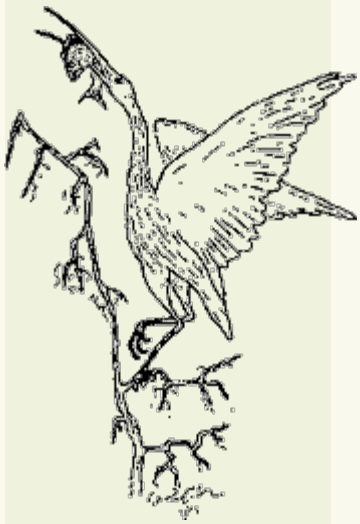

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# Welcome to the Walt Dineen Society

*A forum for communicating about South Florida Ecosystems*

**Who is Walt Dineen?**
J. "Walt" Dineen (1937-1990) was, for close to three decades, a highly respected biologist/ecologist in South Florida. He was Everglades Project Leader for the Florida Game and Fresh Water Fish Commission, and Director of Environmental Sciences at the South Florida Water Management District. Walt was one of the first to develop a broad regional perspective for the Everglades ecosystem, and to use that understanding to influence and improve management practices. Perhaps his most valuable contribution to the Everglades was his strong, personal demonstration of the importance of having well-informed scientists participate in the management and policy debates. For his early role in this process, we honor his name.

**Mission**
The Walt Dineen Society is an informal, non-affiliated forum, dedicated to the task of substantially improving the communication of technical information on the ecosystems of South Florida, among the natural, physical, and social scientists and the management and policy leaders who work in this region. The Society considers that frequent exchanges of research results, and multi-disciplinary discussions designed to integrate new information with the old, are essential steps leading to improved understandings of the natural components and ecological processes of the South Florida systems. It is these intellectual processes that will assure that our understanding of both the natural and managed systems continue to mature (i.e., "the whole [of our understanding] is greater than the sum of its parts"). By supporting a communications process that is organized from the perspective of systems, in contrast to an issues or project-driven perspective, we believe that science will be in the strongest position to make substantial contributions to the important management and policy questions raised by the restoration programs.

**Walt Dineen Society Conferences**
To achieve these goals, the Society sponsors conferences pertaining to the ecosystems of South Florida. The main priority of these conference is to encourage everyone who is conducting studies in the natural and physical sciences in South Florida to report on their on-going and completed work. These conferences differ from other technical conferences in the region in that:

1 they are systems-focused;
2 we encourage participation by all researchers and students of the natural systems of South Florida; and
3 the conference is organized to maximize the opportunities for the integration of new information from a broad array of disciplines.
For more information about upcoming or current conferences, please refer to our Conference Page. Program information and abstracts from the first Walt Dineen Conference are available at the Conference Archive.

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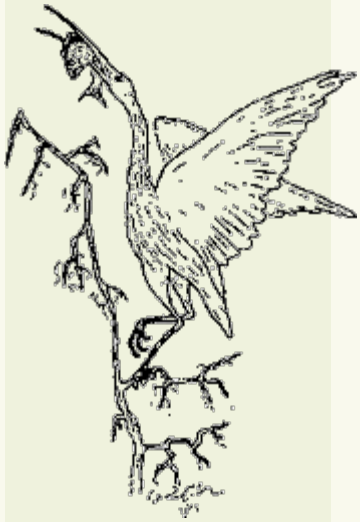

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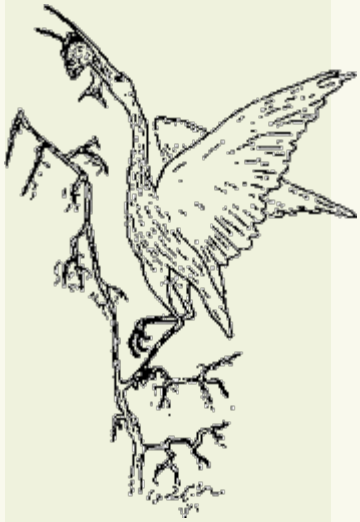

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# Walt Dineen Society Annual Conference '97

Guide to Sessions

**Thursday, May 22, 1997**

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15:00 - 16:15 Session II: Environmental Management

17:00 - 19:30 Session III: Posters

**Friday, May 23, 1997**

9:00 - 10:15 Session IV: Wetlands

10:45 - 11:45 Session IV: Wetlands - cont.

12:45 - 14:15 Session V: Bird Studies

15:00 - 16:30 Session VI: Bird & Other Animal Studies

**Saturday, May 24, 1997**

9:00 - 10:15 Session VII: Marine Ecology

10:45 -12:00 Session VII: Marine Ecology - cont.

Complete Conference Program
[*Adobe PDF; 550K*]

**Walt Dineen Society**



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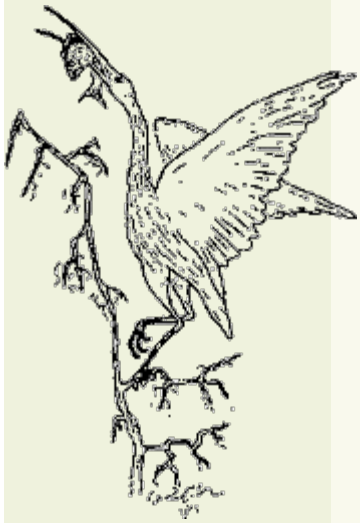

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## Daily Schedule of Sessions - Thursday, May 22

### SESSION IV: WETLANDS

| *TIME* | *AUTHOR(S)* | *ABSTRACT* | *TITLE* |
|---|---|---|---|
| 9:00 - 9:15 | Wu et al. | 97401 | Sawcat probability model and the effects of a delayed Everglades restoration program on the distribution of sawgrass |
| 9:15 - 9:30 | Sklar and Newman | 97402 | A conceptual model for soil phosphorus availability in hydrologically altered wetlands of the Everglades |
| 9:30 - 9:45 | Fitz et al. | 97403 | Evaluating Everglades ecosystem dynamics with spatial simulation models |
| 9:45 - 10:00 | Daoust et al. | 97404 | Evaluating the role of phosphorus as a mechanism to induce ecosystem state change in freshwater wetlands of Everglades National Park: short-term results after one year of enrichment |
| 10:00 - 10:15 | Brandt and Kitchens | 97405 | Are tree islands in Loxahatchee National Wildlife Refuge small and circular or large and elongated and oriented in the direction of flow? |
| 10:45 - 11:00 | McVoy | 97406 | Soil-based estimation of pre-drainage (ca. 1850) Everglades landscapes and their hydrology |
| 11:00 - 11:45 | Dong et al. | 97407 | Modeling periphyton and phosphorus linkages in the Everglades |
| 11:45 - 12:00 | Bern et al. | 97408 | The contribution of carnivory to the nitrogen and phosphorus growth needs of the bladderwort, Utricularia foliosa |



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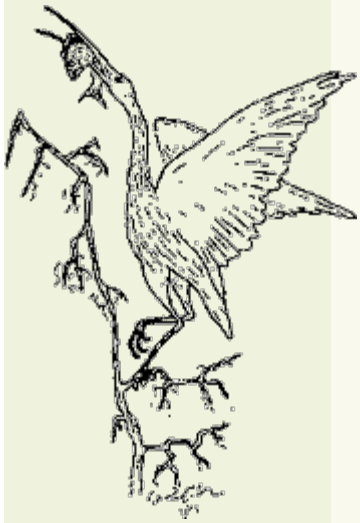

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**Session IV: Wetlands** **Abstract #: 97401**

## SAWCAT PROBABILITY MODEL AND THE EFFECTS OF A DELAYED EVERGLADES RESTORATION PROGRAM ON THE DISTRIBUTION OF SAWGRASS

Wu, Yegang, Fred Sklar, Ken Rutchey, Tom Fontaine
Everglades Systems Research Division, South Florida Water Management District, West Palm Beach, FL 33414

### ABSTRACT

In the last two decades sawgrass (Cladium jamaicense) communities of Water Conservation Area 2A (WCA 2A) in the northern Everglades have been invaded by cattail (Typha spp.) communities. A spatially explicit Markov chain probability model (SAWCAT) was developed to simulate the fragmentation processes of cattail invasion (Wu et al. 1997). The model combines the effects of agricultural phosphorus (P) runoff and water depth (D) into a probability function for cattail invasion where: Prob_pw = 1 / (1 + a * exp(-b * P)) + c * D / P; sawgrass cells are 20 x 20 m; invasion is based on the number of 1-8 adjacent cattail cells; and probabilities are expressed as, Prob_a = [0.049, 0.052, 0.061, 0.065, 0.069, 0.072, 0.076, 0.094]. We used Jensen et al.'s 1973 vegetation map and a cattail coverage of 4.7% (2,054 ha) as the initial condition. A spatial distribution of soil total phosphorus was simulated in the SAWCAT. Rutchey and Vilchek's 1991 and 1995 cattail distribution maps were used to calibrate the model. The simulated cattail distributions for 1991 and 1995 (15.7% and 21.0%, respectively), were very similar to actual cattail maps (13.02% and 22.17%, respectively). The model assumes that Stormwater Treatment Area-2 (STA-2) built in 1999 will reduce TP runoff to 50 ppb. However, STA construction could be delayed by two years. What could be the impacts of such a delay? SAWCAT predicted that by the year 2006 cattail will occupy about 34.8% (mean = 15,074 ha, standard deviation = 9.1 ha) of WCA-2A if STA-2 is finished by 1999. If STA-2 is finished by 2001, the model predicts a total cattail expansion of 15,387 ha by the year 2006. The delay would cause a net increase of 55 ha of cattail, 133 ha of cattail mix, and 125 ha of mixed cattail. The model also predicted that water depth might have an impact on cattail invasion but not significantly.



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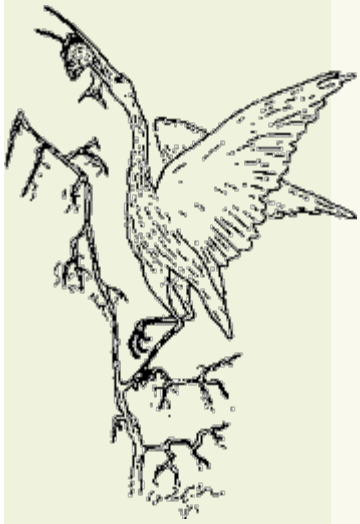

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**Session IV: Wetlands** **Abstract #: 97402**

## A CONCEPTUAL MODEL FOR SOIL PHOSPHORUS AVAILABILITY IN HYDROLOGICALLY ALTERED WETLANDS OF THE EVERGLADES

Fred H. Sklar and Sue Newman
ESRD, SFWMD, West Palm Beach, FL

### ABSTRACT

A number of ecologicalmodels are being developed to evaluate the impacts associated with Everglades restoration. However, current ecological and water quality models for the Everglades do not include detailed soil physics associated with repeated wetting and drying of hydric soils. As part of the Everglades Landscape Model (ELM), designed to evaluate plant and nutrient structure and function, we hypothesize that the relationship between hydrology and cattail invasions in the Everglades can, at times, be explained by changes in soil nutrient content as a function of bulk density. Low water tables and the concurrent oxidation of Everglades peat, due to fire, water diversions, drought, and flood control, are thought to concentrate nutrients in the upper root zones of sedges and grasses. A STELLA$^{TM}$ program was developed to evaluate this hypothesis and to establish the merits of a bulk density algorithm for the ELM. The goal was to create a bulk density response parameter that was sensitive to the cumulative impacts of successive dry downs. This was accomplished by calibrating the model against soil and plant data from the Holey Land Wildlife management Area. Observations in the Holey Land suggest a spatial distribution of cattail that has been controlled by a combination of water depth and fire. We duplicated this relationship by developing a cumulative cattail suitability function that was sensitive to water depth, biologically available phosphorus, and the proportion of slough within a region. The Holey Land was divided into five regions according to depth. Each region was initialized with the proportion of sawgrass, cattail, and slough known to exist in 1990. Weekly water depths and inputs of nutrients from agriculture from 1990 to 1995 were the forcing functions. Results are not yet conclusive. However, it is clear that fire has the potential to create both the space (i.e., slough) and soil nutrient conditions required by cattail. Computer experiments continue as we refine the cumulative impact functions. We suspect that these functions, once calibrated, will have significant utility in Water Conservation Area 3A where water tables have been low and therefore, the potential for cattail invasion may be high.



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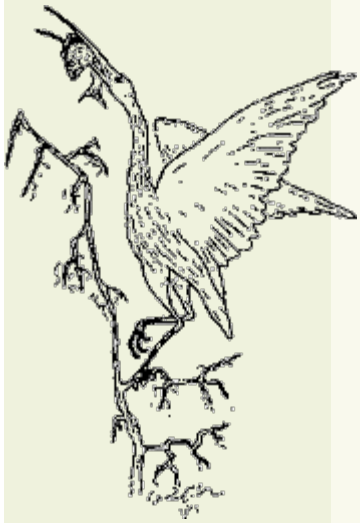

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**Session IV: Wetlands** **Abstract #: 97403**

## EVALUATING EVERGLADES ECOSYSTEM DYNAMICS WITH SPATIAL SIMULATION MODELS

Fitz, H. Carl, F.H. Sklar, Y. Wu
South Florida Water Management District

### ABSTRACT

Whereas Everglades restoration efforts are being initiated, the complex interactions of physical, chemical and biological processes in this heterogeneous landscape are incompletely understood. Stormwater Treatment Areas (STAs) and modifications to the water control system will alter water and nutrients across space and time within the region. Our simulation models incorporate hydrologic, nutrient, and plant dynamics in order to evaluate the spatio-temporal patterns of landscape change associated with management alternatives. In our Everglades Landscape Modeling Program, we developed a general model with scaleable code and applied it to 1) WCA2A (the CALModel) and to 2) the combined area of the WCAs, part of Big Cypress, and Everglades National Park (the ELModel). In the current model development phase, we used CALM to analyze ecological dynamics of the wetlands of WCA2A, where data for parameterizing and calibrating the model are of the highest quality. In some examples of the model interactions and feedbacks, we saw that drydown and rewetting the soils modified bio-available nutrients which in turn affected the plant growth; altered macrophyte biomass in regions near nutrient inflows substantially affected water levels through differences in transpiration and overland flow. Under various scenarios of water and nutrient load changes associated with potential loads from the STAs, the distribution of water and soil nutrients, periphyton, and marsh graminoids were significantly different compared to the base case of no STA construction. Calibration and uncertainty analyses are underway, and the lessons learned from the CALM will be applied to the full ELM as another tool for preliminary evaluation of the C&SF Project Restudy in the next year.



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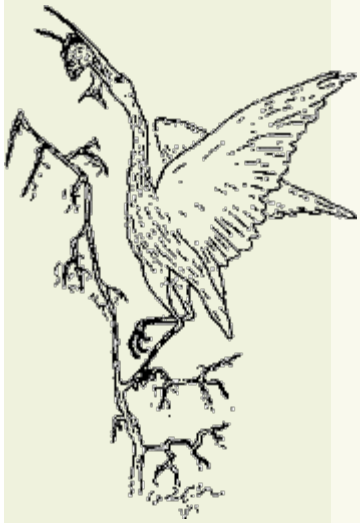

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**Session IV: Wetlands** **Abstract #: 97404**

## EVALUATING THE ROLE OF PHOSPHORUS AS A MECHANISM TO INDUCE ECOSYSTEM STATE CHANGE IN FRESHWATER WETLANDS OF EVERGLADES NATIONAL PARK: SHORT-TERM RESULTS AFTER ONE YEAR OF ENRICHMENT

Daoust, Robert J., Childers, Daniel L., and Diana L. Rodriguez
Department of Biological Sciences, Florida International University, University Park, Miami, FL 33199

### ABSTRACT

The Florida Everglades not only constitute one of North America's largest expanses of contiguous wetlands, but are also among one of its most imperiled ecosystems. Specifically, they have been divided up into three distinct regions: the Everglades Agricultural Area, a drained region used primarily for sugarcane production; the Water Conservation Areas, a large region managed by the State of Florida for water control purposes; and, Everglades National Park (ENP), the only region where conservation and protection of this unique ecosystem is given top priority. Anthropogenic activity in south Florida has altered both the natural hydrologic regime and the nutritional status of these wetlands. Past research has indicated that these changes affect natural Everglades wetlands, but are unclear as to whether one factor plays a greater causal role than the other. Since March 1996, we have been performing a nutrient enrichment experiment, using in situ mesocosms and two enrichment levels, in ENP to further evaluate the causal role that phosphorus enrichment plays in altering community structure and inducing ecosystem state change. Locating our experiment in ENP allowed us to eliminate the confounding effect of altered hydrologic regime since this area has been less impacted than others. Our analysis suggests that emergent macrophyte community composition remains unaffected. Those ecosystem components which cycle phosphorus more rapidly, such as soil and algal microbial processes, have, however, begun to be affected by our enrichment experiment. This suggests to us that phosphorus does play a role in causing the observed ecosystem state changes occurring in freshwater Everglades wetlands.



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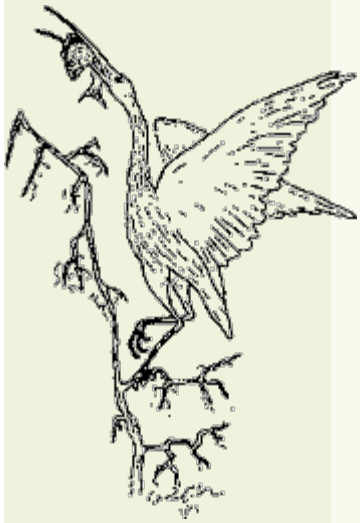

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**Session IV: Wetlands** **Abstract #: 97405**

## ARE TREE ISLANDS IN LOXAHATCHEE NATIONAL WILDLIFE REFUGE SMALL AND CIRCULAR OR LARGE AND ELONGATED AND ORIENTED IN THE DIRECTION OF FLOW?

Laura A. Brandt and Wiley M. Kitchens
University of Florida, Department of Wildlife Ecology and Conservation and USGS-BRD, Florida Cooperative Fish and Wildlife Research Unit, Gainesville, Florida

### ABSTRACT

Historic descriptions of tree islands in the Everglades have characterized them as being small and circular or large and elongated and oriented in the direction of historic water flow. In this study we examine that notion for one area of the Everglades, Loxahatchee National Wildlife Refuge. Size, shape, and orientation were determined for 2144 tree islands identified from 1987 satellite imagery. Tree islands ranged in size from 0.05 ha to 62 ha and represented a continuum of sizes. All circular tree islands were < 0.6 ha while elliptical tree islands ranged in size from 0.05 ha to 62 ha. Orientation of elliptical tree islands was bimodal with most oriented between 0 and 20 degrees or 150 and 180 degrees (180 = north to south). Larger tree islands showed less variance in orientation than smaller tree islands. Orientation was not correlated with flow direction predicted from elevation data alone, but appears to be more related to the large scale north to south gradient and historic patterns of sheet flow. Laura A. Brandt and Wiley M. Kitchens University of Florida, Department of Wildlife Ecology and Conservation and USGS-BRD, Florida Cooperative Fish and Wildlife Research Unit, Gainesville, Florida.



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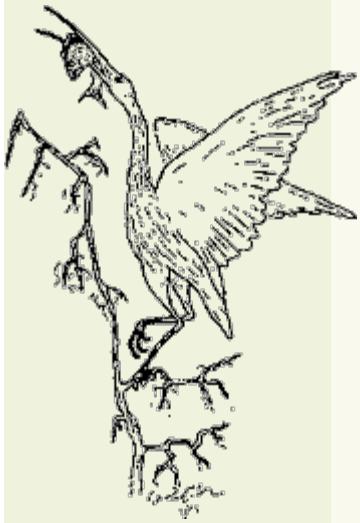

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**Session IV: Wetlands** **Abstract #: 97406**

## SOIL-BASED ESTIMATION OF PRE-DRAINAGE (CA. 1850) EVERGLADES LANDSCAPES AND THEIR HYDROLOGY

Christopher McVoy
Environmental Defense Fund/South Florida Water Management District
Hydrologic Systems Modeling Div., SFWMD West Palm Beach, FL 33416

### ABSTRACT

Intensive synoptic studies from the 1940s provide the best available picture of the Everglades as a whole. Accurately portraying the system as it was then, these studies also reflect any alterations caused by thirty years of canal drainage.

In the present research we developed a picture of the landscapes -- the soils, hydrology, topography and vegetation -- present prior to drainage. Development of this picture included two aspects: characterization of the landscapes and determination of their spatial extents. Soil was assumed to be the most stable aspect of each landscape. A comprehensive soil map of the Everglades published in 1948 therefore formed the basis for estimating spatial extents.

Hindcasting of the 1948 soil map and characterization of each pre-drainage landscape was based on synthesis of numerous sources: a 1915 soil survey; published studies of soil change after drainage; federal and state township surveys; historical observations of water levels and vegetation; and reports from expeditions, etc.

Results of the synthesis suggested that a large portion of the Everglades had been altered substantially by the 1940s. The ridge and slough landscape -- containing the deepest water -- originally extended continuously from the present Loxahatchee Wildlife Refuge to Shark River Slough. The sawgrass plains of the northern Everglades occupied less area than when mapped in the 1940s. Areas along the edge of the Everglades mapped as wet prairie on sandy soils were likely originally sawgrass on peat soil. Average annual variation in water depth throughout the Everglades was likely about two feet. Water depths in the sloughs of the ridge and slough landscape, on average, varied between 12 inches in May to 30 inches in October; a hydroperiod of 365 days. The sawgrass plains ranged between six inches below ground in May to 18 inches above in October.

Comparison of this study with results from the South Florida Natural System Model are presented graphically in an associated poster.



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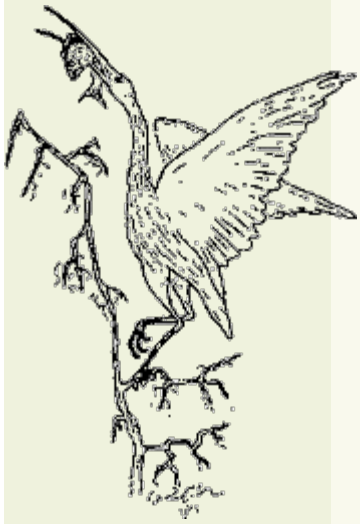

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**Session IV: Wetlands** **Abstract #: 97407**

## MODELING PERIPHYTON AND PHOSPHORUS LINKAGES IN THE EVERGLADES

Quan Dong, Paul McCormick, Fred Sklar
Everglades Systems Research Division, South Florida Water Management District

### ABSTRACT

Native periphyton is a key ecosystem component in the Everglades. They have been identified as extremely sensitive to phosphorus supply. Periphyton are also being considered as the basis for ecological-engineering design of periphyton storm-water Treatment areas to reduce phosphorus in agricultural runoff. We are developing a periphyton model to study the relationship between periphyton community structure, production, phosphorus and other environmental conditions. This model serves as a quantitative framework that can (a) describe the system, (b) synthesize the current ecological information from empirical studies, (c) evaluate importance of various ecological processes and parameters, (d) identify critical links and missing links in current ecological understanding, and (e) generate hypotheses and projections. The design of the model allows users to perform different analyses with a minimum effort of modification. The structural complexity of the model can be controlled in different analyses depending upon the objectives and scales of each study. The model is applicable to characterizing the phosphorus-threshold and the retention capacity of phosphorus of the periphyton storm-water treatment areas. For example, our model analyses suggest that small gradual changes in phosphorus supply n a certain range may lead to a dramatic change (bifurcation) in the community structure and biomass of periphyton. Such a range is a parameter of the phosphorus-threshold.



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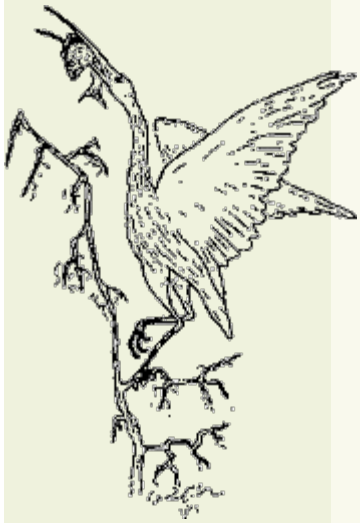

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**Session IV: Wetlands** **Abstract #: 97408**

## THE CONTRIBUTION OF CARNIVORY TO THE NITROGEN AND PHOSPHORUS GROWTH NEEDS OF THE BLADDERWORT, UTRICULARIA FOLIOSA

Amanda Bern, Jennifer Richards and Brian Fry
Department of Biological Sciences, University Park, Florida International University, Miami FL, 33199

### ABSTRACT

Utricularia foliosa is a free-floating aquatic carnivorous plant found throughout south Florida's freshwater wetlands. Although there is no question that these plants are capable of capturing and digesting small invertebrate prey, the extent to which carnivory supplies nitrogen and phosphorus for growth of U. foliosa is unknown. In order to determine the relative contribution of carnivory to U. foliosa, we estimated carnivory supply of nitrogen and phosphorus versus the plant growth demand. Estimates from the published literature for other Utricularia species suggest that the maximum contribution from carnivory for nitrogen and phosphorus needs of these plants are 26% and 15% respectively. However our observations for U. foliosa show that maximal values for carnivory are closer to 8% nitrogen and 5% phosphorus. Overall, our findings show that these putatively carnivorous plants in fact obtain most of their nitrogen and phosphorus via foliar uptake. This raises the question of why these plants invest such a large percentage of their biomass in making bladders. In fact, U. foliosa investment in carnivorous organs (bladders) is highly variable. Trap allocation usually varies from 18.8% to 52% of the plants total biomass, but at one field site, the entire population of U. foliosa had no bladders. A transplant experiment showed that this plasticity in bladder production was environmentally induced. We are currently investigating the factors that control plant investment in bladders.



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| Fitz, H.C. | Wetlands | 97403 |
| Fontaine, T. | Wetlands | 97401 |

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| Frederick, P. | Upland Plants<br>Bird Studies | 97103<br>97503, 97504, 97505 |
| Fry, B. | Wetlands<br>B&A Studies | 97408<br>97601 |
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| Gebelein, J. | B&A Studies | 97602 |
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| Halley, R.B. | Marine Ecology | 97703 |
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| Huang, Haolon | B&A Studies | 97602 |
| Huston, M.A. | B&A Studies | 97606 |
| Jaffe, R. | Posters | 97304, 97305 |
| Kelley, M.H. | Env. Mgmt. | 97202 |
| Kieckbusch, D.K. | Posters | 97311 |
| Kitchens, W. | Wetlands<br>B&A Studies | 97405<br>97601 |

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| Laha, S. | Env. Mgmt. | 97204 |
| Lee, D.W. | Upland Plants | 97105 |
| Loftus, W. | B&A Studies | 97603 |
| Lynch, H. | Bird Studies | 97504 |
| Makemson, J. | Env. Mgmt. | 97201 |
| Maloney, B.A. | Marine Ecology | 97701 |
| Mazzotti, F.J. | Env. Mgmt.<br>Posters | 97201, 97202<br>97302 |
| McCormick, P. | Wetlands | 97407 |
| McVoy, C. | Wetlands | 97406 |
| Mealey, B.K. | Bird Studies | 97501 |
| Meeder, J. | Env. Mgmt.<br>Marine Ecology | 97205, 97702, 97705,<br>97709 |
| Merickel, J.A. | Marine Ecology | 97706 |
| Miller, J. | Posters | 97302 |
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| Morrison, D. | B&A Studies | 97605 |
| Mullahey, J.J. | Upland Plants | 97104 |
| Mumford, P.L. | B&A Studies | 97604 |
| Nath, A. | Env. Mgmt. | 97203 |

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| Oberbauer, S.F. | Upland Plants<br>Marine Ecology | 97102<br>97709 |
| Oehm, N.J. | Marine Ecology | 97704 |
| Owen, D. | Env. Mgmt. | 97201 |
| Pages, C. | Bird Studies | 97501 |
| Park, W. | Posters | 97310 |
| Parks, G.M. | Bird Studies | 97501 |
| Perez, B.C. | Posters<br>Marine Ecology | 97309<br>97704 |
| Platt, W. J. | Upland Plants | 97101 |
| Prager, E.J. | Marine Ecology | 97703 |
| Prieto, L. | Env. Mgmt. | 97204 |
| Reyes, E. | Posters<br>Marine Ecology | 97307, 97308<br>97704 |
| Richards, J. | Wetlands | 97408 |
| Roberts, R.E. | Upland Plants | 97106 |
| Rodriguez, D.L. | Wetlands | 97404 |
| Rose, C.D. | Marine Ecology | 97710 |
| Ross, M. | Env. Mgmt.<br>Marine Ecology | 97205<br>97705, 97709 |
| Rudnick, D. | Marine Ecology | 97704 |

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| Rutchey, K. | Wetlands | 97401 |
| Sah, J.P. | Marine Ecology | 97705 |
| Salatas, J. | Bird Studies | 97505 |
| Shinn, E.A. | Marine Ecology | 97703 |
| Sklar, F. | Wetlands<br>Marine Ecology | 97401, 97402, 97403, 97407<br>97704 |
| Slater, H.H. | Upland Plants | 97101 |
| Smith, T.J. III | Posters<br>Marine Ecology | 97306<br>97706 |
| Sorrentino, D. | B&A Studies | 97605 |
| Spalding, M. | Bird Studies | 97504 |
| Stoddard, P.K. | Posters | 97302 |
| Surdick, J., Jr. | Upland Plants | 97103 |
| Sutula, M. | Posters<br>Marine Ecology | 97307, 97309<br>97704 |
| Tansel, B. | Env. Mgmt. | 97204 |
| Telesnicki, G. | Env. Mgmt.<br>Marine Ecology | 97205<br>97705, 97709 |
| Vilches, M.T. | Env. Mgmt. | 97204 |
| Whelan, K.R.T. | Upland Plants | 97102 |
| Wiebe, W.J. | Marine Ecology | 97706 |

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| Willsie, A.A. | Marine Ecology | 97708 |
| Wise, M. | B&A Studies | 97605 |
| Wu, Y. | Wetlands | 97401, 97403 |
| Zieman, J.C. | Marine Ecology | 97708 |



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