

Project Title: The Status and Abundance of the Big Cypress Fox Squirrel
(*Sciurus niger avicennia*)

Funding Source: U. S. Fish and Wildlife Service

Date of proposal: February 22, 2006

Co-Principal Investigators:

Reed F. Noss
Department of Biology
University of Central Florida
4000 Central Florida Blvd.
Orlando, FL 32816-2368
407-823-0975
moss@mail.ucf.edu

Jane M. Waterman
Department of Biology
University of Central Florida
4000 Central Florida Blvd.
Orlando, FL 32816-2368
407-823-2922
waterman@mail.ucf.edu

Graduate Research Assistant:

Danielle Munim
Department of Biology
University of Central Florida
4000 Central Florida Blvd.
Orlando, FL 32816-2368
954-298-1251
DanielleBCFS@hotmail.com

Table of Contents

- I. Introduction: page 1
- II. Overview: pages 2-4
- III. Objectives: pages 4-6
- IV. Methods: pages 6-8
- V. Products: page 8
- VI. Literature Cited: pages 9-11
- VII. Qualifications: 12-16
- VIII. Supporting Documentation and Special Concerns: page 17

Abstract

The Big Cypress Fox Squirrel is a subspecies endemic to the South Florida Ecosystem. Since 1990 it has been listed as threatened by the Florida Fish and Wildlife Conservation Commission. The decline of the BCFS mirrors the decline in its preferred habitats as South Florida has been increasingly transformed by human activities. The purpose of this project is to conduct a status survey to determine the distribution, abundance, and habitat use of Big Cypress fox squirrels (BCFS). There are two main project goals: (1) Assess the distribution, abundance, and habitat use of the Big Cypress fox squirrel throughout its range in southwest Florida (2) Examine the demographic rates, home range, and dispersal patterns of fox squirrels in different habitat types to provide baseline data for a spatially-explicit population model. The U.S. Fish and Wildlife Service will use this information to evaluate the conservation status of the species and to determine whether or not it qualifies for listing under the U.S. Endangered Species Act.

Keywords: wildlife, conservation, ecology

? THREE ENP specimen in middle freezer in museum ?

Overview

Ecosystems decline in extent or quality as human development continues to expand and encroach on wild lands, as do the species associated with them, leading to a steady cascade of species requiring attention under the Endangered Species Act or related state laws (Noss et al. 1995). However, certain species may serve as useful indicators or "focal species" for determining the quality of ecosystem remnants, the required management practices, or the necessary area and configuration of reserve networks (Lambeck et al. 1997, Noss et al. 1997, Carroll et al. in press). The Big Cypress fox squirrel appears sensitive to fragmentation, roads, fire regime, and other aspects of the structure and function of ecosystems in South Florida and is a promising candidate as a focal species for ecosystem management. The status of a species is not only determined by its distribution and abundance, but also by its demographic performance and genetic condition within and among local populations. The most reliable means of assessing population and metapopulation viability of the Big Cypress fox squirrel may be a spatially-explicit population model (Dunning et al. 1995, Carroll et al. in press). These models are data-hungry and must be founded on reliable empirical data and on an understanding of variability in habitat suitability for the species in question (Scott et al. 2002). This research will build the empirical basis for a comprehensive assessment of the status of the Big Cypress fox squirrel.

The Big Cypress fox squirrel (*Sciurus niger avicennia*) is a subspecies endemic to the South Florida Ecosystem. Big Cypress fox squirrels may be present in a variety of habitat types including cypress forest, pine flatwoods, tropical hardwood forest, oak hammocks, golf courses and suburban areas (Williams and Humphrey 1979). Its diet consists of cabbage palm fruits, slash pine seeds, cypress seeds, figs, buds, acorns, fungi, and occasionally, bird eggs, nestlings, and frogs (Humphrey and Jodice 1992). They are polymorphic in pelage color and average 28-38cm. in length and a life span of 7-10 years (Koprowski et al. 1988). Big Cypress fox squirrels nest in cabbage palm, pine, and cypress trees; they use both leaf nests and cavities (Jodice and Humphrey 1992). The present distribution of the Big Cypress fox squirrel is southwestern Florida south of

the Caloosahatchee River. However, some populations may be present just north of the Caloosahatchee River in Charlotte and Glades counties. Populations have been reported as rare and highly scattered in Collier, Lee, Hendry, and Monroe counties (Jodice and Humphrey 1992).

The purpose of this project is to conduct a status survey to determine the distribution, abundance, and habitat use of the Big Cypress fox squirrel. The U.S. Fish and Wildlife Service will use this information to evaluate the conservation status of the species and to determine whether or not it qualifies for listing under the U.S. Endangered Species Act. Since 1990, the Big Cypress fox squirrel has been listed as threatened by the Florida Fish and Wildlife Conservation Commission, and recently the subspecies was reviewed by the U.S. Fish and Wildlife Service for possible listing as an endangered species. The decline of the Big Cypress fox squirrel mirrors the decline in its preferred habitats as South Florida has been increasingly transformed by human activities. There has been a 79% reduction in slash pine timberland in South Florida (Wooding 1990), and large-scale development of pinelands west of the Big Cypress National Preserve could potentially reduce and fragment remaining populations of fox squirrels (Humphrey and Jodice 1992). Simulation models estimate a minimum of 300 fox squirrels is needed for long term survival and each would need between 7.9 and 37.5km of habitat (Wooding 1990).

Examining the population structure of small mammals in their native habitat in comparison with populations in a situation unlike their natural habitat may provide valuable insights into which of the species characteristics vary under differing ecological conditions. Due to fire suppression, understory growth has resulted in less suitable habitat for Big Cypress fox squirrels which require an open, mature, pine-oak forest with minimal understory growth (Jodice and Humphrey 1992). Golf courses and other suburban areas may provide more suitable habitat for fox squirrels than their native habitat in the natural areas due to the abundance of native and exotic mast producing species. Previous research has found higher fox squirrel abundance in suburban areas than in native, relatively undisturbed habitats (Jodice and Humphrey 1992, Ditgen 1999). Big

Cypress fox squirrel populations also exist in areas that were formerly marshland, pine flatwoods, and upland prairie that have been drained and converted to pasture (Wooding 1997). Grazing by cattle hinders understory growth on pastureland and enhances habitat quality for fox squirrels. Research is needed to develop habitat management guidelines for golf courses and private lands that support fox squirrels, along with determining the status of Big Cypress fox squirrels and habitat quality in the various state parks, forests, and conservation lands throughout southwest Florida.

Objectives

Project Goals

- A. Assess the distribution, abundance, and habitat use of the Big Cypress fox squirrel throughout its range in southwest Florida
- B. Examine the demographic rates, home range, and dispersal patterns of fox squirrels in different habitat types to provide baseline data for a spatially-explicit population model

Part A

Although fox squirrels are generally found in pine flatwoods, the specific habitat requirements of Big Cypress fox squirrels are poorly understood (Humphrey and Jodice 1992). Big Cypress fox squirrels tend to be more abundant in areas with minimal understory (Loeb et al. 1999). Gray squirrels are reported to outcompete fox squirrels in areas with dense understory (Weigl et al. 1989; Edwards et al. 1998; Loeb 1999). Golf courses and pastureland have little to no understory and may provide more suitable habitat for fox squirrels than in the natural areas. Even though a large amount of potential fox squirrel habitat may remain; many areas may be avoided due to understory growth or other variables. We will analyze the distribution and abundance of Big Cypress fox squirrels in relation to habitat variables to identify preferred vs. available habitat characteristics.

H₁: The distribution and abundance of fox squirrels is dependent on certain habitat characteristics

H₂: Fox squirrel abundance and distribution is not homogenous throughout different habitats.

Part B

In order to develop a spatially-explicit population model, fox squirrel demographic rates, home range, and dispersal patterns in different habitats must be thoroughly investigated. In general, the southeastern species of fox squirrels appear to be long-lived, with low adult mortality and few, small litters each year (Conner 2001). These life history characteristics may explain why most populations of southeastern fox squirrels are declining and have failed to recover even after preservation of potential habitats (Tappe and Guynn 1998). Previous research indicates that male fox squirrels disperse farther from the natal site than female fox squirrels. Investigations of dispersal abilities of fox squirrels in fragmented landscapes are needed in southeastern populations (Rosenblatt et al. 1999; Zollner 2000; Goheen et al. 2003). Previous research indicates that it is not uncommon to find a male home range overlapping with that of several females, but there is no overlap in male ranges (Sheperd and Swihart 1995). Adult female fox squirrels may have a greater impact on density regulation than adult males. (Benson 1980; Hansen and Nixon 1984; Koprowski 1996).

H₃: Male and female fox squirrels will have different home range and dispersal patterns.

H₄: There is a difference in the demographic rates, home range and dispersal patterns of fox squirrels in different habitats.

Part C

Fox squirrels may be more divergent morphologically and allozymically than gray squirrels because populations have been isolated for longer periods of time by the Mississippi River. Variability in coloration, habitat, and size differences suggest long-term or repeated isolation of Western and Eastern populations (Moncrief 1993; Moncrief 2001). Three subspecies of *Sciurus niger* occur in

Florida. *S. n. niger*, also known as the Carolina fox squirrel is found in the Florida panhandle and adjacent southeastern states. *S. n. shermani*, Sherman's fox squirrel, ranges throughout central and northern Florida. *S. n. avicennia*, Big Cypress fox squirrel, is found in southwest Florida (Wooding 1997). The latter two subspecies differ in pelage and cranial features (Moncrief 2001). The Caloosahatchee River marks the northern boundary of Big Cypress fox squirrels and may act as a barrier to gene flow between Sherman's and Big Cypress fox squirrels (Noss, pers. comm.). However, classification of the Sherman's fox squirrel and Big Cypress fox squirrel as subspecies is questionable. Some researchers have reported that the two subspecies can produce hybrids and therefore shouldn't be considered separate; however, others believe that the Big Cypress fox squirrel has diverged from the Sherman's fox squirrel as it became locally adapted to the environment of southwest Florida and should be considered an entirely different species (Main, pers. comm.). Tissue samples will be collected from a small piece of skin (5mm) from the tail according to guidelines from another researcher contracted by USFWS, who is undertaking a rangewide genetic and phylo-geographic study of fox squirrels.

Methods

This study will document the historic and current distribution of the Big Cypress fox squirrel by obtaining and mapping occurrence records from the U.S. Fish and Wildlife Service, Florida Natural Areas Inventory, Florida Museum of Natural History, and other sources, and through interviews with biologists and other field personnel of public land-managing agencies, private land conservation agencies, and private landowners. We will collect information in the form of verified sightings, road kills (or other dead specimens), and individuals captured in nest boxes and live traps.

Twenty transects, 1 km in length, will be set up in areas with confirmed Big Cypress fox squirrel populations. Nest boxes (40X21X21cm; 7.62cm. circular entrance) will be placed at 100m intervals along each transect. There will be 200

total nest boxes installed at least 6m high and will be checked once per month for inhabitants. These nest boxes will be put up in areas throughout the range of the Big Cypress fox squirrel. Our goal is to have at least two transects of nest boxes in the Big Cypress National Preserve.

Opportunistically, fox squirrels will be captured in Tomahawk live traps (24X6X6" double door) baited with peanuts, walnuts, pecans, and sunflower seeds. In the natural areas, traps will be wired open and baited for several weeks to acclimate squirrels to their presence and to improve capture success.

Fox squirrels can be handled efficiently in a cloth bag that restrains the body and appendages, and allows easy respiration (Koprowski 2002). Squirrels will be weighed and examined for sex, age, reproductive condition, and external parasites. I will classify females with lactating mammarys as reproductive (Carey and Johnson 1995). Big Cypress fox squirrels will be marked for identification using PIT tags. A small piece of tissue (5mm) will be taken from the tip of the tail. All individuals will be released at the site of capture. Locations of squirrels will be recorded using a Garmin 12 Global Positioning System (GPS).

Stratified random sampling will be used to survey and sample natural areas and private land to determine preferred vs. available habitat. Survey sites will be selected from land cover maps. Transects (1km) will be established to survey each site for fox squirrels and to measure habitat variables at each 100m interval. Fox squirrel sightings will be compared between golf courses and natural areas. Each site will be sampled three times to calculate a standard deviation of abundance. Abundance estimates will be made using minimum number known alive (MNKA) (Krebs 1966).

Habitat characteristics will be measured within a 10m radius plot according to standard techniques (Avery and Burkhart 1994). The following habitat variables will be assessed at each trap site, nest box site, or 100km interval along 1km transects: tree height, diameter at breast height (dbh), tree species, percent canopy closure, and understory density. A 2-section collapsible pole will be used to estimate horizontal foliage density (Griffith and Youtie 1988). Understory cover and mast will be measured in nested 1m² subplots 5m from the center in each

cardinal direction. Natural nests will be located, and aspects of nest site selection will be recorded. A TreeTop Peeper will be used to unobtrusively inspect natural cavities and nest boxes. Habitat characteristics will also be compared with the known burn history of the study areas. Multiple logistic regression analysis will be used to relate species abundance to selected habitat variables (Carey and Johnson 1995). Chi-squared will be used to test if use of certain habitats differ from expected use according to availability. G-test of independence will be used to test if fox squirrel abundance is independent of habitat type.

Radiotelemetry is useful in locating and tracking medium-sized and large animals especially those who are difficult to monitor by live-trapping (Animal Care and Use Committee 1998). Radio collars will be used to assess demographic rates, dispersal patterns and home range characteristics of Big Cypress fox squirrels in their natural environment and suburban areas. 8-10 adult Big Cypress fox squirrels caught in live traps or nest boxes will be fitted with radiotransmitters (Sirtrack 148 MHz) and monitored via telemetry to track movement patterns, demographics, and habitat use. The adaptive kernel method will be used to calculate sizes of feeding ranges and core areas (Worton 1989). Student t-tests will be used to compare home range size and dispersal patterns between male and female Big Cypress fox squirrels. The Kruskal-Wallis test will be used to assess differences in means for home range data and to compare the effects of habitat, proximity, and sex on the difference in area between the selected and nearest patch. A G-test of Independence will be used to test if fox squirrel home range, demographic rates, and dispersal patterns are independent of habitat type.

Products

No publications or reports are available yet for this research. I was provided a map of the Big Cypress National Preserve from Deborah Jansen that indicates the locations of Big Cypress fox squirrel sightings. I am eager to read the report that Deborah Jansen is in the process of preparing that details the distribution and abundance of the Big Cypress fox squirrel in the Big Cypress National Preserve. I expect this report to aid greatly in focusing my research efforts.

Literature Cited

- Animal Care and Use Committee. 1998. Guidelines for the capture, handling, and care of mammals as approved by the American Society of Mammalogists. 79(4): 1416-1431.
- Avery, T.E. and H.E. Burkhart. 1994. Forest Measurements, 4th ed. McGraw-Hill Inc., New York.
- Benson, Barbara N. 1980. Dominance relationships, mating behavior, and scent marking in fox squirrels (*Sciurus niger*). Mammalia, 44(2): 143-159.
- Carey, A.B. and M.L. Johnson. 1995. Small mammals in managed, naturally young, and old-growth forests. Ecological Applications 5:336-352.
- Carroll, C., R.F. Noss, P.C. Paquet, and N.H. Schumaker. In press. Integrating population viability analysis and reserve selection algorithms into regional conservation plans. Ecological Applications.
- Conner, L. Mike. 2001. Survival and cause-specific mortality of adult fox squirrels in southwestern Georgia. Journal of Wildlife Management, 65(2): 200-204.
- Ditgen, Rebecca S. 1999. Population estimates, habitat requirements, and landscape design and management for urban populations of the endemic Big Cypress fox squirrel (*Sciurus niger avicennia*). Doctoral dissertation, University of Florida, Gainesville. 131pp.
- Dunning, J.B., Jr., D.J. Stewart, B.J. Danielson, B.R. Noon, T.L. Root, R. Lamberson, and E.E. Stevens. 1995. Spatially explicit population models: current forms and future uses. Ecological Applications, 5: 3-11.
- Edwards, John W., Heckel, David G., and David C. Guynn, Jr. 1998. Niche overlap in sympatric populations of fox and gray squirrels. Journal of Wildlife Management, 62(1): 354-363.
- Goheen, Jacob R., Swihart, Robert K., Gehring, Thomas N., and Michael S. Miller. 2003. Forces structuring tree squirrel communities in landscapes fragmented by agriculture: species differences in perceptions of forest connectivity and carrying capacity. OIKOS, 102: 95-103.
- Griffith, Brad and Berta A. Youtie. 1988. Two devices for estimating foliage density and deer hiding cover. Wildlife Society Bulletin, 16(2): 206-210.

- Hansen, Lorinie P. and Charles M. Nixon. 1984. Effects of adults on the demography of fox squirrels (*Sciurus niger*). Canadian Journal of Zoology, 63: 861-867.
- Humphrey, S. R., and P. G. R. Jodice. 1992. Big Cypress fox squirrel. Pp. 224-233 in *Rare and Endangered Biota of Florida*, vol. 1: *Mammals*, ed. S. R. Humphrey. University Press of Florida
- Jodice, Patrick G. R., and Stephen R. Humphrey. 1992. Activity and diet of an urban population of Big Cypress fox squirrels. Journal of Wildlife Management, 56(4): 685-692.
- Koprowski, John L. 2002. Handling tree squirrels with a safe and efficient restraint. Wildlife Society Bulletin, 30(1): 101-103.
- Koprowski, John L. 1996. Natal philopatry, communal nesting, and kinship in fox squirrels and gray squirrels. Journal of Mammalogy, 77(4): 1006-1016.
- Koprowski, John L., Roseberry, John L., and W.D. Klimstra. 1988. Longevity records for the fox squirrel. Journal of Mammalogy, 69(2): 383-384.
- Krebs, J. R. and N. B. Davies. 1981. An Introduction to Behavioral Ecology, 3rd edition. Oxford, Blackwell Scientific Publications.
- Lambeck, R.J. 1997. Focal species: a multi-species umbrella for nature conservation. Conservation Biology, 11: 849-856.
- Loeb, Susan C. 1999. Responses of small mammals to coarse woody debris in a southeastern pine forest. Journal of Mammalogy, 80(2): 460-471.
- Loeb, Susan C., Chapman, Gregg L., and Theodore R. Ridley. 1999. Sampling small mammals in southeastern forests: the importance of trapping in trees. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies, 53: 415-424.
- Moncrief, Nancy D. 1993. Geographic variation in fox squirrels (*Sciurus niger*) and gray squirrels (*S. carolinensis*) of the lower Mississippi river valley. Journal of Mammalogy, 74(3): 547-576.
- Moncrief, Nancy D. 2001. Allozymic variation in the endangered Delmarva fox squirrel (*Sciurus niger cinereus*): genetics of a translocated population. American Midland Naturalist, 146: 37-42.
- Noss, R.F., E.T. LaRoe, and J.M. Scott. 1995. Endangered ecosystems of the United States: a preliminary assessment of loss and degradation. Biological Report 28. USDI National Biological Service, Washington D.C.

- Noss, R.F., M.A. O'Connell, and D.D. Murphy. 1997. The science of conservation planning: habitat conservation under the Endangered Species Act. Island Press, Washington D.C.
- Rosenblatt, Daniel L., Heske, Edward J., Nelson, Suzanne L., Barber, Diana M., Miller, Martin A., and Bruce MacAllister. 1999. Forest fragments in east-central Illinois: islands or habitat patches for mammals. *American Midland Naturalist*, 141: 115-125
- Scott, J.M., P.J. Heglund, and M.L. Morrison, editors. 2002. Predicting species occurrences: issues of accuracy and scale. Island Press, Washington D.C.
- Sheperd, Forrest B. and Robert K. Swihart. 1995. Spatial dynamics of fox squirrels (*Sciurus niger*) in fragmented landscapes. *Canadian Journal of Zoology*, 73: 2098-2105.
- Tappe, P. A. and D.C. Guynn, Jr. 1998. Southeastern fox squirrels: r-or K-selected? Implications for management. In: *Ecology and Evolutionary Biology of Tree Squirrels*. M.A. Steele, J.F. Merritt and D. A. Zegers. Virginia Museum of Natural History Spec. Publ. No. 6.
- Weigl, P. D., M. A. Steele, L. J. Sherman, J. C. Ha, and T. L. Sharpe. 1989. The ecology of the fox squirrel (*Sciurus niger*) in North Carolina: implications for survival in the southeast. *Bulletin of Tall Timbers Research Station*, 24: 1-93.
- Williams, Kathleen S. and Stephen R. Humphrey. 1979. Distribution and status of the endangered Big Cypress fox squirrel (*Sciurus niger avicennia*) in Florida. *Florida Scientist*, 42(4): 196-200.
- Wooding, John B. 1997. Distribution and population ecology of the fox squirrel in Florida. Doctoral Dissertation, University of Florida, Gainesville. 138pp.
- Wooding, J.B. 1990. Status, life history, and management of fox squirrels in Florida. Florida Game and Fresh Water Fish Commission.
- Worton, B.J. 1989. Kernel methods for estimating the utilization distribution in home-range studies. *Ecology*, 70: 164-168.
- Zollner, Patrick A. 2000. Comparing the landscape level perceptual abilities of forest sciurids in fragmented agricultural landscapes. *Landscape Ecology*, 15: 523-533.

Qualifications

Reed F. Noss, Ph.D.

Reed Noss is the Davis-Shine Professor of Conservation Biology at the University of Central Florida, Chief Scientist for The Wildlands Project, and an international consultant and lecturer. He has a B.S. in Education from the University of Dayton, a M.S. in Ecology from the University of Tennessee, and a Ph.D. in Wildlife Ecology from the University of Florida. He has worked as an ecologist for the Ohio Department of Natural Resources, Florida Natural Areas Inventory, and U.S. Environmental Protection Agency during his 30-plus years in the environmental field. Dr. Noss is the author of over 200 scientific and semi-technical articles and several books: ***Saving Nature's Legacy*** (1994), coauthored by Allen Cooperrider; ***The Science of Conservation Planning*** (1997), coauthored by Michael O'Connell and Dennis Murphy; ***The Redwood Forest*** (2000), which he edited; and two coedited books: ***Ecological Integrity***, (2000) and ***Large Mammal Restoration*** (2001). The first and last of these books have won major book awards.

Dr. Noss was Editor-in-Chief of ***Conservation Biology***, the leading journal in the field, from 1993 through 1997 and is Past President of the Society for Conservation Biology (1999-2001). From 1993 through 1996 he held a Pew Scholars Fellowship in Conservation and the Environment. In 1995 he won the Edward T. LaRoe III Memorial Award of the Society for Conservation Biology. He is certified as a Senior Ecologist by the Ecological Society of America and is an elected Fellow of the American Association for the Advancement of Science. His present research involves the application of science to conservation planning at regional to global scales.

Jane Waterman, Ph.D.

Dr. Waterman's research has focused on the selective factors that influence the evolution of sociality and mating systems. She has 20 years of experience studying squirrels. She earned her Ph. D. from the University of Minnesota in 1994. The species diversity of squirrels and other small mammals allows her to pursue investigations into the environmental factors affecting social and mating systems. She is currently studying the behavior of two species of ground squirrels living in the Namib desert of Namibia, Africa. Dr. Waterman also studies male grouping in the polar bear, a marine species in which amicable male groups form. Such all-male groups are quite rare among mammals and thus provide an excellent opportunity to gain important insights into selective forces leading to sociality. Here are a few selected publications:

Waterman, J. M. 2002. Delayed maturity, group fission and the limits of group size in female Cape ground squirrels. *Journal of Zoology (Lond.)*. 256(1): 113-120

Waterman, J.M. 1998. Mating tactics of male Cape ground squirrels (*Xerus inauris*): consequences of year-round breeding. *Animal Behaviour*. 56: 459-466.

Waterman, J. M. 1996. Reproductive biology of a tropical, non-hibernating ground squirrel. *Journal of Mammalogy*. 77: 134-146.

Danielle Munim, Master of Science student

Danielle will be conducting all the field work for this research. Danielle is a graduate student in the Department of Biology at the University of Central Florida. She has been trained to handle squirrels and to collect data by Dr. Waterman and Dr. Noss. She will write her Master's thesis on the Big Cypress fox squirrel. Please refer to Danielle Munim's curriculum vitae below...

Danielle A. Munim
1560 NE 45th Street
Oakland Park, FL 33334
Phone 954-298-1251
Email: DanielleBCFS@hotmail.com

EDUCATION

University of Central Florida
Orlando, FL
Master of Science program in Biology
Certificate program in Conservation Biology

August 2003-Present

University of Central Florida
Orlando, FL
Bachelor of Science in Psychology
Magna Cum Laude, 3.88 GPA
Minor in Criminal Justice

August 2000-August 2003

The American University
Washington D.C.
General Education Curriculum

August 1999- May 2000

EMPLOYMENT

University of Central Florida, Fall 2004-Present

Graduate Research Assistant

Thesis advisors: Reed F. Noss, Ph.D. and Jane Waterman, Ph.D.

Master's thesis project funded by the U.S. Fish and Wildlife Service

Project title: The Status, abundance, and molecular phylogeography of the
Big Cypress fox squirrel (*Sciurus niger avicennia*)

Duties include capturing fox squirrels in Tomahawk live traps to take measurements, examine for reproductive condition, collect tissue samples, and implant a PIT Tag for permanent ID. I also fit squirrels with radio collars for the radiotelemetry aspect of the study to look at dispersal and home range patterns. In addition, I build and put up nest boxes in areas known to support fox squirrel populations. Finally, I conduct stratified random sampling of potential habitat in order to quantify the amount of available habitat that exists for the Big Cypress fox squirrel throughout its range in southwest Florida.

University of Central Florida, Fall 2004

Teaching Assistant for two Biodiversity (BSC 2011) laboratory classes

Biodiversity professor: Dr. Pedro Quintana

Duties include lecturing, creating and grading quizzes and exams, and assisting students in species identification taxonomic classification, and experimental methodology

University of Central Florida, Fall 2003

Teaching Assistant for two General Biology (BSC 2010) laboratory classes

General Biology professors: Dr. Linda Walters and Pamela Thomas

Duties include lecturing, creating and grading quizzes, and assisting students in laboratory exercises and reports.

Pulmonary and Critical Care Consultants, June-August 1999-2003

Office Manager: Cathy Karchefsky

Duties include working at a medical doctor's office inputting patient information, office, and hospital charges into the computer, printing bills to insurance companies and patients, inputting all patient and insurance payments into the computer, scheduling diagnostic tests at hospitals for patients, and clerical tasks.

Volunteer Work

50th State Science and Engineering Fair of Florida, Orlando, FL

Judge for senior level Zoology research projects April 7, 2005

Director for the Florida Foundation for Future Scientists: Nancy A. Besley

Duties include interacting with and questioning high school student researchers along with determining the order of awards and choosing the overall winner.

Wildlife Care Center, Ft. Lauderdale, FL

Volunteer, Summer 2003

Volunteer Manager: Sonia Hedrick

Volunteer for this non-profit organization dedicated to the rescue, rehabilitation and release of Florida's injured or orphaned wildlife.

Duties include cleaning the habitats of rodents and birds, and working in the nursery hand-feeding and cleaning the cages of infant animals including ducks and a numerous variety of baby song birds.

Applied Cognition and Technology Laboratory, University of Central Florida, Orlando

Research Assistant, Spring 2003

Director: Dr. Valerie Sims

With a research team, I designed a research questionnaire, collected and analyzed data for a study that investigated whether attitudes toward animal cruelty are related to a person's beliefs about control and anger management. We analyzed whether participants would respond differently to scenarios involving different animals, the gender of the abuser, and to scenarios involving neglect vs. cruelty.

Behavioral Ecology and Evolution Laboratory, University of Central Florida, Orlando

Research Assistant, October 2002

Director: Gillian Eckhardt, a graduate student working under Dr. Jane Waterman in the Biology department at the University of Central Florida.

Transferred footage of polar bears from a video camera to DVD for a study investigating the behavior of polar bears that gather to engage in strenuous play while waiting for the Hudson Bay to freeze before starting their season hunt.

Sea World, Orlando, FL

Whale watch intern, August-October 2002

Director: Otto Fad

Observed and recorded the behaviors of a pod of killer whales, with special attention paid to the nursing frequency of a newborn calf.

Institute for Simulation and Training, University of Central Florida, Orlando, FL

Research Assistant, Spring 2002

Director: Dr. C. Shawn Burke and doctoral student Heather Priest

Developed an annotated bibliography for the Multidisciplinary University Research Initiative (MURI) Operator Performance Under Stress (OPUS) project. Performed extensive literature searches, wrote parts of the annotated bibliography, mapped cities on Operation Flashpoint for use on a research project

Publication

Priest, H.A., Burke, C.S., Stagl, K.C., Munim, D. (in press).

An Annotated Bibliography of the Literature Regarding Individual and Team Adaptability, Stress, and Training (Tech. Rep.) Orlando, Florida: University of Central Florida, Institute for Simulation and Training, MURI-OPUS

Presentations

Sims, V.K., Chin, M.G., Bassion, D., Keifer, A., Munim, D., Patel, T., Yordan, R. (2003, August). Predicting justified punishments for animal cruelty and neglect. International Society of Anthro-Zoology, Canton, OH.

Priest, H. A., Burke, C. S., Munim, D., Salas, E. (2002, September). The impact of stress on adaptability in teams. Proceedings of the 46th Annual Meeting of the Human Factors and Ergonomics Society, Baltimore, MD.

Honor Societies and Professional Memberships:

Society for Integrative and Comparative Biology, 2006
Ecological Society of America, 2005
Psi Chi The National Honor Society in Psychology, 2001
Golden Key Honors Society, 2000
National Association of Collegiate Scholars, 2000
Spanish National Honors Society, 1997

Languages:

English, advanced Spanish

References:

Reed F. Noss, Ph.D.
Davis-Shine Professor of Conservation Biology
Department of Biology
University of Central Florida
4000 Central Florida Blvd.
Orlando, FL 32816-2368
407-823-0975
rnoss@mail.ucf.edu

Jane M. Waterman, Ph.D.
Associate Professor
Department of Biology
University of Central Florida
4000 Central Florida Blvd.
Orlando, FL 32816-2368
407-823-2922
waterman@mail.ucf.edu

Supporting Documentation and Special Concerns

Caution and common sense will always be exercised while conducting this research in the Big Cypress National Preserve. Study sites will be accessed on foot, however, there are funds allocated to a swamp buggy rental in the funding provided by U.S. Fish and Wildlife, but the need to use a swamp buggy is not expected. Deborah Jansen and/or her assistants will be contacted to gain access to sites that are not accessible to the public. There will not be any chemical use or ground disturbance associated with this project. All procedures concerning the trapping and handling of fox squirrels has been approved by IACUC. Any live-trapped animals will be released at the site of capture.