to Florida have a large range, well outside of Florida in all directions, while others have a very limited range, like endemic species of the Lake Wales ridge or Apalachicola River bluffs. Since trees are long-lived organisms, provenance (where they originate) can be a

significant factor in the successful growing and establishing of trees in ecological restoration projects, but also in ornamental landscapes. Your Mom and Dad really are important. Foresters and growers in Western states have created some excellent techniques for tracking tree provenance. It all starts with the creation of a tracking database and retaining the details of tree seed collection. Ultimately, the tree seed is certified. This identification, tracking and certification system has served tree growers, tree planters and landowners well. Does native plant and tree provenance in Florida need to be addressed? This presentation will provide some case studies on individual tree species, illustrate where provenance problems can occur, identify what others are doing and provide some thoughts about the future.

Plant Provenance: What Landscape Designers and Nursery Growers Need to Know About Specifying Native Plants — Native Wildflowers and Grasses

Native wildflowers and grasses can be important components of sustainable landscapes – residential, commercial, meadows and roadsides. To facilitate sustainability of native herbaceous species used in these situations requires that producers as well as those recommending and using plants and seeds consider issues that affect sustainability and relate to practices that are deemed ecologically appropriate. Toward that end, this presentation will provide information about the relative importance and implications of plant origin, genetic diversity and phenotypic plasticity (adaptability) as it relates to both growers and landscape designers. Research results will be used to illustrate some key points.

BIO SKETCH *Rick Joyce is President and Partner of Forestry Resources Ecological, Inc. (FRE). FRE is a well-established ecological restoration company that specializes in the land management and the control, removal and mowing of exotic pest plants for private and public sector clients. Prior to joining FRE, he was Vice President of Ecosystem Sciences with Kitson Babcock LLC, the purchaser of the 91,000 acre Babcock Ranch. For most of his career, Rick was Director of the Division of Environmental Sciences for Lee County government, working there over 19 years. Prior to Lee County, he worked for Coastplan, Inc. the environmental consulting firm of Dick Workman. Rick has been a Certified Arborist since 1996 and was the state president of the Florida Chapter of the International Society of Arboriculture for two years. As a current board member, he has been involved with FNPS for over twenty years and has been the Coccoloba Chapter and state president. Rick grew up in North Fort Myers. He is an Eagle Scout. He graduated from the University of Central Florida. Rick has a love and passion for Florida's natural systems and native plants. Over many years, he has strived to share the beauty and the ecological benefits of these critically important pieces of earth infrastructure.*

BIO SKETCH *Jeff Norcini is a private consultant (OecoHort, LLC) specializing in establishment and management of sustainable landscape plantings, propagation and production of native wildflowers, and seed dormancy and germination issues of native wildflowers. He was a faculty member with the University of Florida/IFAS at the North Florida Research & Education Center in Quincy, Florida, from 1987 through March 2009. From 1996 through March 2009, his program centered on technology-oriented and fundamental issues related to commercial production and use of pre-variety germplasm of native wildflowers, with a minor emphasis on native grasses. Research and extension activities focused on issues relevant to both production and use – seed biology, cultural practices associated with population management and genetics. For more information, visit www.OecoHort.com.*

GREG JUBINSKY

The Florida Invasive Species Partnership: Invasive Species Know No Boundaries – Do We?

The Florida Invasive Species Partnerships (FISP) is a multi-agency and organizational effort to help improve the efficiency and effectiveness of partnership approaches to preventing and controlling invasives species through increased communication, coordination and shared resources. The health of our production lands, natural lands and wildlife habitats are critically important to us all and invasive species represent a very real and serious threat. If landowners and land managers in Florida wish to achieve long-term success with regards to combating invasive species, it is critical to collaborate with all stakeholders, focusing on prevention as well as treatment. FISP members have developed three goals: 1) Encourage voluntary partnerships to increase effectiveness and decrease costs of comprehensive invasive species management; 2) Encourage the development, implementation and sharing of new and/or innovative approaches to address the threat of invasive species; and 3) Provide tools and resources that enable the development of unified approaches, bridging the gap between private landowners' and land management agency invasive species efforts. The threat of invasive non-native species is great, but it can be effectively and efficiently addressed through coordinated, collective effort, which includes:

Multiple agencies and organizations in partnership;
Involve private landowners and interests;
Recognize and respect differences and commonalities in missions;
Conservation leverage, i.e. using each other's programs and assistance to strengthen and support conservation work.

[Bio]

GEORGE KISH

Status of Plant Phenology Activities in Florida and the Southeast

A Florida Phenology Workshop held at the University of Florida in May 2009 produced monitoring lists of desirable plants and animals for phenology observations. A summary of the Workshop findings will be presented along with future plans for potential FNPS participation in phenology observations. A list of native Florida plant species selected

for phenological monitoring will be described and images of plant phenophases (for example, first flower, first leaf, full flower, first fruit or seed) will be presented for selected plants.

BIO SKETCH *George Kish is a past President of the Suncoast chapter and a past Director-at-Large of the FNPS. He earned his BS in Biology from Drexel University and his MS in Environmental Science from Rutgers University. George is a hydrologist with the US Geological Survey in Tampa, Florida and a PhD student at the University of South Florida in the Department of Geography, Environmental Science and Policy. He is also the coordinator of the Southeast Regional Phenology Network, a branch of the USA-National Phenology Network (USA-NPN). These networks promote a broad understanding of plant and animal phenology and the relation of phenology to environmental and climatic change.*

KATHY MALONE

Community ButterflyScaping: Going Beyond Butterfly Gardening

ButterflyScaping expands the concept of butterfly gardening through the community-wide preservation and planting of butterfly host vegetation. In ButterflyScaping, the vegetation in yards, swales, roadsides, common areas (including in containers called "butterfly bouquets" along town center sidewalks), green walls, community ponds, dry detention areas, undeveloped areas, easements and natural areas work together to form ButterflyScapes—a large-scale habitat attractive to butterflies, pollinators, birds and other local wildlife. Butterfly gardens, and even floating pond mats landscaped with vegetation that cleanse pond water, can also be components of ButterflyScapes. ButterflyScapes can be community amenities that serve as areas of interest for residents, beautification efforts, functional wildlife habitats and landscapes that potentially lower maintenance costs through reduced mowing and minimal or no irrigation, fertilizers and pesticides. Developers and community associations alike may want to consider a ButterflyScaping theme, under the umbrella of Florida-Friendly Landscaping™ principles, for their communities. Such landscapes can be marketing tools for communities as they serve the goals of Florida-Friendly Landscaping™, which aim to conserve and protect water quality.

BIO SKETCH *Kathy Malone is the statewide builder and developer coordinator for the Florida-Friendly Landscaping™ Program which is based in Gainesville at the University of Florida, Institute of Food and Agricultural Sciences. Prior to joining Florida-Friendly, she worked at the Florida Museum of Natural History at UF where she co-authored Project Butterfly WINGS, a national 4-H citizen-science butterfly monitoring curriculum. She has founded two Florida chapters of the North American Butterfly Association and conducts surveys of rare butterflies as a volunteer for the Florida Natural Areas Inventory. Kathy worked at the South Florida Water Management District for 18 years, the last four of which were in the Land Stewardship Division where she wrote the District's award-winning public lands recreational guide. Kathy's passion is butterfly photography. She has a Bachelors degree in journalism with a minor in environmental science from the University of Florida, and a Masters degree in education from Palm Beach Atlantic University.*

D. BRUCE MEANS, PhD

The Wild, Wild World of the Florida Panhandle: Taking Stock of an Amazing Cradle of Life (or U. S. Biodiversity Hotspot)

Where in the U. S. and Canada do you find the most frogs (27), most snakes (42), most turtles (18), high salamander richness (29), a high number of birds (~300), very high plant species richness (>2500), and probably more carnivorous plants (30) than any similarly sized area in the world? Largely passed over in Colonial times, now this region is experiencing a dramatic population boom from US internal migration. Its main ecosystem, the longleaf pine forest, accounting for about 60% of the original landscape, has shrunk to less than 2% of its pre-colonial extent, and yet, the region still boasts of a large treasure trove of native ecosystems such as remnant patches of longleaf pine forest, swamps and springs, river bottomlands and flatwoods, carnivorous plant bogs, numerous first-magnitude springs, and caves. Based on his more than 40 years studying this special region, Dr. Means displays its biodiversity treasures with captivating photographs of its many native ecosystems and unique animals and plants. Hint: this fantastic place is somewhere near you!

BIO SKETCH *D. Bruce Means is a triple alumnus of Florida State University, receiving his PhD in Ecology in 1975. Past Director of Tall Timbers Research Station (1976-1984), he is presently President and Executive Director of Coastal Plains Institute and Land Conservancy (since 1984) and Adjunct Professor at Florida State University Department of Biological Science (since 1976). Dr. Means is a field ecologist with more than 45 years' experience; his main research interests center on fire ecology, longleaf pine ecosystem, tropical biology, tepui ecology, biogeography, pond ecology, amphibians and reptiles, and rare and endangered species. He has published more than 260 scientific research papers, contract reports and popular articles and is author of three books,* Florida, Magnificent Wilderness *and* Priceless Florida — Natural Ecosystems and Native Species*, both about the ecology of Florida, and* Stalking the Plumed Serpent and Other Adventures in Herpetology*. His long-awaited fourth book,* Diamonds in the Rough — Natural History of the Eastern Diamondback Rattlesnake*, is on press and expected to be published in early 2010. Bruce co-produced and starred in eight documentary films for National Geographic Explorer, BBC Television and PBS. His most exciting recent research is the discovery of an unrecognized biodiversity hotspot involving unexplored tepuis (giant mesas) in Guyana, South America, where he has found numerous frogs, giant earthworms and terrestrial crabs new to science. For further information, check out his website: www.brucemeans.com.*

TOM MILLER

Pitcher Plants as Art and Science

Botany and art seem very different disciplines that are yet integrally linked. The natural beauty of vegetation and flowers has always attracted artists, from Van Gogh's *Sunflowers* to Rousseau's primeval forests. On the other hand, many botanists learn basic art skills to complete illustrations that document important plant traits or species. Scientific drawings can be striking in their precision and beauty. So, what divides "art" from "scientific illustration"? What, if anything, separates the soul of artist from the brain of scientist? This dichotomy is explored using North American pitcher plants as an example. Pitcher plants have been a favorite of both artists and botanists due to their unusual and beautiful leaf forms and visually striking flowers. Examples of scientific drawings and photographs of native pitcher plants from north Florida will be presented along with artistic representations of the same plants to provide a light-hearted exploration of the reciprocal influences of art and botany, from herbariums specimens to artistic Sarracenia urinals.

BIO SKETCH *Tom Miller is a plant ecologist in the Department of Biological Science at Florida State University. He first encountered purple pitcher plants while foraging for blueberries on quaking bogs in Michigan and has studied various aspects of their ecology every since. He now conducts research on several species of pitcher plants in the Apalachicola National Forest, although much of his work focuses on the small communities of invertebrates that live inside their leaves. When he wants a little diversity, he also works on dune vegetation patterns of local barrier islands. He has no pretentions of ever being an artist or having significant artistic knowledge.*

VIVIAN NEGRÓN-ORTIZ, PhD

The breeding system and reproductive success of two Florida Panhandle federally listed species: *Ribes echinellum* (Grossulariaceae) and *Rhododendron minus* var. *chapmanii* (Ericaceae)

Plant reproductive output can be limited by a variety of factors, both intrinsic and extrinsic. Dr. Negrón-Ortiz investigated the reproductive biology of two federally listed shrub species, — threatened *Ribes echinellum* and endangered *Rhododendron minus* var. *chapmanii* — and recorded female reproductive output (flowers produced, fruit set) and plant size (number of stems, height) for both species. She used hand-pollination experiments to determine the breeding system of *R. m. chapmanii*. In both species, flowers are protandrous and primarily visited by bumblebees. Reproductive output for *R. m. chapmanii* was higher in 2008, but the average flowering stem was higher in 2009; growth was similar for both years. In 2008, 22% of the *R. echinellum* plants produced flowers and 18% produced fruits; but in 2009, 5% of the plants produced flowers — the proportion of plants producing fruits was reduced to less than 1%. Of the 49 *R. echinellum* plants tagged in 2008, 18% were not found in 2009 and were presumed dead. Of the plants that were found, 68% lacked green shoots so were either dormant or dead. The listing and recovery processes under the Endangered Species Act, and the conservation implications of the reproductive ecology of these species, will be discussed.

BIO SKETCH *Vivian Negron-Ortiz earned her BS and MS degrees in Biology from the University of Puerto Rico and received her PhD in Botany from Miami University in Oxford, Ohio. She is currently employed by the US Fish and Wildlife Service, Panama City, Florida, as the recovery lead for the NW Florida federally listed plant species. She conducts surveys and research and prepares status reviews and Recovery Plans for endangered and threatened plant species, and identifies conservation opportunities for imperiled plants. She is an Adjunct Assistant Professor in the Department of Botany of Miami University. Her research focuses on speciation and island biogeography in the Caribbean, plant reproduction/breeding system evolution, and the relationship of rarity to plant reproductive biology and application of these results to conservation. She has conducted studies in Puerto Rico, Cuba, the Bahamas, St. Vincent and the Grenadines, as well as northern and southern Florida. Vivian has experience teaching at all levels from high school to graduate students. She believes that education is the key element for necessary changes in the relationship between our society and biological resources, and that natural science should be integrated with law, public policy, and social sciences to develop effective programs for the conservation of biological diversity.*

GINNE STIBOLT

Sustainable Gardening for Florida

Sustainable Gardening, as defined by Ginny Stibolt, encompasses a wide range of activities and techniques. She will highlight these eight principles of sustainability: 1) Save time and money; 2) Have a minimal impact on the environment; 3) Make the best use of available resources; 4) Reduce carbon dioxide in the air; 5) Offset some of the heat absorbed and stored by urban/suburban structures; 6) Increase habitat for wildlife; 7) Prevent damage to infrastructure; 8) Prepare for disasters such as hurricanes, fires, and drought. This presentation shows that there are more ways to increase sustainability in landscapes in addition to using more native plants. Conserve water and pollute less by installing rain barrels and rain gardens. Reduce lawn acreage and better manage the remainder into a "Freedom Lawn." Use scientifically-proven gardening techniques instead of blindly following old gardeners' tales such as companion planting, volcano mulching, using artificially-aerated compost tea as a pesticide, and using gravel in containers to enhance drainage. Better-informed gardeners have more fun.

BIO SKETCH *Ginny Stibolt, a life-long gardener with an MS degree in Botany from the University of Maryland, moved to Northeast Florida in 2004. All of her previous experience and education did not help one bit when she tried her hand at Florida gardening. So she opened her botany texts, bought some Florida-based books, joined the Florida Native Plant Society, and began to research Florida gardening. Knowing she couldn't be the only transplanted gardener in the area, she started writing her popular "Adventures of a Transplanted Gardener" columns and posted*

them on her website, www.transplantedgardener.com, in Jacksonville's newspaper, the Florida Times Union*, and on www.floridata.com, an online plant encyclopedia. Some of her columns have been republished by other organizations such as in the Master Gardener newsletters. She's also the garden writer for* Vero Beach Magazine*. And now she's written a book,* Sustainable Gardening for Florida*, published by University Press of Florida (www.sustainablegardening4florida.com).*

RESEARCH PRESENTATIONS

Coastal Berm Habitat Restoration at Mariposa Key
Adam Gaylord and Damon Moore
[Abstract]

Native plant recruitment at restored mosquito impoundments in Mosquito Lagoon
Melinda Donnelly, University of Central Florida, Linda Walters, University of Central Florida, Jonas Stewart, Volusia County Mosquito Control, William Greening, Volusia County Mosquito Control, and Ron Brockmeyer, St. Johns River Water Management District
Mosquito impoundments were created during the 1960s throughout Mosquito Lagoon, FL by constructing dikes on outer marsh edges with dredge material excavated from the marsh. Dikes and adjacent borrow ditches changed the system's hydrological properties, facilitating invasion by exotic and native terrestrial vegetation. Opening culverts and breaching dikes in the early 1990s restored connectivity, followed by mechanically leveling substrate in the late 1990s. Vegetation monitoring began during 2005 and currently includes five restored impoundments in different recovery stages and two reference marshes. Soil characteristics and substrate elevation were also measured to evaluate relationship with plant recruitment. Natural recruitment of 11 native saltmarsh plants has occurred at restored impoundments, including mangrove species, *Rhizophora mangle*, *Avicennia germinans*, and *Laguncularia racemosa*, and smooth cordgrass, *Spartina alterniflora*. The overall abundance of exotic *Schinus terebinthifolius* was also significantly reduced following dike removal. Within one month of substrate leveling, recovery of saltmarsh plant communities began through natural regeneration from neighboring marshes. However, plant community recovery can be a slow process, with an increase of total plant cover of ~10% during the first year. Results from this monitoring program are providing insights on effectiveness of this restoration method and recovery rate estimates for future restoration projects.

Ecology of the threatened orchid *Sacoila lanceolata* var. *paludicola*.
Craig N. Huegel, PhD and Kathleen K. McConnell, Ecological Services Associates, LLC
A previously unknown population of approximately 250 plants of the leafy beaked ladies'-tresses, *Sacoila lanceolata* var. *paludicola* (Luer) was discovered by the authors in Sarasota County, Florida. This discovery represents a range extension in Florida of approximately 90 linear miles from the previous known locations and a new county record for this species. It also represents a significant increase in the known population of this state-listed threatened, terrestrial orchid. The authors mapped and monitored individual *Sacoila lanceolata* var. *paludicola* specimens over three years (February–May 2008–2010) to gather information to better understand the distribution, ecological requirements, and general ecology of this species. During this effort, each plant was mapped and given a unique number for data collection purposes. The results of this work show clear ecological differences between this variety and the more common and widespread *Sacoila lanceolata* var. *lanceolata*. The presentation will include a description of the Sarasota County site and observations on the distribution and ecology of this rare orchid variety that has been proposed as a separate species.

Evaluation and conservation of *Harperocallis flava*: a federally endangered plant in the savannas of the Apalachicola River Basin
Herbert Kesler and Jennifer Trusty, Folius Consulting
Harperocallis flava is one of the rarest plant species in all of Florida and is considered critically imperiled throughout its global and state range. The herb bog/savanna habitat where *H. flava* is found is defined as a fire-dependent community. The use of prescribed burns is the major management tool in this ecosystem yet little information on the influence of fire on *H. flava* is available. In order to determine how prescribed fire effect populations of this species a demographic study has been initiated. During the time when individuals are in fruit (May–June) populations were visited and individuals were located and tagged at seven sites. This preliminary research indicates that the morphology and phenology of *H. flava* may make it susceptible to fire applied at the inappropriate time. Each ramet of this species produces only one flower and the entire reproductive process may take up to 5 months. If prescribed fire is applied during flowering or seed maturation no seeds may be produced or seeds in the process of ripening may be burned up. In addition, previous works has indicated that *H. flava* lacks a seed bank. Continued research will identify the population growth rates under different management regimes in order to create recommendations that maximize the long-term success of this rare Florida endemic species.

Pine rockland wildflowers for native landscaping in south Florida
Suzanne Koptur, Department of Biological Sciences, Florida International University

Kopler and her students have collected seeds from many pine rockland species and propogated them for use in native gardens and landscapes in schoolyards and on roadsides of Miami. The major extent of pine rockland has been transformed into urban dwellings, businesses and streets, since they were the higher, dry ground upon which people could most easily settle. In this presentation, some of the species that are the most successful in cultivation, and perhaps promising for native plant growers, will be examined. Some species grow readily from fresh seed; others germinate better with pre-soaking, or scarification and pre-soaking, or acid pre-soaking. Many support wildlife (birds, butterflies, and other insects) essential for ecological restoration. Some of the adaptations for life in the pine rockland can promote their survival, while others provide challenges for their life in a more hospitable environment, such as a garden.

Replacing torpedograss with native species in shallow herbaceous wetlands
Chris Matson and Debi Tharp, The Nature Conservancy
Torpedograss is an aggressive, non-native, aquatic, invasive plant that can displace native vegetation and change the aquatic environment. While one study examines and describes maidencane's ability to exclude torpedograss, most research focuses on herbicide trials and economic efficacy of chemical control without any long-term vegetation establishment goals. Experience has shown that without active establishment of native competition, torpedograss control is a zero-gain long-term proposition where control is cyclic and likely perpetual. Matson and Tharp have developed methods to successfully displace torpedograss in shallow wetlands formerly dominated by torpedograss by following researched herbicidal control protocols and planting native competition, thus reducing and sometimes reversing the effects of torpedograss invasion on water quality and aquatic habitat quality, and nearly eliminating future needs to apply chemical treatments to areas with re-established natives. Labor costs for various projects and a general protocol are available as a handout.

Even St. John's worts get the blues: inbreeding depression and genetic drift in *Hypericum cumulicola*
Christopher G. Oakley, Department of Biological Science, Florida State University.
Small populations face many challenges to persistence including decreased genetic variation needed to adapt to a changing environment. This reduction in genetic variation arises because of increased mating among relatives, or by the chance loss of genetic variation due to genetic drift. Plants are particularly susceptible to these problems because of their sessile nature, and narrow endemics are at heightened risk due to anthropogenic modifications of dwindling habitat. Oakley examined the effects of inbreeding and genetic drift on plant performance in the endangered plant *Hypericum cumulicola*. He used a series of controlled pollinations within and among multiple populations of different sizes, and evaluated germination, survival, and reproduction of the resulting progeny. Unexpectedly, Oakley found no pattern for inbreeding depression with respect to population size despite wide among-population variation in the detrimental effects of inbreeding. Crosses between populations showed a marked increase in performance, mostly for the smallest populations, suggesting a role for chance loss of variation due to genetic drift. Future research is proposed to examine population variation in self-fertilization rate as a possible explanation for the unexpected inbreeding depression results. This research will help to further our understanding of the causes of genetic erosion in imperiled plant species.

Quantifying success in a restoration outplanting of the endangered Beach Jacquemontia (*Jacquemontia reclinata*): Comparisons with nearby natural populations
John B. Pascarella, Katherine Mincey and Kayla Perry, Department of Biology, Georgia Southern University.
A detailed study of one outplanting site (Juno Dunes Natural Area, Palm Beach County) was used to compare three outplanting sites to nearby natural populations across the range of the species (Miami-Dade to Palm Beach County). Annual census data from 2007–2009 was used to measure survivorship, growth and reproduction. At Juno Dunes, plant survival was high with only 1 death from 2007–2009. By 2009, aveage plant size and cover were stabilizing, likely due to constraints by existing vegetation and a trail/road. Fruit and seed production continued to increase. Reproduction was very extensive and new plants were recruited within three years of outplanting. Across the three regions, survivorship was similar in both outplanted and natural populations while cover was higher in two of the three outplanted populations by 2009. All three outplanted sites had higher reproductive effort, including a greater percentage of reproductive plants and higher seed production per plant. By 2009, recruitment of new plants was similar across sites. While all three outplanting sites can be considered successful, the poorer performance of natural sites warrants concern, as they may be suffering from overgrowth and competition. In comparison, sites selected for outplanting were generally very open and had little existing competition.

Variation in growth ratios and aboveground biomass allocation of resprouting shrubs with time after fire in scrubby flatwoods.
Jennifer L. Schafer and Michelle C. Mack. University of Florida, Department of Biology
Growth of resprouting species over time after fire has implications for biomass recovery and species persistence. Stem allometry may vary over time, due to changes in the post-fire environment, and among species, due to species specific constraints. Schafer and Mack measured and harvested aboveground stems of the most abundant shrubs in scrubby flatwoods (the oaks, *Quercus chapmanii*, *Quercus geminata* and *Quercus inopina* and the ericaceous species, *Lyonia fruticosa* and *Lyonia lucida*) from sites of different times since fire. Height, basal diameter and biomass per stem of all species increased from six weeks to eight years after fire; however, from eight to 20 years

after fire, height, diameter and biomass remained similar or decreased. Oaks had higher height:diameter ratios than ericaceous species six weeks after fire; whereas, eight years after fire ericaceous species had higher height:diameter ratios than oaks. Leaf:shoot biomass ratios of oaks decreased with time since fire, while leaf:shoot biomass ratios of ericaceous species were highest one year after fire. Similar growth and biomass allocation ratios from eight to 20 years after fire suggests that recovery of biomass occurs within eight years after fire, while variation in allometry among species likely maintains patterns of species abundances in scrubby flatwoods ecosystems.

Monitoring the demographics and reproductive ecology of scrub spurge (*Euphorbia rosescens*)
Stacy Smith, Carl Weekley and Eric Menges, Archbold Biological Station
Scrub spurge (*Euphorbia rosescens*) is a recently described herb narrowly endemic to the Lake Wales Ridge in Highlands County. Since its description in 2002, Smith, Weekley and Menges have followed scrub spurge populations in Florida rosemary scrub, xeric scrubby flatwoods and roadsides. Plants emerge from belowground dormancy in early spring, flower during the late spring and early summer, and die back in the fall, over-wintering as rootstock. In contrast to high annual survival rates (>70%), flowering percentages are low among our 13 study populations (median=9.0%, range 0-9.7%). Scrub spurge flowers are unisexual and aggregated into cuplike structures termed cyathia that are arranged on compound multi-branched inflorescences. To investigate floral sex ratios and flowering phenology, over 400 cyathia were followed annually in two successive years. It was found that a cyathium may contain only male, only female, or both male and female flowers. Plants may be male, female or andromonoecious (containing both male-only and bisexual cyathia). Female, male and andromonoecious plants differ in the number of cyathia. Both female and andromonoecious plants can initiate fruits, but initiation rates are low (<33.3%) and fruit maturation is negligible (<1.8%). Low fruit production may be a limitation on population increases and the founding of new populations.

Do habitat, microsite and seed density affect recruitment limitation in native and disturbed scrub?
Elizabeth Stephens and Pedro Quintana-Ascencio, Biology Department, University of Central Florida
Recruitment success of native plant species is central to restoration of imperiled habitat. Restoration of the Archbold Reserve, a previously agricultural property adjacent to Archbold Biological Station on the Lake Wales Ridge, provides a unique opportunity to compare factors influencing seed availability and establishment of Florida scrub plants in native and disturbed scrub. Stephens and Quintana-Ascenscio evaluated effects of habitat type on seed production and effects of habitat, microsite type and seed density on seed predation and establishment in two native scrub species: *Chamaecrista fasciculata* and *Balduina angustifolia*. On average, seed production per individual and per site was greater for each species in disturbed than in native scrub. Seed predation was associated with seed density for *C. fasciculata*, but not for *B. angustifolia*. *C. fasciculata* germination and establishment were associated with habitat, microsite, seed density, and two way interactions between habitat and density, as well as habitat and microsite, and microsite and density (germination only). *B. angustifolia* germination and establishment were associated with habitat, microsite and density. Results will be examined within the context of a demographic matrix model to identify which component of life history has the biggest demographic impact on the species; conclusions will determine necessary remedial measures in the restoration.

Creation of a floristically diverse Beech-Magnolia forest in the southeastern coastal plain, Brooks County, Georgia, USA
John D. Tobe, Ecological Resource Consultants, Inc., Lawrence D. Tobe, Sr. and Sandra L. Tobe
The Beech-Magnolia plant community is regarded as a climax forest association. Within the coastal plain floristic region, widespread pinelands are dominated by relatively few pine species in the canopy, contain a species diverse groundcover, and are adapted to frequent fires. Localized Beech-Magnolia forests contain a variety of vegetative life forms and a species rich canopy, subcanopy and groundcover. Both pinelands and Beech-Magnolia forests in the area where this research was conducted contain many endemic and floristically disjunct taxa. In 1972, the creation/restoration site was an intensively managed agricultural site. By observing regional plant succession, it was found that plant succession could be manipulated and the appropriate conditions for survival and growth of climax forest tree species could be created. During the first 37 years of restoration, pines were planted and later slower growing, long-lived species such as oaks, hickory and magnolia were added. After 20 years of forest canopy management, pines were selectively thinned and native subcanopy species were successfully added. In summary, after 37 years of observation and manipulation of the plant succession process, this study found that the climax species often require 30 or more years to successfully reproduce; subcanopy species require 10-15 years, and groundcover species, especially vernal species, require 3-6 years.

Determinants of successful groundcover restoration in forests of the Southeastern United States: a regression tree approach
Jennifer L. Trusty, Department of Natural Sciences, Gulf Coast Community College and Holly K. Ober, University of Florida, North Florida Research and Education Center
In order to increase the biodiversity and cover of native groundcover plant species at a restoration site, a variety of site preparation techniques, invasive species control activities and seeding/planting methodologies are often employed by restoration practitioners. In this study, Classification and Regression Trees (CART) was used to identify those restoration activities that most often lead to successful groundcover establishment in forests of the

Southeastern United States. CART analysis on the survival of plants established through outplanting identified planting season, the presence of canopy cover, and the use of prescribed fire as the most important factors in determining mean survivorship values. In contrast, the single greatest predictive variable in the establishment density of seeds sown on restoration sites was the use of herbicide prior to planting which explained 30% of the variation in establishment rate. Based on these analyses, we describe simple, discrete recommendations for groundcover restorationists that can improve the survival and establishment of native plant species in restoration sites across the Southeastern Coastal Plain of the US.

Demographic monitoring of *Paronychia chartacea* ssp. *minima*, a rare annual herb of the Florida Panhandle
Carl W. Weekley, Archbold Biological Station
Paronychia chartacea is a federally listed Florida endemic herb with two allopatric subspecies that differ in habitat, life history, and management needs. Subspecies *chartacea* is a short-lived perennial occurring primarily in pyrogenic Florida rosemary scrub on the Lake Wales Ridge, while subspecies minima is an annual largely restricted to karst pond shorelines in two Panhandle counties. Subspecies *chartacea* is known from numerous protected sites and has been well studied. In contrast, subspecies minima is known from few occurrences, is poorly protected, and has not been previously investigated. We collected demographic data on *P.c. minima* from 103 0.25-m radius circular quadrats in four populations on the Econfina Creek Water Management Area. In April 2009, we marked 4807 seedlings and in September recorded seedling survival, growth and fecundity. In the April survey, seedling densities ranged from 58 to 1308 seedlings per m2. In the September census, seedling survival was 25.1% overall and did not differ significantly among the four populations. Like ssp. chartacea, *P.c. minima* is functionally dioecious and sexually dimorphic. In the October census, fruits were found on fewer than half of the plants. While *P.c. chartacea* habitat requires fire, the management needs of *P.c. minima* are not yet determined.

The fate of reintroduced populations of the rare endemic mint, *Conradina glabra*
Jason Bladow and Alice A. Winn, Department of Biological Science, Florida State University
Conradina glabra is an endangered mint found in only a few locations in Liberty County, Florida. This woody perennial shrub is thought to have once occupied transition zones between steephead ravine forests and adjacent longleaf pine dominated sandhill ecosystems. Much of the original habitat of this species was lost to disturbance and the remaining populations of *C. glabra* are found along road margins and at the edges of sand pine plantations. In 1991, three populations of *C. glabra* were established at the margin between steepheads and sandhill habitat at the Nature Conservancy's Apalachicola Bluffs and Ravines Preserve. Bladow and Winn monitored growth, survival and seed production of all individuals in each introduced population, and up to 500 in each of three of the remaining "natural" populations for one year and used this information to evaluate the success of introduced populations and to compare their structure and dynamics with existing roadside populations. They will describe the current state of the introduced populations and the expected future growth of these populations based on demographic modeling. They will also use analysis of the model to compare expected long-term success of *C. glabra* in its putative natural habitat with roadside habitat.

RESEARCH POSTER PRESENTATIONS

Factors limiting the establishment of native species in former agricultural lands
Annalisa Weiler, Department of Biology, University of Central Florida
Land-use legacies associated with agriculture often have negative effects on the reestablishment of native plant communities. After agricultural abandonment exotics, which are typically stronger competitors under these modified conditions, displace and inhibit the establishment of native species. Restoring natural soil conditions (i.e. low fertility and low pH) may be a more effective, long term method for the recovery and restoration of native plant communities in abandoned agricultural lands than current practices of applying herbicide annually. I am conducting a restoration experiment at Merritt Island National Wildlife Refuge in a former citrus grove that was historically Florida scrub/ scrubby flatwoods, and is now invaded by exotic species. I am examining if removing exotic biomass in combination with lowering fertility with carbon additions and lowering pH by applying sulfur will promote native plant establishment. My results thus far suggest that disturbing the soil (e.g. tilling and topsoil removal) is an effective method for reducing exotic biomass, but must occur several times in order to significantly reduce exotic species richness and cover. Likewise, the addition of soil amendments may have to occur several times in order to detect any changes in soil chemical properties that would provide native species with a competitive advantage over exotic species.

Fire, flowering, and fragmentation: The effect of fires on the biology of pineland golden trumpet (*Angadenia berteroi*), a rare species of the pine rocklands.
Beyte Barrios Roque, Gabriel Arrellano and Suzanne Koptur, Florida International University
The Pine Rocklands of south Florida are a fire-dependent ecosystem associated with outcroppings of limestone. The largest outcrop is the Miami Ridge formed by several fragments from Miami to Homestead and Long Pine Key in Everglades National Park. The pine rockland plants have several adaptations to fire. Burns improve plant growth, flowering, seed germination, and seedling establishment. Habitat fragmentation and destruction of the natural environment may have a negative effect on the biology of plants. Little is known about the biology of *Angadenia*

berteroi, a threatened endemic species of the south Florida pineland. We selected 6 study sites in the pine rockland forest scattered along Miami Rock Ridge and a fire managements units within Everglades National Park where *A. berteroi* is present, We estimated the density of adults, using a adaptive cluster sampling. We also measured litter depth and canopy closure as physical indicators of time since the last fire. Fragmentation and lack of fire, as well as greater impact of exotic species, negatively affect the abundance of this native plant. Data on this beautiful and threatened species may provide impetus to not only conserve, but to properly manage, remaining Pine rockland in south Florida.

Feral hogs (*Sus scrofa*): wetland friend or foe?
Camille R. Brescacin and David G. Jenkins, University of Central Florida
Wetlands are a prominent feature in the Florida landscape and are potentially threatened by the non-native feral hog (Sus scrofa). Feral hogs destroy wetland vegetation when they forage ("root") and potentially enable colonization of native and non-native plant species by exposing soil and depositing seeds in feces. Intermediate disturbance may enhance wetland plant diversity, but repeated or intense disturbance may reduce it. To understand the effects of feral hogs on wetlands, we monitored seven wetlands and four trails at the Little Big Econ State Forest for a year. We documented rooted patch sizes, rooting intensity, and frequency of re-rooting, and we collected fecal samples for seed germination trials. Most rooting occurred from July-November with a surprisingly large number of small (<2 m2) patches. The majority of patches were re-rooted at least once, but some patches were re-rooted as many as five times. To date, 32 plant species (4 non-native) have germinated from fecal samples. Approximately 60% of the species are obligate or facultative wetland species from the Cyperaceae and Poaceae families. Feral hogs disperse more native wetland species than non-natives in central Florida, but their rooting chronically disturbs extensive patches of wetland vegetation to prevent regrowth by native wetland plants.

Mating system biology of the Florida native plant: *Illicium parviflorum*
Nicholas Buckley and Joseph H. Williams, University of Tennessee, Knoxville
Illicium parviflorum is an evergreen perennial species that is endemic to central Florida, particularly within the Ocala National Forest. Though locally abundant, *I. parviflorum* is currently listed as endangered at the state level due to being under constant threat of habitat disturbance and overharvesting. Previously, *I. parviflorum* had been assumed to be self-incompatible due to low seed set. Since self-incompatible (SI) species require additional individuals of a different genotype to successfully reproduce, and therefore are at a greater risk of extinction when experiencing mate-limitation. We provide evidence that *I. parviflorum* can produce fruits when undergoing self-pollination. However, fruit-sets of both out-crossed and self-crossed flowers were quite low, indicating that populations may be experiencing low genetic diversity, a product of inbreeding depression. Current ongoing research is being focused on elucidating the relatedness of individuals using genetic analysis to determine diversity within populations, while future research will be directed towards investigating plant fitness.

Experimental introductions of *Chrysopsis floridana* onto protected Manatee and Pinellas County lands
Cindy Campbell, Bok Tower Gardens
Florida golden-aster is an endemic to west-central peninsular Florida and currently only known from scrub communities in Hillsborough, Manatee and Hardee counties. It is considered extirpated from Pinellas County. With federal and state funding, and cooperation of land managers representing agencies within these four counties, two experimental introductions have occurred since 2008. The introductions have occurred on SWFWMD land in Manatee and county owned land in Pinellas. Continued collaboration with these agencies and private landowners have positioned us for additional plantings in Pinellas in 2010-2011. Seed collected in December of 2007-2009 representing 22 populations has been banked at BTG. Seed quality and germination rates are being compiled for comparative donor site analysis. Microhabitats and land management differ at each introduction site. Outplants are tagged and BTG staff conduct demographic monitoring once during flowering season. Results from the 2008-2009 monitoring have been compiled and first and second year seed collected for germination trials. Our efforts toward the goal of self sustaining populations at these sites will contribute to a better understanding of population dynamics and microhabitat requirements.

Stuck on you: Seagrass fragment recruitment on natural verses restored oyster reefs
Stephanie Garvis, Marc Kemper, Jeb Eubanks, Kyle Iketani, Andrew Howard, Jonathan Winfrey, Melissa Ussa, Justina Napoli, John Cunningham, Cassandra Dickerson and Linda Walters, Department of Biology, University of Central Florida
Sexual reproduction in seagrass is considered rare and colonization of new areas is accomplished via vegetative fragments. In Mosquito Lagoon, Florida, previous research has shown that fragments of the seagrass Halodule wrightii are successful if the fragment contains an apical meristem and is retained on a suitable substrate. The outer edges of natural (reference) oyster reefs could be considered suitable substrate, however H. wrightii is rarely encountered there. Meanwhile, H. wrightii beds have begun to regularly show up along the outer edges of newly restored oyster reefs. To understand this difference, we ran field experiments with both reef types. Current oyster restoration efforts in Mosquito Lagoon involve fastening oyster shells to plastic mesh mats to provide vertical substrate for larval recruitment. We examined different methods of attachment as well as different lengths of retention between natural and restored reefs. For the attachment/retention trials, testing was done using 120 fragments per

treatment on six restored and six reference reefs. On each reef we placed 20 fragments of each of three treatments: (1) fragments haphazardly dropped on reef, (2) fragments woven into mesh/clusters, and (3) fragments twist-tied to mesh/clusters. Monitoring was done 24 hours post-deployment, and then weekly for four weeks.

Demographic decline in the rare scrub mint, *Dicerandra christmanii*, and the need for habitat alteration and augmentation

Sarah J Haller and Eric S. Menges, Archbold Biological Station

Dicerandra christmanii is one of the most critically endangered Lake Wales Ridge endemics. Only five populations are known in Highlands County and all occur in gap matrices within yellow sand oak-hickory scrub. Over the last 16 years we have studied *D. christmanii* demography in its only protected population, Lake Wales Ridge National Wildlife Refuge (LWRNWR) (Flamingo Villas tract). Our study sub-populations occur in 3 areas of varying disturbance and have declined since their inclusion in our research. One sub-population, for example, peaked in size in 1997 with 121 individuals in our demography plots; in 2009, only 17 plants remained. Annual survival averaged ~ 70%, but has been declining; annual survival dropped below 50% for the first time in 2009 to 35%. Recruitment has high annual variation but patterns show greater recruitment in areas of more recent disturbance and overall poor recruitment in the last few years. These patterns are likely related to weather (e.g., precipitation effects on seedlings) and vegetation encroachment due to fire suppression. We propose an experimental project to enhance *D. christmanii* sub-populations by modifying habitat with gap creation and augmenting populations with seeds and plants at the LWRNWR.

Floristic composition of Florida limestone glades

Ann F. Johnson, Florida Natural Areas Inventory, Wilson Baker, Tallahassee, FL and Loran C. Anderson, Biology Department, Florida State University

The Florida limestone glades in Gadsden and Jackson counties have long been known by botanists to harbor a unique set of calciphilic plants and have been well collected since the 1980's. We visited these glades during all seasons over the course of several years (2005-2009) to voucher their flora with our own collections, as well as searching the A.K. Gholson (AKG) and R.K. Godfrey (FSU) herbaria for specimens. From these sources we compiled a list of over 200 plant species that occur in at least 3 of the 22 glades. Most frequently encountered are species that tend to be dominant on at least portions of the glades, including Schoenus nigricans, Sporobolus vaginiflorus, Rhynchospora divergens, Muhlenbergia capillaris, Stenaria nigricans and the moss, Weissia jamaicense. Other frequently encountered, but less abundant species, are Nothoscordum bivalve, Allium carolinense var. mobilense, and Polygala grandiflora var. angustifolia . Although the Florida glades are not known to harbor any endemics, they do support a number of plants that are rare in Florida. A map of the Florida glades in relation to other limestone – influenced areas is given and their floristic composition is compared to nearby areas, including the black belt prairies of Alabama and Oaky Woods Wildlife Management Area in Georgia.

Identifying mechanisms of facilitation on a barrier island

Jackie Monge and Elise Gornish, Department of Biological Science, Florida State University

Positive species relationships occur when a plant modifies its microhabitat, improving the conditions for a neighboring individual. It has been proposed that positive interactions (facilitation) increase with environmental stress, although little is known about its prevalence or the mechanisms involved. Facilitation was observed across sand dune habitats on a barrier island in Apalachicola, FL. Shading, disturbance and hydraulic lift were tested as mechanisms for the positive species relationships observed in the different habitats found across the island. Results from observational and empirical work show that shading facilitated the growth of vegetation and increased species richness in the interdune at a greater magnitude than in the foredune and backdune habitats. Hydraulic lift occurs at a greater degree in the foredune and backdune than in the interdune habitat. Disturbance may be involved in facilitation the growth of vegetation in the foredune and interdune habitats only and increased species richness in the foredune and backdune habitats. This work has important implications for succession theory in stressful systems, which can be useful for restoration work in these areas.

Death and Taxus: Survival and recruitment in four populations of Florida yew (*Taxus floridana*)

Ann M. Redmond, ENTRIX, Tallahassee, FL and Alice A. Winn, Department of Biological Sciences, Florida State University

Stems of *Taxus floridana* were individually marked in four locations in 1982. The diameter at ground level of each stem was measured, and each individual was assigned to a gender on the basis of the presence of male or female cones. Individuals too small to produce cones were designated juveniles. All stems were censused and re-measured in 2009. We will report analyses of survival, growth, and recruitment of individual stems over a 27 year time period for these four populations. The percent of stems marked in 1982 that survived to 2009 was low for males, females, and juveniles in all populations. The mean diameter of stems that survived the census interval was significantly larger than that of stems that survived for males, juveniles and females. Lack of clear spatial pattern in stem survival suggests the action of multiple sources of mortality rather than a single event or source. Surviving adult stems grow slowly, which limits the potential for individuals to attain a size refuge from mortality. Recruitment over 27 years was uniformly poor across all sites. This species faces a difficult future unless recruitment is occurring on a larger spatial or temporal scale than encompassed by our study.

Developing methods to conserve the endangered plant, scrub lupine

J. Rynear and C. Peterson, Rare Plant Conservation Program, Bok Tower Gardens

Scrub lupine, *Lupinus westianus* var. *aridorum*, is endemic to Polk, Orange, and Osceola Counties in central Florida but has been extirpated from Osceola County. Presently, this scrub species occurs on the Mt. Dora Ridge in Orange County and on the Winter Haven Ridge in Polk County. Prior to 2002, the records of the Florida Natural Areas Inventory (FNAI) documented 45 populations of scrub lupine. By 2008, only 8 confirmed sites remained. With funding from the USFWS and the state of Florida, DPI, the Rare Plant Conservation Program at Bok Tower Gardens (Program) has been working to (1) annually survey and collect germplasm from all remaining wild populations in compliance with the collection guidelines of the Center for Plant Conservation, (2) conserve all remaining germplasm of this species and store a portion of this material in the Program's National Collection, (3) develop and refine both in situ and ex situ propagation methods, including protocols for tissue culture micropropagation, transplantation, and acclimatization, and since 2008, (4) establish genetically diverse populations at protected sites.

Examining the effect of fire exclusion on the growth of longleaf pine and forest stand dynamics

Brandy J. Saffell, Department of Geography, Florida State University

Frequent low intensity understory fires play an important role in southeastern coastal plain forests. Fire eliminates fire-intolerant vegetative species that could potentially restrict the growth and regeneration of native fire-tolerant species. This study explores the effect fire exclusion has on the growth of three southeastern pine trees: longleaf pine (*Pinus palustris*), loblolly pine (*P. taeda*), and shortleaf pine (*P. echinata*). This study also examines general differences in forest stand dynamics between burned and unburned pine forest. The project was conducted at Tall Timbers Research Station in Tallahassee, Florida, on a large unburned site and a regularly fire-treated site. On each site, data on tree growth was collected by obtaining tree cores from the target species. Data on forest stand dynamics was collected by establishing several plots and using a GPS to map species composition and distribution. The yearly tree growth of each species was measured using standard dendrochronology techniques to compare the two sites. The results of the study are currently under analysis. The implications of the study are important in understanding the role of natural fire in southeastern pine forest dynamics to foster improved forest management policies and techniques.

Restoration of structure and composition of a degraded sandhill community with fire at Apalachicola Bluffs and Ravines Preserve, Liberty County, Florida

Jodi L. Slapcinsky, Greg S. Seamon, David Printiss and Brian Kreiter, The Nature Conservancy

Efforts are underway to restore the structure and composition of a degraded sandhill community with fire in The Apalachicola Bluffs and Ravines Preserve, owned and managed by The Nature Conservancy. Prior to TNC ownership, most of the uplands were cleared, windrowed and planted in off-site slash pine plantations. We are restoring fire and Pinus palustris (longleaf pine) to these areas, using a less disturbed, fire-managed area of the preserve as a target for longleaf pine community restoration. We are monitoring sites to see if they increasingly resemble the target over time after successive burns. The variables presently measured are 1) size structure and density of longleaf pine, 2) the percent cover and density of hardwoods and off-site pines greater than 1 m tall, 3) density of seedlings and 4) percent understory cover of perennial graminoids, litter, bare ground, and other plants less than 1 m tall. Eighteen years of monitoring data reveal that after at least three prescribe burns over 83% of the variables measured for 7 of 10 burn units (78%) are progressing toward the target site for longleaf pine community restoration.

Does pre-dispersal predation affect growth of red mangrove propagules?

Lauren Stroud, Linda Walters and Melinda Donnelly, University of Central Florida

Mangroves are a vital component of estuaries, providing numerous benefits including shoreline protection, filtration of run-off, and habitat and nursery grounds for fauna. Mangroves reproduce by producing buoyant, viviparous propagules which may be damaged by predators before dispersal, while attached to trees, during dispersal, and after dispersal, when stranded in intertidal regions. In the fall of 2008, we documented that 50% of red mangrove propagules (*Rhizophora mangle*) had pre-dispersal damage. To understand the relationship between propagule growth and predation, in 2009 we monitored propagules of *R. mangle* while attached to trees in Mosquito Lagoon, Florida. Three hundred propagules were marked at the beginning of germination (May) on 15 trees and length, width and predation damage was recorded bi-weekly until propagules were ready for dispersal (August). By August, 70.3% of propagules had pre-dispersal damage in the form of bite marks, holes or scrapes along the exterior of the propagule. All trees had at least 50% of propagules with damage. However, the presence of damage did not significantly affect propagule growth relative to undamaged individuals (width: $t = 1.3$, $p = 0.2$; length: $t = 0.1$, $p = 0.9$), suggesting pre-dispersal damage does not negatively affect growth of propagules of R. mangle.