AGENDA REPORT
January 8, 2019

Board Direction. Re: Appointment of EEL Selection and Management Committee Members

SUBJECT:
Appointments to the Environmentally Endangered Lands Program Selection and Management Committee (SMC)

FISCAL IMPACT:
There is no Fiscal Impact as a result of this action.

DEPT/OFFICE:
Parks and Recreation

REQUESTED ACTION:
It is requested that the Board of County Commissioners give staff direction regarding appointment of SMC members.

SUMMARY EXPLANATION and BACKGROUND:
The EEL Selection and Management Committee shall serve as an expert scientific advisory committee to the Board on all issues involving the acquisition and management of environmentally endangered lands within the EEL Program protected area network in Brevard County.

The EEL Selection and Management Committee will provide technical review for all land acquisition proposals for outside funding. The EEL Selection and Management Committee shall consider and develop a conceptual county-wide strategy for land acquisition and management that considers local, state and national conservation issues and needs (Sanctuary Management Manual). The EEL Selection and Management Committee shall serve as an advisory committee to County EEL staff for comprehensive management plan development and implementation for all EEL Program acquisition sites.

Below is a list of current Selection and Management Committee (SMC) members and their appointment dates and term expiration dates. Members have indicated a desire to continue to serve on this committee.

SMC Member	Reappointment Date	Term Expires	Original Appointment Date
Dave Breininger	12/06/2016	12/31/2018	05/01/1998
Paul Schmalzer	12/06/2016	12/31/2018	08/21/1990

Laurilee Thompson	12/06/2016	12/31/2018	03/08/2011
Kim Zarillo	12/06/2016	12/31/2018	10/01/2000
Randy Parkinson	01/24/2017	12/31/2018	08/21/1990
Oli Johnson	10/18/2016	12/31/2018	10/18/2016
Tammy Foster	01/23/2018	12/31/2018	01/23/2018
Elizabeth Becker	08/14/2018	12/31/2020	08/14/2018

It is requested that the Board give staff direction regarding the appointment of SMC members with the following options:

Option 1: Re-appoint Randy Parkinson, Dave Breininger, Paul Schmalzer, Laurilee Thompson, Kim Zarillo, Oli Johnson and Tammy Foster for two year terms to expire in December 2020.

Seven of the existing SMC Committee member's terms expire on December 31, 2018. According to County Ordinance No. 95-31, "An at-large member may continue to serve after the expiration of his or her term until he or she is reappointed or until a new appointment is made."

Option 2: Re-appoint a limited number of members, as specified by the Board, for two year terms to expire in December 2020 and authorize staff to initiate procedures to appoint replacement members to EEL Program SMC.

Option 3: Authorize staff to initiate procedures to appoint replacement members to the EEL Program SMC.

Under Options 2 and 3, staff must:

a. Advertise to accept applications to fill the vacant positions on the SMC.
b. Nominees are reviewed by the Qualifying Committee and given an initial ranking based on level of expertise and education.
c. The Qualifying Committee submits their list of applicants to the Procedures Committee for review.
d. Procedures Committee submits the list of qualified applicants to staff and staff submits the list to the Board for review and final ranking.
e. The Board appoints new members based on final ranking.

The process noted above typically takes 2 to 3 months to complete.

The Land Acquisition Manual (LAM) identifies criteria for the SMC appointments. (See attached)

1. Have a graduate academic degree in biological or environmental sciences or demonstrated professional expertise (minimum six (6) years) in a closely related conservation field such as ecosystem management, natural resources conservation, aquatic biology, field ecology, marine biology, botany, geology, hydrology, fire ecology, natural areas management, human use and recreation in natural areas, science education, or natural area sanctuary design.
2. Have demonstrated knowledge of Brevard County ecosystems and specific knowledge of the habitat

types and conservation land management techniques.

CLERK TO THE BOARD INSTRUCTIONS:
Please return Board Memo to the EEL Program.

ATTACHMENTS:

Description

- **EEL LAM PROCEDURES**
- **SMC RESUMES/CVs**

BREVARD County
BOARD OF COUNTY COMMISSIONERS

FLORIDA'S SPACE COAST

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January 9, 2019

MEMORANDUM

TO: Mary Ellen Donner, Parks and Recreation Director

RE: Item J.3., Board Direction on Appointment of EEL Selection and Management Commmittee (SMC) Members

The Board of County Commissioners, in regular session on January 8, 2019, approved Option 2, re-appointing Oli Johnson and Tammy Foster for two year terms, expiring December 2020; authorized staff to initiate procedures to appoint replacement members to the EEL Program SMC; and directed Commissioner Lober to bring back a resolution regarding the requirments for an academic degree in Biological or Environmental Sciences.

Your continued cooperation is always appreciated.

Sincerely,

BOARD OF COUNTY COMMISSIONERS
SCOTT ELLIS, CLERK

Donna Scott
for: Tammy Rowe, Deputy Clerk

/kp

cc: County Manager
County Attorney

Information on the Selection and Management Committee Appointment Process is found on pages 12 – 14 of the EEL Program's Land Acquisition Manual (LAM)

EEL Selection and Management Committee
Membership shall consist of eight (8) members appointed by the Board for a minimum term of two (2) years. The Board of County Commissioners shall strive to maintain a committee membership that possesses a diversity of demonstrated expertise or experience to enhance the land acquisition and management goals of the EEL Program. The Board may appoint members that do not reside in the respective Commissioner's District.

All EEL Selection and Management Committee members shall:
1. Have a willingness to serve in a voluntary capacity.
2. Be willing to make a long-term commitment to the EEL Selection and Management Committee.
3. Have a graduate academic degree in biological or environmental sciences, OR, demonstrated professional expertise (minimum six (6) years) in a closely related conservation field such as ecosystem management, natural resources conservation, aquatic biology, field ecology, marine biology, botany, geology, hydrology, fire ecology, natural areas management, human use and recreation in natural areas, science education, or natural area sanctuary design.
4. Have demonstrated knowledge of Brevard County ecosystems and specific knowledge of the habitat types and conservation land management techniques.

The procedure for this appointment to the EEL Selection and Management Committee shall be:
The qualifications of all applicants/nominees (applicants) responding to a call by the County Commissioners for EEL Selection and Management Committee volunteers shall be reviewed by a Qualifying Committee consisting of the EEL Program Manager, the Chairman of the Procedures Committee (or their designee), and the Director of Human Resources (or their designee). Staff will present the list of all applicants to the Qualifying Committee for review and an initial ranking based on their level of experience and education. Qualifications for EEL Selection and Management Committee members are outlined in the LAM on pages 13 & 14.

The method of the initial ranking by the Qualifying Committee is as follows:
1. All applicants who meet the minimum qualifications as approved by the Qualifying Committee will be assigned one hundred (100) points.
2. Five (5) additional points are assigned for each graduate degree (Masters or Doctorate) in ecosystem management, natural resources conservation, aquatic biology, field ecology, marine biology, botany, geology, hydrology, fire ecology, natural areas management, human use and recreation in natural areas, science education, or natural areas sanctuary design.
3. And/or two (2) additional points for each year up to six (6) years for demonstrated professional expertise in biological or environmental sciences, or a closely related conservation field such as ecosystem management, natural resources conservation, aquatic biology, field ecology, marine biology, botany, geology, hydrology, fire ecology, natural areas management, human use and recreation in natural areas, science education, or natural area sanctuary design.

The Qualifying Committee will provide the list of all applicants to the Procedures Committee including identification of those applicants/nominees that have been determined by the Qualifying Committee to be qualified. The qualified applicants will be identified by their initial ranking.

The Procedures Committee will review the list of applicants presented by the Qualifying Committee and will verify the final list of qualified applicants through a majority vote. County EEL staff will provide the list of the qualified applicants in ranked order from highest to lowest to the Board for review and final ranking.

The Board shall review the qualifications of the qualified nominees and give each applicant a raking score from 1-3. The Assistant County Administrator (or designated county staff) shall tabulate the ranking scores. The applicant with the highest score shall be appointed to the EEL Selection and Management Committee, the applicant with the second highest score shall be appointed as an alternate to the Committee. In the case of tied scores, the Board Chairperson will choose members or alternates by drawing names of those with tied scores from a box.

5/5/2014

David R. Breininger

06/04/2018

Work:
Conservation Biologist
NASA Ecological Programs
Kennedy Space Center, FL 32899
Phone: (321) 289-5130
Email: david.r.breininger@nasa.gov

Home:
413 Tortoise View Circle
Satellite Beach, FL 32937
Phone (321) 777-837
dbreinin@gmail.com

Experience & Expertise

Thirty-seven years' experience integrating research, monitoring, management, conservation area design, environmental assessment, regulatory analyses, and education. Experience emphasizes field studies, mark-recapture, remote sensing, radio telemetry, geographical information systems, statistical modeling, population analyses and landscape modeling. Collaborations with scientists and managers from federal, state, and local governments, and non-government organizations to integrate science and management to inform decision making. Expertise includes endangered species biology, biodiversity conservation, fire ecology, habitat quality, landscape dynamics, population demography, dispersal biology, and community composition.

Education

2009 *Ph.D., Conservation Biology,* University of Central Florida
1981 *M.S., Ecology*, Florida Institute of Technology
1978. *B.S., Marine Biology*, Florida Institute of Technology

Employment History

2015-present *Senior Scientist, Integrated Mission Support Services, Kennedy Space Center Ecology Program.* Conduct research on endangered species, habitat and ecosystem dynamics to support adaptive management and develop strategies for restoration, and habitat management. Participate in leadership of several projects and perform advisory review of other Kennedy Space Center Ecological Program activities.

2017-present *Courtesy Faculty, University of Central Florida*. Conduct research to support strategic decision making on passive versus active translocation strategies for Florida scrub-jays subject to habitat destruction including blood and feather sampling to support genetic and disease studies.

2009-2015. *Lead Wildlife Biologist, InoMedic Health Applications, Kennedy Space Center.* Conducted research on endangered species, habitat and ecosystem dynamics to support adaptive management and develop strategies for restoration, and habitat management. Coordinate activities of 5 biologists.

1995-2009. *Senior Scientist and Lead, Dynamac Corporation, Kennedy Space Center*. Conducted research on wildlife and habitat dynamics to support environmental management, mitigation, restoration, and habitat management. Coordinated activities of 4 to 8 biologists and managed subcontracts.

1993-1995. *Research Scientist, Florida Institute of Technology* Conducted field studies and population risk modeling to support the Brevard County Scrub Conservation Plan.

1984-1994. *Lead (1994), Supervisor, (1991-1993), Wildlife Biologist (1984-1990), Bionetics Corporation, Kennedy Space Center.* Conducted studies to predict and interpret environmental impacts and develop strategies for mitigation, restoration, and habitat management. Coordinated 4-7 biologists.

1982-1984. *Engineer, Planning Research Corporation.* Analyzed regulatory requirements and prepared regulatory documents for NEPA, endangered species, ground water, and surface water, floodplain, and wetland topics to support the Kennedy Space Center Environmental Management Office.

1982. *Teacher, Brevard County School District*. Taught math and biology.
1981. *Research Assistant, Technology Incorporated, Kennedy Space Center*. Investigated effects of the space vehicle launches on vegetation.
1978-1981. *Graduate Teaching Assistant, Laboratory Supervisor, Florida Institute of Technology,* Performed field and lab instruction for Ecology, Advanced Field Ecology, Environmental Biology, Plant Biology, Vertebrate Zoology, Vertebrate Anatomy, and General Biology. Field instruction included Florida, Great Smokey Mountains, Central and Southern Rocky Mountains.

Honors and Awards

2017	Charlie Corbeil Conservation Award, Preserve Brevard
2017	Kennedy Space Center Engineer/Scientist of the Year, NASA
2016	Outstanding Alumni Knight, University of Central Florida
2016	Regional Director's Conservation Award, U.S. Fish and Wildlife Service
2014	Employee of the Month, NASA Medical and Environmental Support Contract
2009	Most Productive, NASA Life Sciences Support Contract
1997	Visionary Award, NASA Life Sciences Support Contract
1996	JFK Award for Leadership, NASA Life Sciences Support Contract
1995	Conservation Colleague Award, Nature Conservancy
1978	Graduated with High Honors, Florida Institute of Technology
1978	Beta Beta Beta Honor Society
1974-1978	Dean's List every quarter, Florida Institute of Technology

Appointments

2017- Conservation Committee Chair, Allen Broussard Conservancy
2016- Research Associate, University of Central Florida
2015- Board of Directors, Allen Broussard Conservancy (Forever Florida)
2014- Judge, River Fest Sustainability Award, Keep Brevard Beautiful
2013- 2017 Editorial board, Advances in Ecology
2010-2011 Research Professor, Florida Institute of Technology
2010-2016 Graduate Faculty Scholar, University of Central Florida
2009- Board, Florida Institute of Conservation Science
1997- Brevard County Environmentally Endangered Lands Selection and Management Committee
1997- Florida Scrub-Jay Recovery Team
1999–2001 Florida Scrub-Jay Fire Strike Team Advisory Board
1999-2000 Brevard County Crucial Habitat Conservation Planning Committee
1998-1999 Interagency Fire Science Team
1995-1997 South Florida Ecosystem Multi-Species Recovery Team
1997-1998 Florida Ornithological Society's Grants and Awards Committee Chair
1994-1996 Florida Ornithological Society's Research Awards Committee
1994-1995 Florida Scrub-Jay Habitat Conservation Guidelines Committee
1994-1995 Indian River Lagoon Biodiversity Symposium Planning Group, National Estuary Program
1993 Scientific Advisory Group for the Brevard County Scrub Habitat Conservation Plan, Chair

Scientific Publications (87)
Journal Articles (51)

Breininger, D.R., D.M. Oddy, E.D. Stolen, D. K. Hunt. 2018. Influence of sex and transients on survival and detection probabilities of the Southeastern beach mouse. **Journal of Mammalogy** 99: 946–951.

Bauder, J.M., D.R. Breininger, M.R. Bolt, M.L. Legare, C.L. Jenkins, B.B. Rothermel, and K. McGarigal. 2018. Multi-level, multi-scale habitat selection by a wide-ranging, federally threatened snake. **Landscape Ecology** 33: 743–763.

Breininger, D.R., T.E. Foster, G. M. Carter, B.W. Duncan, E.D. Stolen, J. E. Lyon. 2018. The effects of vegetative type, edges, fire history, rainfall and management in fire-maintained habitat. **Ecosphere** 9:1-15.

Breininger, D.R., R.D. Breininger, and C.R. Hall. 2017. Effects of surrounding land use and water depth on seagrass dynamics with attention to a catastrophic algal bloom. **Conservation Biology** 31:67-75.

Bauder, J.M., D.R. Breininger, M.R. Bolt, M.L. Legare, C.L. Jenkins, B.B. Rothermel, and K. McGarigal. 2016. The influence of sex and season on conspecific overlap in a large actively-foraging Colubrid snake. **Plos One**: 11:1-19.

Bauder, J.M., D.R. Breininger, M.R. Bolt, M.L. Legare, C.L. Jenkins, B.B. Rothermel, and K. McGarigal. 2016. Seasonal variation in Eastern Indigo Snake (*Drymarchon couperi*) movement patterns and space use in peninsular Florida at multiple temporal scales. **Herpetologica** 72: 214-226.

Bauder, J.M., D.R. Breininger, M. R. Bolt, M. L. Legare, C.L. Jenkins, and K. McGarigal. 2015. The role of the bandwidth matrix in influencing kernel home range estimates for snakes using VHF telemetry data. **Wildlife Research** 42:437-453.

Duncan, B., P. A Schmalzer, D.R. Breininger, E.D. Stolen. 2015. Comparing fuels reduction and patch mosaic fire regimes for reducing fire spread potential, a spatial modeling approach. **Ecological Modeling** 314:90-99.

Zimmerman, M., E. Stolen, D. Oddy, D. Breininger, and C. Pruett. 2015. Microspatial sampling reveals cryptic influences on gene flow in a threatened mammal. **Conservation Genetics** 16:1-12.

Breininger, B. Duncan, M. Eaton, F. Johnson, J. Nichols. 2014. Integrating land cover modeling and adaptive management to conserve endangered species and reduce catastrophic fire risk. **Land** 3:874-897.

Stolen E.D, D M. Oddy, M. L. Legare, D. R. Breininger, S.L. Gann, S. A. Legare, S. K Weiss, K. G. Holloway-Adkins. 2014. Preventing tracking-tube false detections in occupancy modeling of southeastern beach mouse. **Journal of Fish and Wildlife Management** 5:270-281.

Breininger, D.R., E. D. Stolen, G. C. Carter, D. M. Oddy, S. A. Legare. 2014. Quantifying how territory quality and sociobiology affect recruitment to inform fire management. **Animal Conservation** 17:72-79.

Breininger, D. R., M. J. Mazerolle, M. R. Bolt, M. L. Legare, J. H. Drese, J. E. Hines. 2012. Using multistate models to quantify habitat fragmentation impacts of eastern indigo snake survival. **Animal Conservation** 15:361-368.

Breininger, D.R., R. M. Bolt, M. L. Legare, J. H. Drese, E. D. Stolen. 2011. Factors influencing home range size of Eastern Indigo Snakes (*Drymarchon couperi*) in central Florida. **Journal of Herpetology** 45:484-490.

Johnson, F. A., D. R. Breininger, B. W. Duncan, J. D. Nichols, M. C. Runge, B. K. Williams. 2011. A Markov decision process for managing habitat for Florida Scrub-Jays. **Journal of Fish and Wildlife Management** 2:234-2470.

Williams, B. K., M. J. Eaton, D. R. Breininger. 2011. Adaptive resource management and the value of information. **Ecological Modeling** 222:3429-3436.

Carter, G. M., D. R. Breininger, E. D. Stolen, D. M. Oddy. 2011. Determinants of nest survival in a managed Florida Scrub-Jay population. **Condor** 113:629-636.

Breininger, D. R., J. D. Nichols, B. W. Duncan, E. D. Stolen, G. M. Carter, D. Hunt, J. H. Drese. 2010. Multistate modeling of habitat dynamics: factors affecting Florida scrub transition probabilities. **Ecology** 91:3354-3364.

Breininger, D. R., E. D. Stolen, D. M. Oddy and G. C. Carter. 2010. A model selection approach to predicting whether Florida Scrub-Jays delay breeding. **Condor** 112:378-389.

Breininger, D. R., J. D. Nichols, G. M. Carter, D. M. Oddy. 2009. Habitat-specific breeder survival of Florida Scrub-Jays: inferences using multistate models. **Ecology** 90:3180-3189.

Carter, G.M., M. L. Legare, D. R. Breininger, and D. M. Oddy. 2007. Nocturnal nest predation: a potential obstacle to recovery of a Florida Scrub-Jay population. **Journal of Field Ornithology** 78:390-394.

Breininger, D. R., B. Toland, D. M. Oddy, and M. L. Legare. 2006. Landcover characterizations and Florida Scrub-Jay (*Aphelocoma coerulescens*) population dynamics. **Biological Conservation** 128:169-181.

Carter, G. M., E. D. Stolen, D. R. Breininger. 2006. A rapid approach to modeling species-habitat relationships. **Biological Conservation** 127:237-244.

Breininger, D. R. and D. C. Oddy. 2004. Do habitat potential, population density, and fires influence Florida Scrub-Jay source-sink dynamics? **Ecological Applications** 14:1079-1089.

Akçakaya, H. R., J. L. Atwood, D. R. Breininger, C. T. Collins, B. W. Duncan. 2003. Metapopulation dynamics of the California Least Tern. **Journal of Wildlife Management** 67:829-842

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Breininger D. R., B. W. Duncan, and N. J. Dominy. 2002. Relationships between fire frequency and vegetation type in pine flatwoods of east-central Florida, USA. **Natural Areas Journal** 22:186-193.

Burgman, M. A., D. R. Breininger, B. W. Duncan, and S. Ferson. 2001. Setting reliability bounds on habitat suitability indices. **Ecological Applications** 11:70-78.

Breininger, D. R., M. A. Burgman, and B. M. Stith. 1999. Influence of habitat, catastrophes, and population size on extinction risk on Florida Scrub-Jay populations. **Wildlife Society Bulletin** 27:810-822.

Breininger, D. R. 1999. Florida Scrub-Jay demography and dispersal in a fragmented landscape. **Auk** 116:520-527.

Duncan, B. A., S. Boyle, D. R. Breininger, and P. A. Schmalzer. 1999. Coupling past management practice and historical landscape change on John F. Kennedy Space Center. **Landscape Ecology** 14:291-309.

Breininger, D. R., M. J. Barkaszi, R. B. Smith, D. M. Oddy, and J. A. Provancha. 1998. Prioritizing wildlife taxa for biological diversity conservation at the local scale. **Environmental Management** 22:315-321.

Breininger D. R., V. L. Larson, B. W. Duncan, R. B. Smith. 1998. Linking habitat suitability to demographic success in Florida Scrub-Jays. **Wildlife Society Bulletin** 26:118-128.

Breininger, D. R. 1997. Avifauna of an unimpounded salt marsh on Merritt Island. **Florida Field Naturalist** 25:1-10.

Smith, R. B., D. R. Breininger and V. L. Larson. 1997. Home range characteristics of radiotagged Gopher Tortoises on Kennedy Space Center, Florida. **Chelonian Conservation and Biology** 23:358-362.

Breininger, D. R., V. L., Larson, D. M. Oddy, R. B. Smith and M. J. Barkaszi. 1996. Florida Scrub-Jay demography in different landscapes. **Auk** 113:617-625.

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Swain, H., D. R. Breininger, D. S., Busby, K. B. Clark, S. B. Cook, R. A. Day, D. E. DeFreese, R.G., Gilmore, A.W. Hart, C.R. Hinkle, D.A. McArdle, P.M. Mikkilsen, W.G. Nelson, and A.J. Zahhaorcak. 1995. Introduction to Indian River Biodiversity Conference. **Bulletin of Marine Science** 57:1-7.

Breininger, D. R., P. A. Schmalzer, and C. R. Hinkle. 1994. Gopher Tortoise (*Gopherus polyphemus*) densities in coastal scrub and slash pine flatwoods in Florida. **Journal of Herpetology**. 28: 60-65.

Breininger, D. R. 1992. Birds of swale marshes on John F. Kennedy Space Center. **Florida Field Naturalist** 20: 36-41.

Breininger, D. R. and R. B. Smith. 1992. Relationships between fire and birds in coastal scrub and slash pine flatwoods in Florida. **American Midland Naturalist** 127: 233-240.

Breininger, D. R., M. J. Provancha and R. B. Smith. 1991. Mapping Florida Scrub-Jay habitat for purposes of land-use management. **Photogrammetric Engineering and Remote Sensing** 57: 1467-1474.

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Breininger, D. R. 1990. Avifauna of hammocks and swamps on John F. Kennedy Space Center. **Florida Field Naturalist** 18:21-44.

Breininger, D. R. and R. B. Smith. 1990. Waterbird use of coastal impoundments and management implications in east central Florida coast. **Wetlands** 10:1-19.

Breininger, D. R. and P. A. Schmalzer. 1990. Effects of fire and mechanical disturbance on vegetation and birds in oak/palmetto scrub. **American Midland Naturalist** 123:64-74.

Dreschel, T. W., R. B. Smith and D. R. Breininger. 1990. Florida Scrub-Jay mortality on roadsides. **Florida Field Naturalist** 18:82-83.

Breininger, D. R. 1989. A new population estimate for the Florida Scrub-Jay on Merritt Island National Wildlife Refuge. **Florida Field Naturalist** 17:25-32.

Smith, R. B. and D. R. Breininger. 1988. Northern breeding range extension for the Roseate Spoonbill. **Florida Field Naturalist** 16:65-67.

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Stolen, E. D., D, R. Breininger, and P. C. Frederick. 2005. Using waterbirds as indicators in estuarine systems: successes and perils. **Estuarine Indicators**. Pages 409-422 in S. A. Bortone, editor. CRC Press, Inc.

Breininger, D. R., M. L. Legare, and R. B. Smith. 2004. Eastern Indigo Snakes: influence of edge effects on population viability. Pages 299-311 in H. R. Akçakaya, M. A. Burgman, O Kindvall, C. C. Wood, P. Sjorgren-Gulve, J. S. Hatfield, and M. A. McCarthy, editors. **Species Conservation and Management: Case Studies**. Oxford University Press, New York.

Breininger, D. R., B. A. Burgman, H. R. Akçakaya and M. O. O'Connell. 2002. Use of metapopulation models in conservation planning, Pages 405-427 *in* K. J. Gutzwiller, editor. **Concepts and Applications of Landscape Ecology in Biological Conservation**. Springer-Verlag, N.Y.

Breininger, D. R., M. J. Provancha and R. B. Smith. 1994. Mapping Florida Scrub-Jay habitat for purposes of land-use management. Pages 251-258 *in* W.J. Ripple, editor. **The GIS Applications Book: Examples in Natural Resources a Compendium.** American Society for Photogrammetry and Remote Sensing, Bethesda, MD.

Conference Proceedings (7)

Breininger, D. R. and D. M. Oddy. 2001. Fire and Florida Scrub-Jay source-sink dynamics in mesic flatwoods. Pages 3-7 in D. P. Zattau (editor), Proceedings of the Florida Scrub Symposium 2001. U.S. Fish and Wildlife Service, Jacksonville, Florida.

Duncan, B. A. and D. R. Breininger. 1998. Quantifying habitat change: modeling historical and current Florida Scrub-Jay habitat suitability. GIS/LIS Proceedings, Dallas, Texas.

Duncan, B. W., S. Boyle, P. A. Schmalzer, and D. R. Breininger. 1996. Spatial quantification of historic landscape change within two study sites on John F. Kennedy Space Center. Sixteenth Annual ESRI Users Conference. Published on CD-ROM and on the World Wide Web at www.esri.com.

Duncan, B. W., R. A. Reddick, R. B. Smith and D. R. Breininger. 1994. Protecting the environment in the space age: GIS at the John F. Kennedy Space Center. Geo Info Systems 4:38-42.

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Johnson, F. A. D. R. Breininger, B. Duncan, Marc Epstein. Adaptive Habitat Management for Florida Scrub-Jays at Merritt Island National Wildlife Refuge, Southeastern Adaptive Management Group, Florida Integrated Science Center.
http://cars.er.usgs.gov/SEAMG/seamg_2004_annual_report/seamg_2004_annual_report.html

Breininger, D. R. 2003. Biological criteria for the recovery of Florida Scrub-Jay populations on public lands in Brevard County and Indian River County. Final Report to Endangered Species Office, U. S. Fish and Wildlife Service, Jacksonville, FL. http://northflorida.fws.gov/Scrub-Jays/breininger-2003-report.htm

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Breininger, D. R., D. M. Oddy, M. L. Legare, and B. W. Duncan 2000. Developing biological criteria for the recovery of Florida Scrub-Jay populations on public lands in Brevard County: patterns of fire history, habitat fragmentation, habitat use and demography. In J.D. Brenner (editor). Ecological and economic consequences of the 1998 Florida wildfires: http://flame.fl-dof.com/joint_fire_sciences/.

Larson, V. L., S. P. Rowe, and D. R. Breininger. 1997. Temporal and spatial patterns in avian activity at the Shuttle Landing Facility, John F. Kennedy Space Center, Florida, USA. NASA/TM-97-206644.

Breininger, D. R., V. L. Larson, R. Schaub, P. A. Schmalzer, B. W. Duncan, D. M. Oddy, R. B. Smith, F. Adrian and H. Hill, Jr. 1996. A Conservation Strategy for the Florida Scrub-Jay on John F. Kennedy Space Center/Merritt Island National Wildlife Refuge: an initial scientific basis for recovery. NASA/TM-111676.

Fitzpatrick, J. W., R. Bowman, D. R. Breininger, M. A. O'Connell, B. M. Stith, J. Thaxton, B. Toland, and G.E. Woolfenden. 1995. Habitat conservation plans for the Florida Scrub-Jay: a biological framework. U.S. Fish and Wildlife Service, Jacksonville, FL.

Larson, L., S. P. Rowe, and D. R. Breininger. 1995. A review of Falconry as a bird control technique with recommendations for use at the Shuttle Landing Facility, John F. Kennedy Space Center, Florida USA. NASA/TM-110142.

Swain, H. M., P. A. Schmalzer, D. R. Breininger, K. V. Root, S. A. Bergen, S. R. Boyle, and S. MacCaffree. 1995. Appendix B: Biological Consultant's Report. In: Scrub Conservation and Development Plan, Brevard County. Natural Resource Management Division, Brevard County, Florida.

Breininger, D. R., M. J. Barkaszi, R. B. Smith, D. M. Oddy, and J. A. Provancha. 1994. Endangered and potentially endangered wildlife on Kennedy Space Center: conservation of faunal integrity as a goal for biological diversity. NASA/TM-109204.

Schmalzer, P. A., D. R. Breininger, F. Adrian, R. Schaub, and B. W. Duncan. 1994. Development and implementation of a scrub habitat compensation plan for Kennedy Space Center. NASA/TM-109202.

Breininger, D.R. 1992. Habitat model for the Florida Scrub-Jay on Kennedy Space Center. NASA/TM-107543.

Breininger, D. R. 1989. Review of wildlife resources of Vandenberg Air Force Base, Santa Barbara County, California. NASA, Biomedical Operations and Research Office, KSC. NASA/TM-102146.

Breininger, D. R. 1988. Survey for Least Bell's Vireo in riparian habitat on Vandenberg Air Force Base, Santa Barbara County, California. NASA/TM-100984.

Breininger, D. R., P. A. Schmalzer, D. A. Rydene, and C. R. Hinkle. 1988. Burrow and habitat relationships of the Gopher Tortoise in coastal scrub and slash pine flatwoods on Merritt Island, Florida. Florida Game and Fresh Water Fish Commission Nongame Wildlife Program Final Report. Tallahassee, Florida.

Schmalzer, P. A., C. R. Hinkle and D. Breininger. 1985. Effects of space shuttle launches STS-1 through STS-9 on terrestrial vegetation of John F. Kennedy Space Center. NASA/TM-83103.

Trade Journals (4)

Duncan, B. W., D. Breininger, R. Akçakaya, J. Atwood, and C. Collins. 2002. The California least tern spatial database. Geospatial Solutions 12 (11): 36.

Duncan, B. W., R. A. Reddick, R. B. Smith and D. R. Breininger. 1994. Protecting the environment in the space age: GIS at the John F. Kennedy Space Center. Geo Info Systems 4:38-42.

Duncan, B. W., R. A. Reddick, R. B. Smith and, D. R. Breininger. 1993. Environmental monitoring at John F. Kennedy Space Center. ARC News 15:7-16.

Triandafils, D., A. Maples, and D. Breininger. 1992. Rugged video system for inspecting animal burrows. NASA Tech Briefs 16: 92.

Theses (2)

Breininger, D. R. 2009. Landcover change and population dynamics of Florida Scrub-Jays and Florida Grasshopper Sparrows, Ph.D. Dissertation, University of Central Florida, Orlando, Florida.

Breininger, D. R. 1981. Habitat preferences of the Florida Scrub-Jay (*Aphelocoma c. coerulescens*) at Merritt Island National Wildlife Refuge, Florida. M.S. Thesis. Florida Institute of Technology, Melbourne, Florida.

Examples of >200 Lectures

2018 Florida Scrub-Jay Conservation along the Central Florida's Atlantic Coast. Archie Carr National Wildlife Working Group.

2018 Florida scrub-jay habitat & population dynamics, National Science Foundation Metamodeling Group, Working Group, White Oak.
2017. Integration of endangered species science & management using Florida scrub-jays as an example. Environmental Law Class, Florida Institute of Technology.
2016. Introduction to capture-recapture analyses using Program MARK. Beach Mouse Working Group
2015. Open water diamondback terrapin population estimation. Florida Atlantic Coast Diamondback Terrapin Working Group.
2014. Florida East Coast Diamondback Terrapin –A Species of Conservation Concern, Brevard County Environmentally Endangered Lands Program.
2014. Source-Sink Dynamics & Adaptive Management. Conservation Biology Class, University of Central Florida.
2013. Quantifying how territory quality and sociobiology affect recruitment to inform fire management. Florida Wildlife Society.
2012. Habitat & Population Dynamics of Florida Scrub-Jays. Science Café. Florida Institute of Technology and Brevard Zoo.
2009. Using multistate models to study Florida Scrub-Jay survival and ecosystem dynamics. Florida Institute of Technology, Biological Sciences Seminar.
2008. Quantifying habitat and management needs for landscape management. Beach Mouse Working Group.
2007. Adaptive Resource Management for Florida Scrub-Jays: a new way forward. Brevard Zoo and Brevard Nature Alliance.
2007. Florida Scrub-Jay Demography and Dispersal along central Florida's Atlantic Coast. Annual Banquet Speech, Florida Ornithological Society.
2007. Collaborating to recover Florida Scrub-Jays on conservation lands. Northeast Florida Scrub Working Group.
2006. Building networks in rapidly developing human landscapes: an example from Florida. Connectivity and Reserve Design: Incorporating Landscape and Population Connectivity into Conservation Planning for Changing Land- and Seascapes Symposium. Society of Conservation Biology.
2005. Adaptive Management of Florida Scrub-Jays at Merritt Island NWR, Adaptive Management Conference Series #7, Adaptive Resource Management for Threatened and Endangered Species #2, National Conservation Training Center.
2004. Edge effects and population viability of Eastern Indigo Snakes. International Snake Ecology Conference 4. Applied Ecology Workshop. Southern Illinois University.
2003. Waterbirds as estuarine indicators. Estuarine Indicators Workshop, Sanibel-Captiva Conservation Foundation, Sanibel, Florida.
2002. Florida Scrub-Jay habitat and populations along Florida's Atlantic Coast. Pelican Island National Wildlife Refuge Celebration, Sebastian, Florida.
2001. How does fire history influence Florida Scrub-Jay populations? Space Coast Flyway Festival, Merritt Island Florida. Talk and field tours led each year.
2000. Opportunities for Florida Scrub-Jay recovery along the east central Florida coast. Spring Florida Ornithological Society Meeting, Titusville.
1999. How does fire history influence Florida scrub animals? Florida Scrub Habitat Management workshop, Tampa, Florida.
1995. Influence of habitat, catastrophes, and population size on extinction risk on Florida Scrub-Jay populations. Florida Ornithological Society, Fall Meeting, Cocoa Beach.
1994. Spatial patterns in habitat preference and demographic success of Florida Scrub-Jay populations. Ecology Institute, University of Georgia.

1992. Spatial distribution and habitat needs have endangered species in scrub along the central Florida Atlantic coast. Florida Native Plant Society.
1990. Effects of fire on birds in a Florida oak/palmetto scrub. South Florida Interagency Wildland Fire Council.
1990. Effects of fire and mechanical disturbance on Florida Scrub-Jays, Gopher Tortoises and Indigo Snakes. National Wildfire Coordinating Group.
1989. Effects of fire and mechanical disturbance on plants and animals in coastal scrub and slash pine. Florida Chapter of The Wildlife Society.
1989. Effects of fire on Florida Scrub-Jays, Gopher Tortoises and Indigo Snakes. State Department Office of Foreign Disaster Assistance. Merritt Island National Wildlife Refuge.
1989. Overview of terrestrial and wetland wildlife research at Kennedy Space Center. Center for Wetlands, University of Florida.

Proposals Funded ($>3 million) as Co-PI or PI

2020-2017	Using genetics and ecology to identify optimal conservation strategies for Florida scrub-jays impacted by habitat loss, Florida Department of Transportation, University of Central Florida
2012-2008	Adaptive resource management monitoring of Florida Scrub-jays on Merritt Island National Wildlife Refuge, U.S. Fish and Wildlife Service.
2011-2007	Florida Scrub-Jay demography in restored landscapes, Brevard Zoo.
2009-2007	Quantifying habitat and population dynamics to guide Florida Scrub-Jay recovery, Florida Fish and Wildlife Conservation Commission.
2006-2005	Florida Scrub-Jay population and habitat dynamics along central Florida's Atlantic coast, Brevard Nature Alliance.
2006-2005	Florida Scrub-Jay population dynamics. Alan Broussard Conservancy.
2006-2005	Metapopulation dynamics and recovery potential of Florida Grasshopper Sparrows (*Ammodramus savannarum floridanus*), U.S. Fish and Wildlife Service.
2004-2003	Florida Scrub-Jay Habitat and Population Status on St. Sebastian River State Park Preserve, Florida Department of Environmental Protection.
2004-2002.	Status and distribution of Eastern Indigo Snakes (*Drymarchon corais couperi*) on Avon Park Air Force Range, U.S. Air Force.
2002-2001.	Metapopulation viability analyses of the California Least Tern, NASA.
2001-2000.	Population viability of the Eastern Indigo Snake, U.S. Fish and Wildlife Service.
2001-1999.	Habitat and demographic studies supporting development of a population risk model for the Eastern Indigo Snake, Bailey Wildlife Foundation.
1999-1998.	Patterns of Fire History, Habitat Fragmentation, Habitat Use and Florida Scrub-Jay Demography, Florida Fire Science Team.
2002-1997.	Biological Criteria for the Recovery of Florida Scrub-Jay Populations on Public Lands in Brevard County and Indian River County, U. S. Fish and Wildlife Service.
1998-1997.	Habitat mapping and analyses for the Sebastian Highlands Scrub Habitat Conservation Plan, Indian River County Natural Resources Department.
1997-1995.	Florida Scrub-Jay demography of an urban metapopulation along Florida's Atlantic Coast, U.S. Fish and Wildlife Service.
1997-1994.	Wildlife operational hazards and minimization of bird strike risk to aircraft, NASA.
1995-1993.	Technical support to Brevard County Scrub Habitat Conservation Plan, Brevard County Natural Resources Office.
1993-1992.	Florida Scrub-Jay demography and dispersal along South Brevard's beaches, Alan Broussard Conservancy.

2002-1992	Monitoring scrub restoration on Merritt Island, NASA.
1994-1990.	Florida Scrub-Jay demography on Cape Canaveral Air Station, U.S. Air Force.
1994-1989.	Playlinda Beach Study of Florida Scrub-Jays at Canaveral National Seashore, National Park Service.
1992-1988.	Florida Scrub-Jay response to habitat destruction, U.S. Fish and Wildlife Service.
1985-1984.	Burrow and habitat study of the Gopher Tortoise. Florida Fish and Wildlife Conservation Commission.

Peer review

Ecology, Conservation Biology, Global Ecology and Biogeography, Forest Ecology and Management, Journal of Wildlife Management, Photogrammetric Engineering and Remote Sensing, Auk, Condor, Waterbirds, Journal of Herpetology, Herpetological Review, International Journal of Wildland Fire, Southwestern Naturalist, Florida Division of State Lands, Acta Oecologica, Avian Biology, Canadian Journal of Zoology, Ecography, National Science Foundation, Forest Ecology and Management, Natural Areas Journal, Florida Field Naturalist, Florida Nongame Grant Program, Plos One, Herpetologica, Land, Biological Conservation, Remote Sensing, Oikos, Thallassia, Oecologia.

Project leadership examples

- NASA Ecological Program Project Review and Advisory Board
- Developing an approach to estimate invasive species (feral pig), emerging predators, and rare species using camera trapping and auditory receivers
- Developing a two-phase approach to diamondback terrapin population estimation
- Coordinated adaptive management program for Florida scrub-jay habitat and population management decision making
- Developed a research and monitoring program to predict and interpret how land cover and habitat management influenced Florida scrub-jay habitat and population dynamics
- Developed endangered species compensation plan for new spaceport development
- Developed spatially explicit Florida grasshopper sparrow metapopulation model
- Developed spatially explicit Florida scrub-jay population model to investigate land cover change
- Initiated a program to develop occupancy approaches to monitor southeastern beach mouse population viability and responses to management
- Developed modeling approach to predict how land cover and protected area conservation scenarios influenced eastern indigo snake population viability
- Conducted snake trapping studies on Avon Park Bombing Range
- Performed indigo snake telemetry studies on Avon Park Bombing Range and east central Florida
- Conducted analyses of eastern indigo snake home range, habitat use, movement and survival in relation to different land cover types
- Mentored graduate students on field studies and capture-recapture analyses of many wildlife species
- Assembled a scientific team to do a metapopulation analyses of the California least tern using data from Baja to Oregon
- Assembled a scientific team to do populations analyses of the Western snowy plover at Vandenberg Air Force Base
- Assembled a scientific team to summarize how metapopulations models were used to support landscape ecology and conservation planning internationally
- Quantified how upland and wetland bird assemblages varied based on fire and water management, land cover, and habitat structure

- Developed an approach to identify and prioritize wildlife species of special conservation concern for monitoring and research
- Performed impact studies of unauthorized habitat destruction to Florida scrub-jays as potential Endangered Species Act violations to aid law enforcement and prosecutors
- Characterized wildlife species of biodiversity concern on Vandenberg Air Force Station
- Investigated how gopher tortoise gopher tortoise densities were influenced by water table, vegetation composition, time-since-fire, and habitat structure
- Mentored high school student and teachers in NASA Education Programs (e.g. SHARP)
- Developed approaches to measure gopher tortoise burrow occupancy in different habitat types
- Conducted monitoring of wildlife responses to rocket launches on Kennedy Space Center and Cape Canaveral Air Force Station
- Assisted in the development of endangered species recovery plans
- Assisted in the development of habitat conservation plans and guidelines on habitat conservation plans
- Assisted in the development, administration, and publication of the Indian River Lagoon Biodiversity Symposium
- Developed a wildlife habitat relationship model to predict wildlife species composition by land cover type
- Characterized how groundwater regulatory changes could affect Kennedy Space Center operations and develop a compliance approach
- Preparing, reviewing, and editing NEPA documents
- Developing comments to proposed endangered species listings
- Reviewing laws, regulations, agreements, and NEPA documents to summarize Kennedy Space Center environmental monitoring requirements
- Developed an approach to monitor vegetation responses to space shuttle exhaust

Training

State and Transition Modeling using ST-SIM, Colin Daniels
Master in Business Administration (1/2 course work completed, Florida Institute of Technology)
Mark-recapture, Colorado State University
Habitat Evaluations Procedures, Colorado State University
Ecological Modeling, Colorado State University
Model Selection and Multi-Model Inference, David Anderson
Advanced ARC/INFO, ESRI
Global Positioning Systems, Trimble
ENVI Image Processing, Research Systems, Inc.
Fire Suppression and Standards for Survival, U.S. Fish and Wildlife Service
Interagency Prescribed Fire, Florida Department of Agriculture
Aircraft Safety, U.S. Fish and Wildlife Service
Population Risk assessment, Mark Burgman, Resit Akçakaya, Scott Ferson
Dozens of Environmental Law, Permitting & Regulatory classes
Certified Scuba Diver (>500 open water dives)
Hundreds of First Aid, CPR, and Safety classes

Thesis committees

2017 Population genetics of the Florida scrub-jay population at Kennedy Space Center
Cory Spern. M.S., Florida Institute of Technology

2013 Microspatial population structure, gene flow, and effective population size of southeasterm beach mice (*Peromyscus polionotus niveiventris*), Monica Zimmerman, M.S., Florida Institute of Technology

2013 Modeling survival of immature loggerheads (*Caretta caretta*) and green turtles (*Chelonia mydas*) from 10 years of mark-recapture data at the Florida Power and Light St. Lucie Plant. Andrew Turner, M.S. University of Central Florida

2012 Behavioral analysis of yellow rat snake (*Elaphe obsolete quadrivittata*), a predator of the threatened Florida scrub-jay (*Aphelocoma coerulescens*) in the Kennedy Space Center's Merritt Island National Wildlife Refuge. Angela Munoz. M. S. Florida Institute of Technology

Press, Educational and Outreach Programs.

Participated in newspaper articles, public radio, education and television news casts greater than 20 times. Recent examples include NASA Science Files, British Broadcasting Corporation, and Discovery Channel. Organized workshops on biodiversity, adaptive management, scrub biology, and fire management.

References.

Dr. Jim Nichols, Senior Scientist and Wildlife Biologist. USGS Patuxent Wildlife Research Center, 12100 Laurel Beech Forest Road, Laurel, Maryland 20708-4017. jnichols@usgs.gov, Phone 301-497-5660.
Dr. Reed Noss, Davis-Shine Professor of Conservation Biology, 4000 Central Florida Boulevard, University of Central Florida, Orlando, Florida 32816-2368. rnoss@mail.ucf.edu, Phone 321-823-0975.
Dr. Ross Hinkle, Vice Provost and Dean, Professor of Biology, , 4000 Central Florida Boulevard, University of Central Florida, Orlando, Florida 32816-2368. rhinkle@mail.ucf.edu, Phone 407- 823-6432.
Dr. Carlton Hall, Chief Scientist, Ecological Programs, Kennedy Space Center, Florida 32899. carlton.r.hall@nasa.gov, Phone 321- 321-861-0793.

Personal

Married, three children with strong participation in conservation
Excellent physical condition
Avocations: Surfing, weight-lifting, canoeing, kayaking, fishing, scuba diving, snorkeling, boating, camping, backpacking, skiing, photography, nature observation, marine life, Boy Scouts, coaching.

Primary Permit Holder:

U.S. Fish and Wildlife Service TE106005-4 Florida scrub-jay monitoring
U.S. Geological Survey Federal Bird Master Marking and Salvage Permit 22379.
NASA Institutional Animal Care and Use Committee Protocol GRD-06-043
Merritt Island National Wildlife Refuge Special Use Permit SUP 021

TAMMY E. FOSTER

EDUCATION:
Ph.D, Integrative Biology, University of South Florida, Tampa, FL, 2014
M.S., Botany, University of South Florida, Tampa, FL, 2002
B.S., Biology, Eastern College, St. David's, PA, 1996

PROFESSIONAL TRAINING:
Introduction to ArcView GIS, ESRI, 2000
Learning ArcGIS, ESRI, 2002
Migration from ArcView 3.x to ArcView 8, ESRI, 2002
Primer-E Multivariate Statistics Workshop, St. Petersburg FL, 2002
Grass and Sedge ID Workshop, Sarasota SWCD, 2002
Freshwater Wetland and Upland Restoration in the Southeastern Coastal Plain, University of Maine, 2005
Introduction to R, Coursera, 2015
Eddy Covariance Training, LiCor, 2015

AWARDS:
NASA Earth System Science Fellowship, 1998-2000
NASA Causeway Seawall Replacement Project: In recognition of your continued support of the KSC Environmental and /or Energy Program. Team Member, 2009

SUMMARY OF EXPERTISE:
Experience in conducting vegetation studies and surveys, as well as conducting plant physiological ecology research. Proficient in R, ArcGIS, Trimble GPS usage, GPS pathfinder, SigmaPlot, SPSS, Microsoft Office Products, dBase, and Endnote

PROJECT EXPERIENCE:
National Aeronautics and Space Administration, Kennedy Space Center, 2000-Present. Co-investigator. Collaborate on the design and implementation of a scrub restoration program for Kennedy Space Center. Monitor vegetation changes after combinations of cutting and burning to restore long-unburned scrub habitat. Monitor survival and growth of scrub species planted in former agricultural sites. Map acid and particulate deposition after shuttle launches. Conduct research on scrub oaks using dendrochronology and plant physiology techniques. Collaborate on design, data analysis, and writing of interdisciplinary projects in the Ecological Programs.

United States Air Force, 45th Space Wing, 2007-2010. Co-investigator. Monitor scrub vegetation changes for CCAFS scrub habitat restoration study.

United States Army Corps of Engineers, 2007. Principle investigator. Conduct surveys and prepare uniform mitigation assessments of wetlands and surface waters on land to be used for the Indian River Lagoon-South C-23/24 Stormwater Treatment Area in St. Lucie County, Florida.

United States Army Corps of Engineers, 2006. Co-investigator. Conduct surveys for threatened and endangered plants on land to be used for the Indian River Lagoon-South C-23/24 Stormwater Treatment Area and reservoir in St. Lucie County, Florida.

Brevard County Natural Resources Management Office, 2004-2005. Co-investigator. Conduct surveys for threatened and endangered scrub plants in Brevard County, Florida.

Brevard County Natural Resources Management Office, 2003-2004. Co-investigator. Conduct surveys for selected threatened and endangered plants in Brevard County, Florida.

National Park Service, Canaveral National Seashore, 2002-2004. Co-investigator. Compile floristic inventory and survey for threatened and endangered plants on Canaveral National Seashore, Florida.

United States Air Force, 45th Space Wing, 2000-2003. Co-investigator. Monitored vegetation changes after combinations of cutting and burning to restore long-unburned scrub habitat.

EXPERIENCE HISTORY:

2015-present, Plant Ecologist, Integrated Mission Support Services, Kennedy Space Center, FL

2009-2015, Plant Ecologist, InoMedic Health Applications, Kennedy Space Center, FL

2000- 2009, Plant Ecologist, Dynamac Corporation, Kennedy Space Center, FL.

1997-1999, Graduate Research and Teaching Assistant, University of South Florida, Biology Dept., Tampa, FL.

PRESENTATIONS AND ABSTRACTS:

Foster, T.E., P.A. Schmalzer, and G.A. Fox 2013. Climate-growth relationships for slash pine and two dominant oaks in Florida scrub. Abstract of presented paper. Florida Native Plant Society.

Foster, T.E., P.A. Schmalzer, and G.A. Fox. 2012. Changes in distribution and physiology of scrub oaks along a hydrologic gradient. Abstract of presented paper. 2012 Natural Areas Conference.

Foster, T.E., P.A. Schmalzer, and G.A. Fox. 2011. Site differences in growth response of *Quercus myrtifolia* to climate. Abstract of presented paper. Ecological Society of America Annual Meeting.

Foster, T.E., P.A. Schmalzer, and G. A. Fox. 2010. Correlation between climate and growth for Florida scrub oaks: A dendroecology study. Poster presented at Ecological Society of America Meeting, August 5, 2010, Pittsburgh, Pennsylvania. Abstract available online at http://www.esa.org.

Schmalzer, P.A. and T.E. Foster. 2010. Responses of long-unburned oak-saw palmetto scrub to repeated cutting or burning. Poster presented at Ecological Society of America Meeting, August 5, 2010, Pittsburgh, Pennsylvania. Abstract available online at http://www.esa.org.

Foster, T.E., G.A. Fox, and P.A. Schmalzer. 2008. Relationships between height growth and climatic variables for three Florida scrub oaks. Presentation at Ecological Society of America Meeting, August 8, 2008, Milwaukee, Wisconsin.

Foster, T.E., G.A. Fox, and P.A. Schmalzer. 2008. Relationships between height growth and climatic variables for three Florida scrub oaks. Abstract of presented paper. Ecological Society of America Annual Meeting. Published on CD.

Schmalzer, P.A. and T.E. Foster. 2007. The role of disturbance in maintaining rare scrub plants: Examples from Brevard County, Florida. Presentation to Florida Native Plant Society Annual Conference, Gainesville, Florida, April 21, 2007.

Schmalzer, P.A. and T.E. Foster. 2007. Responses of Florida oak scrub vegetation to multiple cycles of cutting and burning. Abstract of presented poster. Ecological Society of America/Society for Ecological Restoration International Joint Meeting. Published on CD.

Foster, T.E. and P.A. Schmalzer. 2006. The importance of county-acquired lands for the persistence of rare scrub plants in Brevard County, Florida. Presentation at Florida Academy of Sciences Meeting, Florida Institute of Technology, Melbourne, Florida, March 10, 2006.

Foster, T.E. and P.A. Schmalzer. 2006. The importance of county-acquired lands for the persistence of rare scrub plants in Brevard County, Florida. Abstract of presented paper in: Florida Scientist 69 (Supplement 1): 70-71.

Foster, T.E. and P.A. Schmalzer. 2005. Preliminary characterization of habitat for rare scrub plants in Brevard County, Florida. Poster presentation Ecological Society of America 90th Annual Meeting, August 11, 2005, Montreal, Quebec, Canada.

Foster, T.E. and P.A. Schmalzer. 2005. Preliminary characterization of habitat for rare scrub plants in Brevard County, Florida. Abstract of presented poster in: Ecological Society of America 2005 Annual Meeting Abstracts. p. 199.

Schmalzer, P.A. and T.E. Foster. 2005. Flora and rare plants of Canaveral National Seashore. Abstract of presented paper in: Technical Bulletin of the Florida Mosquito Control Association 6:20.

Schmalzer, P.A., and T.E. Foster. 2004. Flora and rare plants of Canaveral National Seashore. Abstract of presented paper in: Florida Native Plant Society 24th Annual Conference Program, Lake Buena Vista, Florida. p. 5.

Schmalzer, P.A. and T.E. Foster. 2004. Rare plants of Canaveral National Seashore. Abstract of presented paper in: Florida Scientist 67(Supplement 1): 48-49.

Foster, T.E. and P.A. Schmalzer. 2003. The effect of season of fire on the recovery of Florida scrub. Presentation at Second International Wildland Fire Ecology and Fire Management Congress, Orlando, Florida, November 18, 2003.

Foster, T. E. and P. A. Schmalzer. 2003. The effect of season of fire on the recovery of Florida scrub. Presentation at Ecological Society of America Meeting, August 4, 2003. Savannah, Georgia.

Foster, T. E. and P. A. Schmalzer. 2003. The effect of season of fire on the recovery of Florida scrub. Abstract of presented paper in: Ecological Society of America 2003 Annual Meeting Abstracts. p. 111.

Schmalzer, P.A. and T.E. Foster. 2003. Characteristics of long-unburned scrub on the Merritt Island/Cape Canaveral barrier island complex before restoration. Abstract of presented poster in: Ecological Society of America 2003 Annual Meeting Abstracts. p. 299.

Schmalzer, Paul A., T. E. Foster, S. R. Turek, and C. A. Dunlevy. 2002. Dynamics of openings in Florida oak-saw palmetto scrub created by intense localized burning. Abstract of presented paper in: Southeastern Biology 49(2): 194.

Dreschel, T.W., T.E. Foster, and C.R. Hall. 2001. A ground-based test bed for evaluating plant remote sensing technologies. Abstract of presented paper in: Florida Scientist 64 (Suppl. 1):18-19.

Foster, T.E. and J.R. Brooks. 2001. Water-use efficiency of twelve species in the Florida scrub. Abstract of presented paper in: Florida Scientist 64 (Suppl. 1):19.

Foster, T.E. and J.R. Brooks. 2001. Water use of eleven species in the Florida scrub. Presentation to Florida Scrub Symposium 2001. Abstract of presented paper in: Program of the Florida Scrub Symposium 2001. p. 19.

Foster, T. E. and J. R. Brooks. 2001. The robustness of physiologically based functional groups in Florida scrub. Abstract of presented paper in: Ecological Society of America 2001 Annual Meeting Abstracts. p. 92.

Schmalzer, P.A., S.R. Turek, T.E. Foster, C. A. Dunlevy, and F. W. Adrian. 2001. Reestablishing Florida scrub in a former agricultural site: Survival and growth of planted species. Abstract of presented paper in: Ecological Society of America 2001 Annual Meeting Abstracts. p. 200.

PUBLICATIONS:

Foster, T. E. and J. R. Brooks. 2001. Long-term trends in growth of *Pinus palustris* and *Pinus elliottii* along a hydrological gradient in central Florida. Can. J. For. Res. 31(10): 1661-1670.

Foster, T.E. and J.R. Brooks. 2001. Water use efficiency of eleven species in the Florida scrub. Pp. 41-43 *in* D. Zattau. (ed.). Proceedings of the Florida Scrub Symposium 2001. U.S. Fish and Wildlife Service. Jacksonville, Florida. 63 p.

Duncan, B.W., P.A. Schmalzer, and T.E. Foster. 2002. Mapping shuttle launch clouds at KSC. GeoSpatial Solutions 12(11): 32-37.

Foster, T.E. 2002. Functional groups based on leaf physiology: Are they spatially and temporally robust [thesis]. Tampa, FL: University of South Florida. 83 p.

Foster, T.E. and J.R. Brooks. 2002. Identifying plant functional groups based on leaf physiology in the Florida Scrub: Are they spatially and temporally robust? NASA TM-2002-211174. 84 p.

Schmalzer, P.A., T.E. Foster, and B.W. Duncan. 2002. Revised flora and list of threatened and endangered plants for the John F. Kennedy Space Center area, Florida. NASA TM-2002-211175. 75 p.

Schmalzer, P.A., S.R. Turek, T.E. Foster, C.A. Dunlevy, and F.W. Adrian. 2002. Reestablishing Florida scrub in a former agricultural site: Survival and growth of planted species and changes in community composition. Castanea 67:146-160.

Foster, T.E. and P.A. Schmalzer. 2003. The effect of season of fire on the recovery of Florida scrub. In: Proceedings of the Second International Wildland Fire Ecology and Fire Management Congress, American Meteorological Society, Published on CDROM and at http://www.ametsoc.org.

Schmalzer, P.A. T. E. Foster, and F.W. Adrian. 2003. Responses of long-unburned scrub on the Merritt Island/Cape Canaveral barrier island complex to cutting and burning. In: Proceedings of the Second International Wildland Fire Ecology and Fire Management Congress, American Meteorological Society, Published on CDROM and at http://www.ametsoc.org.

Dreschel, T.W., C.R. Hall, and T.E. Foster. 2004. Demonstration of a porous tube hydroponic system to control plant moisture and growth. NASA TM2004-211533. 21 p.

Dreschel, T.W., C.R. Hall, T. E. Foster, M. Salganic, L. Warren, and M. Corbett. 2005. Examining Dehydration and Hypoxic Stress in Wheat Plants Using a Porous Tube Plant Nutrient Delivery System Developed for Microgravity. Paper number 05ICES-64, The International Conference on Environmental Systems, Rome, Italy, July 2005.

Foster, T.E. and J.R. Brooks. 2005. Functional groups based on leaf physiology: are they spatially and temporally robust? Oecologia 144: 337-352.

Foster, T.E. and P.A. Schmalzer. 2012. Growth *of Serenoa repens* planted in a former agricultural site. Southeastern Naturalist 11(2): 331-336

Foster, T.E. 2014. Water availability as the driving factor of growth and physiological function of co-occurring scrub species in central Florida [dissertation]. Tampa, FL: University of South Florida. 142 p.

Foster, T.E., P.A. Schmalzer, and G.A. Fox. 2014. Timing matters: The seasonal effect of drought on tree growth. Journal of the Torrey Botanical Society 141(3):225-241.

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Schmalzer, P.A., and T.E. Foster. 2016. Flora and threatened and endangered plants of Canaveral National Seashore, Florida. CASTANEA 81(2) 91-127.

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RESUME

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Education

BS in Biology
SUNY at Geneseo
1968

MS in Bio-Environmental Oceanography
Florida Institute of Technology
1981

Experience

Peace Corp Volunteer
Philippines
1970-1972

High School Science Teacher
Martin County High School
Stuart, FL
1976-1979

High School Science Teacher
Melbourne High School
Melbourne, FL
1981-1990

Park Ranger/Naturalist
Turkey Creek Sanctuary
Palm Bay, FL
1993-2016

Profession organizations

Turkey Creek Sanctuary Committee
Marine Resource Council
Sea Turtle Preservation Society
Florida Audubon Society

Current Volunteer (2018)

Turkey Creek Sanctuary
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CURRICULUM VITAE

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EDUCATION

Ph.D., University of Miami; Marine Geology and Geophysics
M.S., University of Iowa; Geology
B.S., Cornell College; Environmental Science

LICENCES

Registered Professional Geologist (PG1054), State of Florida
Professional Geology Business (GB797), State of Florida

EMPLOYMENT

2016 to present	*Research Associate Professor* Sea Level Solutions Center Florida International University
2016 to present	*Courtesy Assistant Research Professor* Department of Biology University of Central Florida
2006 - present	RWParkinson Consulting Inc. *President* Principal of firm specializing in geologic and environmental issues associated with the management and protection of coastal resources.
2012 – 2016	Environmental Remediation & Recovery *Director, Division of Coastal Zone and Watershed Management* Design and construction of watershed BMPs to reduce surface water impairment and restore habitat. Conduct vulnerability assessments and other adaptation activities to address climate change/sea level rise.

Conservation land management and restoration; public education and outreach.

2000 - 2006 Coastal Technology Corporation
Senior Geologist and Laboratory Director
Assess the cause and consequence of coastal erosion. Design and direct geological investigations of coastal zone using bathymetric, seismic, vibracore, and grab sample surveys. Conduct environmental impact assessments associated with coastal urbanization and sea level rise.

2000 Summer Faculty Fellowship
NASA Kennedy Space Center
Conducted applied research on conservation-land and wetland management issues.

1993 - 2000 Associate Professor
Florida Institute of Technology

1995 - 1996 Fulbright Scholar
American Republics Research Program

1987 - 1993 Assistant Professor
Florida Institute of Technology

PUBLICATIONS AND REPORTS

Peer Reviewed Publications

Meeder, J.F., Parkinson, R.W., Ross, M.S., Kominoski, J.S., and Castaneda, S. Submitted. Changing Organic Carbon Storage in Response Accelerating Sea Level Rise, Southeast Saline Everglades, Florida, USA. Nature Geoscience.

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Parkinson, R., and Perez-Bedmar, M., 1996. The Florida Mangrove Trimming Law: Seasonal

Restrictions are One Solution to this Complex Management Issue. 3rd Marine and Estuarine Shallow Water Conference, United States Environmental Protection Agency, Atlantic City, N.J.

Perez-Bedmar, M., and Parkinson, R., 1996. Effects of Selective Trimming on Litter Fall in a Fringing Red Mangrove Forest, East Central Florida, USA. 3rd Marine and Estuarine Shallow Water Conference, United States Environmental Protection Agency, Atlantic City, N.J.

Perez-Bedmar, M., and Parkinson, R., 1996. Impact Assessment of Selective Trimming on Mangrove Primary Productivity, Habitat Value and Ecosystem Function, St. Lucie County, Florida. Third Workshop on Salt marsh Management and Research, Florida Coordinating Council on Mosquito Control, Vero Beach, Florida.

Parkinson, R., David, J., and Haydt, P., 1996. Effects of Predicted Sea-Level Rise on Wetland Management and Mosquito Control. Third Workshop on Salt Marsh Management and Research, Florida Coordinating Council on Mosquito Control, Vero Beach, Florida.

Wiegman, G., and Parkinson, R., 1996. Effects of Rotary Ditching on Salt Marsh Sedimentation, Vegetation Community Succession and Mosquito Control, Volusia County, Florida. Third Workshop on Salt marsh Management and Research, Florida Coordinating Council on Mosquito Control, Vero Beach, Florida.

Nelson, W., Parkinson, R., Eilers, M., Karlen, D., Wiegman, G., and Traudt, B., 1996. Estuarine Reconnection of a Salt Marsh Creek: Part I. Project Overview and Effects on Water Quality. Florida Coordinating Council on Mosquito Control, Third Workshop on Salt marsh Management and Research, Vero Beach, Florida, 22-25 October 1996.

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Karlen, D., Eilers, M., Nelson, W., Parkinson, R., and Wiegman, G., 1996. Estuarine Reconnection of a Salt marsh Creek: Part III. Effects on Fishes and Macro-Crustaceans. Florida Coordinating Council on Mosquito Control, Third Workshop on Salt marsh Management and Research, Vero Beach, Florida.

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Snedaker, S., and Parkinson, R., 1987. Potential Effects of Climate Change on Mangroves with Specific Reference to Global Warming and Sea Level Rise. Proceedings, IOC/WESTPAC Symposium on the Indo-Pacific Convergence, Townsville, Australia.

Parkinson, R., 1986. Reevaluation of Southwest Florida's Coastal Response to Rising Sea Level: Evidence for Progradation. Soc. Econ. Paleontologists and Mineralogists Midyear Mtg. Abstracts, v. 3, p. 87.

Parkinson, R., 1985. Holocene Sedimentation and Coastal Response to Rising Sea Level Along a Low Energy Coastline, Southwest Florida. Geol. Soc. Am. Abstracts with Programs, v. 17, p. 685.

Reports

Parkinson, R., and Seidel, V., 2018. Risk-Based Vulnerability Assessment of the Indian River Lagoon – Interim Report. Submitted to the Indian River Lagoon Council. 10 pgs.

Seidel, V., and Parkinson, R., 2014. Prioritizing Total Maximum Daily Loads (TMDLs) Using Seagrass Habitat Vulnerability to Sea Level Rise. Saint Johns River Water Management District, Palatka, Florida: Phase II.

Seidel, V., and Parkinson, R., 2013. Prioritizing Total Maximum Daily Loads (TMDLs) Using Seagrass Habitat Vulnerability to Sea Level Rise. Saint Johns River Water Management District, Palatka, Florida: Phase I.

Parkinson, R.W. 2010. Municipal Adaptation to Sea-Level Rise: City of Satellite Beach, Florida. City of Satellite Beach, Florida.

Ernest, R., and Parkinson, R., 2010. Implementing Sediment Quality Assurance Measures for the Bathtub Beach Restoration Project, Hutchinson Island, Florida. Martin County, Stuart, Florida.

Parkinson, R.W., 2008. Geological Assessment of Pine Island Conservation Area. Environmentally Endangered Lands Committee, Brevard County Florida.

Parkinson, R. 2008. Spoonbill Bay Cumulative Impact Assessment of Geohazards. Spoonbill Bay Holdings, LP, Galveston, Texas.

Parkinson, R., 2008. Report of Investigation - Reach 8 Offshore Sand Search Survey. Surfrider Foundation, Inc.

Parkinson, R., 2008. Report of Investigation - Reach 7 Project Performance Assessment. Surfrider Foundation, Inc.

Parkinson, R., 2007. Report of Investigation - Reserve at Bay Harbor Development Geohazards Cumulative Impact Assessment – Phase II. Rush Development, LP, Katy, Texas.

Parkinson, R., 2007. Report of Investigation - Reserve at Bay Harbor Development Geohazards Cumulative Impact Assessment – Phase I. Rush Development, LP, Katy, Texas.

Parkinson, R., 2006. Report of Investigation - Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment. MRD Associates, Destin, Florida.

Parkinson, R. 2005. Report of Investigation - Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment. Volusia County.

Parkinson, R., 2004. Report of Investigation - Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment, Phase II. Santa Rosa County.

Parkinson, R., 2003. Report of Investigation - Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment. Sarasota and Charlotte Counties.

Parkinson, R., 2002. Report of Investigation - Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment, Phase I. Santa Rosa County.

Parkinson, R., Magron, J., and Lucas, L., 1999. Physical Attributes of a Natural (Control) and Renourished (Treatment) Beach, Sebastian Inlet, Florida, Year 7. Sebastian Inlet Tax District Commission.

Parkinson, R.W., and Lucas, L., 1998. Biological Monitoring Programs: Marine Turtles-Physical Attributes Sebastian Inlet, Florida. Sebastian Inlet Tax District Commission.

Parkinson, R.W., Magron, J.P., and Rozycki, J., 1998. Physical Attributes of a Natural (Control) and Renourished (Treatment) Beach, Sebastian Inlet, Florida, Year 6. Sebastian Inlet Tax District Commission.

Parkinson, R., and Dunlevy, C., 1999. Action Plan for the Shoreline Stabilization of Pelican Island. U.S. Fish and Wildlife Service Technical Report.

Parkinson, R., Bumstead, T., and Dunlevy, C., 1999. A Preliminary Assessment of the Surman Tract: Recent and Historical Landscape Features. U.S. Fish and Wildlife Service Technical Report.

Parkinson, R., Wiegman, G., and Dunlevy, C., 1997. Development of Restoration and Management Plans: Pelican Island and Surman Tract: Project Status Report. Unpublished Report Submitted to United States Fish and Wildlife Service, Sabastian, Florida.

Parkinson, R., and Perez-Bedmar, M., 1996. Effects of Selective Trimming on Litter Fall in a Fringing Red Mangrove Forest, Indian River Lagoon. Florida Department of

Environmental Protection.

Parkinson, R., and Wiegman, G.J., 1996. Characterization of Sand Trap Sediment, Sebastian Inlet, Florida. Sebastian Inlet Tax District Commission.

Parkinson, R., and Nelson, W.G., 1995. Evaluation of the Effectiveness of Salt Marsh Restoration with Rotary Ditching. East Volusia County Mosquito Control District.

Parkinson, R., Fluke, L.A., 1995. Characterization of Surficial Sediment, Sebastian Inlet Sand Trap. Sebastian Inlet Tax District Commission.

Parkinson, R., and Nelson, W.G., 1995. Annual Technical Report: Biological Monitoring Programs. Sebastian Inlet Tax District Commission.

Parkinson, R., and Fluke, L.A., 1994. Environmental Evaluation of Northern Route for the Proposed Navigation Channel Extension to the Inter-Coastal Waterway. Sebastian Inlet Tax District Commission.

Parkinson, R., and Nelson, W.G., 1994. Annual Technical Report. Biological Monitoring Programs: Sebastian Inlet Tax District Commission.

Parkinson, R., Wiegman, G.J., 1994. Geotechnical Analysis: Channel Extension Project Technical Report. Sebastian Inlet Tax District Commission.

Parkinson, R., 1993. Characterization of Surficial Sediment, Sebastian Inlet Sand Trap. Sebastian Inlet Tax District Commission.

Parkinson, R., and Fluke, L.A., 1993. Geotechnical Analysis of Core Borings, Taylor Creek Area, Ft. Pierce, Florida. Harbor Branch Oceanographic Institution.

Parkinson, R., and Nelson, W.G., 1993. Annual Technical Report: Biological Monitoring Programs. Sebastian Inlet Tax District Commission.

Parkinson, R., and Nelson, W.G., 1993. Environmental Base-Line Study of Lost Creek and Ten Mile Creek, Volusia County, Florida. East Volusia County Mosquito Control District.

Parkinson, R., 1992. Physical Attributes of a Natural (Control) and Renourished (Treatment) Beach, Sebastian Inlet, Florida - Year 1. Sebastian Inlet Tax District Commission.

Parkinson, R., 1992. Preliminary Environmental Assessment of the Proposed Navigation Channel

Extension to the Intracoastal Waterway: Physical Assessment. Sebastian Inlet Tax District Commission.

Parkinson, R., 1992. Geologic History of St. Lucie County Mosquito Control Impoundment 10A. St. Lucie County Mosquito Control District.

Parkinson, R., and Nelson, W., 1992. Annual Technical Report: Biological Monitoring Programs. Sebastian Inlet Tax District Commission.

Parkinson, R.W., 1991. Moisture and Grain Size Characteristics of a Renourished and Control Beach. Sebastian Inlet Tax District Commission.

Parkinson, R., and Nelson, W., 1991. Annual Technical Report: Biological Monitoring Programs. Sebastian Inlet Tax District Commission.

Parkinson, R.W., 1990. Summary Report of Sebastian Inlet Ebb Shoal Core Borings. Sebastian Inlet Tax District Commission.

Parkinson, R., and Nelson, W., 1990. Annual Technical Report: Biological Monitoring Programs. Sebastian Inlet Tax District Commission.

Parkinson, R., Wang, T., David, J., 1990. Pesticide Residue in Barrier Island Salt Marshes Along the Indian River Lagoon. Coastal Zone Management Program, Florida Department of Environmental Regulation.

Parkinson, R., 1988. Turbidity Monitoring of Sebastian Inlet Channel Dredging Project Final Report. Sebastian Inlet Tax District Commission.

OTHER MEDIA

Radio

Smart Growth: Cities versus Natural Disasters: Retreat or Resist? National Public Radio Cities Project. National Building Museum, Washington D.C. October 22, 2014. http://go.nbm.org/site/Calendar/1029868583?view=Detail&id=117861

A Coastal Paradise Confronts Its Watery Future. All Things Considered, National Public Radio. September 18, 2014. http://www.npr.org/2014/09/18/348985568/a-coastal-paradise-confronts-its-watery-future

Newspaper

Everglades under threat as Florida's mangroves face death by rising sea level. The Guardian. May 2, 2018. https://www.theguardian.com/us-news/2018/may/02/mangroves-everglades-florida-rising-sea-level.

The World is Warming and Waiting for Science. Orlando Sentinel. January 23, 2011. http://articles.orlandosentinel.com/2011-01-23/news/os-ed-climate-change-guest-012311-20110121_1_climate-change-dengue-fever-global-warming

Global Warming has been Confirmed. The Florida Times-Union. June 14, 2011. http://jacksonville.com/opinion/letters-readers/2011-06-14/story/guest-column-global-warming-has-been-confirmed

YouTube

Mangroves. Produced by 4Ocean. https://www.facebook.com/4oceanBracelets/videos/279592256099928/. Posted September 14, 2018.

Indian River Lagoon Seagrass Resilience Under Conditions of Rising Sea Level. http://youtu.be/dEwJ4I0ru38 (posted November 29, 2014)

Climate Change and Recreational Boating in Florida. https://www.youtube.com/watch?v=ZheBNRdujDo (posted July 12, 2012)

Adapting Coastal Communities to Sea-Level Rise: Why Isn't Anybody Doing Anything? https://www.youtube.com/watch?v=0i5800yNYLE (posted April 6, 2012)

CONTRACTS

In review	Improving Confidence in Forecasting Wetland Resilience to Accelerating Sea-Level Rise. NOAA RESTORE. $1,839,116.
In review	Scott Run Watershed Protection and Restoration Stage II: BMP Construction. PA DEP Growing Greener Program. $1,105,491.
2016-2020	Stabilize and Protect South Florida Archeological Sites with Integrated Ecosystem Restoration. National Park Service. $225,000.
2018	Risk-Based Vulnerability Assessment of the Indian River Lagoon to Climate

Change and Sea-Level Rise – Phase 2. Indian River Lagoon National Estuary Program. $52,000.

2017 Coastal Zone Management Plan. Rhum Cove Condominium Association. $6,500.

2017 Risk-Based Vulnerability Assessment of the Indian River Lagoon to Climate Change and Sea-Level Rise – Phase 1. Indian River Lagoon National Estuary Program. $24,700.

2017 Coastal Working Group, Martin County, Florida, $20,000

2017 Coastal Zone Land Management Plan. Rhum Cove Condominium Association. $6,240.

2016 Erie Bluff State Park Trail Improvements – Part 2. PA Department of Community and Economic Development, $45,000.

2016 Erie Bluff State Park Trail Improvements – Part 1. Erie County. $34,000

2016 Trout Run Channel and Creek Bank Stabilization Using BMPs. PA Department of Community and Economic Development, $59,000

2016 Coastal Working Group, Martin County, Florida, $20,000

2015 Scott Run Watershed Protection and Restoration. PA Growing Greener 2014 Grant Program, $132,795

2015 Coastal Working Group. Martin County, Florida, $20,000

2014 Coastal Working Group. Martin County, Florida, $20,000

2013 Effect of Sea-Level Rise on Indian River Lagoon Seagrass Habitat – Phase II: Climate Ready Estuaries Program. US EPA, $27,000

2013 Walnut Creek Watershed Riparian Buffer Re-Vegetation. Pennsylvania Sea Grant, $30,363

2012 Effect of Sea-Level Rise on Indian River Lagoon Seagrass Habitat – Phase I:

Climate Ready Estuaries Program. US EPA, $22,000

2011 Geologic Investigation of Potential Borrow Areas Offshore Singer Island Site, Palm Beach County Florida. Taylor Engineering, Inc., $48,500

2011 Sand Trap Compatibility with Native Beaches, St. Lucie Inlet. Atkins, $8,000

2011 Coastal Working Group: Martin County, Florida, $27,000

2010 Upham T-Groin Performance Evaluation: Surfrider Foundation, $5,000

2010 Building Public Consensus on Issues of Beach Fill Compatibility and Near Shore Habitat Quality. Martin County, Florida, $24,000

2010 Real-Time Sediment Testing of Fill During Beach Nourishment. Martin County, Florida, $3,500

2010 Geologic Mapping of Cumberland Island National Seashore. National Park Service, $41,000

2009 Assessing Municipal Vulnerability to Predicted Sea-Level Rise: City of Satellite Beach, Florida. Climate Ready Estuaries Program: Department of Environmental Protection, $20,000

2009 Port Dolphin Geotechnical. Taylor Engineering, $25,000

2009 Geological Assessment of the USACE Offshore Sand Search for Martin County. Martin County, Florida, $29,000

2009 Analysis of Geotechnical Criteria Relating to Coastal Restoration Project Performance. Martin County, Florida, $10,000

2009 Building Public Consensus on Issues of Beach Fill compatibility and Nearshore Habitat Quality. Martin County, Florida, $24,000

2008 Spoonbill Bay Development Geohazards Assessment. Spoonbill Bay Holdings, LP, Galveston, Texas, $16,000

2008 Coastal Working Group Facilitator. Martin County Florida, $45,000

2008	Reach 8 Geological Investigation. Surfrider Foundation, Inc., $5,000
2008	Reach 7 Geological Investigation. Surfrider Foundation, Inc., $9,000
2008	Geological Assessment of Pine Island Conservation Area. Brevard County, Florida, $9,500
2007	Reserve at Bay Harbor Development Geohazards Assessment – Phase I and II. Rush Development, LP, Katy, Texas, $20,000.
2006	Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment. Gulf County, Florida, $45,000
2006	Geological Map of Canaveral National Seashores. United States National Park Service, $25,000
2004	Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment. Volusia County, Florida, $1,500,000
2002	Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment. Sarasota and Charlotte Counties, Florida, $75,000
2000	Offshore Sand Search, Native Beach Characterization, and Compatibility Assessment, Phase I and II. Santa Rosa County, Florida, $275,000
1999	Wetlands Initiative - Historical Marsh Accretion Rates. United States Environmental Protection Agency, $45,000
1998	Environmental Impact Assessment. Sebastian Inlet Tax District, Brevard County, Florida, $200,000
1997	Proposal for the Development of Restoration and Management Plans: Pelican Island and Surman Tract. United States Fish and Wildlife Service (USFWS), $49,000
1997	Environmental Impact Assessment of Mangrove Trimming in the Southern Indian River Lagoon. United States Fish and Wildlife Service (USFWS), $42,045

1997 Evaluation of Physical and Biological Effects of Beach Nourishment on Sea Turtle Nesting and Hatching Success. Sebastian Inlet Tax District, Brevard County, Florida, $68,000

1996 Evaluating the Effects of Selective Trimming on Mangrove Productivity. United State Fish and Wildlife Service, $43,000

1996 Geotechnical Evaluation of Sebastian Inlet Sand Trap. Sebastian Inlet Tax District, Brevard County, Florida, $15,000

1996 Biological Monitoring of Sebastian Inlet. Sebastian Inlet Tax District, Brevard County, Florida, $140,000

1996 Evaluation of Physical and Biological Effects of Beach Nourishment on Sea Turtle Nesting and Hatching Success. Sebastian Inlet Tax District, Brevard County, Florida, $64,000

1995 Evaluation of Physical and Biological Effects of Beach Nourishment on Sea Turtle Nesting and Hatching Success. Sebastian Inlet Tax District, Brevard County, Florida, $60,000

1995 Effects of Selective Trimming on Macro-Benthos and Algae. Florida Sea Grant, $18,000

1995 Project Extension: Evaluation of Permitted Mangrove Pruning on Productivity and Habitat Value. U.S. Environmental Protection Agency, $20,000

1995 Shoreline Stabilization of Spoil Islands. A Pilot Project: St. Johns River Water Management District, $15,000

1994 Evaluation of Permitted Mangrove Pruning on Productivity and Habitat Value. U.S. Environmental Protection Agency, Florida Department of Environmental Protection, St. Johns River Water Management District, and South Florida Water Management District, $60,000

1994 Environmental Monitoring of Sebastian Inlet. Sebastian Inlet Tax District Commission, Brevard County, Florida, $224,000

1994 Physical and Biological Assessment of Sebastian Inlet Rock Reefs. Sebastian Inlet

Tax District Commission, Brevard County, Florida, $30,000

1993 Geotechnical Assessment of Proposed Ft. Pierce Turning Basin. Harbor Branch Oceanographic Institution, Ft. Pierce, Florida, $11,000

1993 Physical Attributes of a Renourished and Natural Beach, Sebastian Inlet, Florida, Sebastian Inlet Tax District, Brevard County, Florida, $14,500

1992 Environmental Monitoring Program, Sebastian Inlet. Sebastian Inlet Tax District Brevard County, Florida, (with Walter Nelson, FIT): $130,000

1992 Natural Resource Assessment of Proposed Navigation Channel Extension, Sebastian Inlet. Sebastian Inlet Tax District Brevard County, Florida, (with Walter Nelson, FIT): $14,500

1992 Physical Attributes of a Renourished and Natural Beach, Sebastian Inlet, Florida. Sebastian Inlet Tax District, Brevard County, Florida, $13,000

1992 Evaluation of the Effectiveness of Salt Marsh Restoration with Rotary Ditching. East Volusia County Mosquito Control (with Walter Nelson, FIT), $20,000

1991 Geological Investigation of St. Lucie County Mosquito Control Impoundment 10A. St. Lucie County Mosquito Control, $5,000

1991 Habitat and Water Quality Monitoring of the Sebastian Inlet Area. Sebastian Inlet Tax District Commission, Brevard County, Florida, $54,000

1991 Shoreface Sediment Distribution Patterns: A Measure of Inlet Influence? National Oceanographic and Atmospheric Administration, $41,100

1991 Grain Size Analysis of Nourished and Control Beach Sites: Sebastian Inlet, Florida. Sebastian Inlet Tax District Commission, Brevard County, Florida, $5,800

1990 Core Borings of the Sebastian Inlet Ebb Shoal. Sebastian Inlet Tax District Commission, Brevard County, Florida, $15,000

1989 A Five Year Biological Monitoring Program of the Sebastian Inlet Area. Sebastian Inlet Tax District Commission Brevard County, Florida, (with Walter Nelson, FIT),

$170,000

1989 Core Borings and Sediment Analysis of the Fort Pierce Harbor Area. Beindorf and Associates (with Lee Harris, FIT), $6,000

1989 Pesticide Residue in Barrier Island Salt Marshes along the Indian River Lagoon. Department of Environmental Regulation (with Tsen Wang, HBOI), $98,000

1988 Turbidity Monitoring of Sebastian Inlet Channel Dredging. Sebastian Inlet Tax District Commission, Brevard County, Florida, $15,000

INVITED LECTURES (select examples)

Effect of Anthropocene Sea-Level Rise on the Plant Communities, Soils, and Carbon Dynamics: Northern Reach of the Southeast Saline Everglades, Florida, USA. Biscayne Bay Regional Restoration and Coordination Team Meeting, Miami, Florida (July 18, 2018).

If the Protect and Defend Strategy Won't Save Florida From Rising Seas, What Will? Florida Institute of Technology, Melbourne, Florida (February 10, 2016).

Florida Sea Level: Past, Present, and Future. Florida Public Archaeology Network (December 9, 2015).

Managing Sea Level Rise in the State of Florida. University of North Florida, Jacksonville, Florida (November 19, 2015).

Managing the Anthropocene Marine Transgression to the Year 2100 and Beyond in the State of Florida. University of Miami, Miami, Florida (November 12, 2015).

City of Satellite Beach Vulnerability to Rising Seas: Assessment and Management Implications. Florida International University, Miami, Florida (November 6, 2015).

Adapting to Rising Sea Level and Extreme Weather Events. East-Central Florida Regional Planning Council Florida Atlantic University, Boca Raton, Florida (March 31, 2009).

Adapting to Rising Sea Level – a Florida Perspective: Sixth International Sustainability Forum – Sustainability 2009: The Next Horizon. Florida Institute of Technology, Melbourne, Florida (March 3 – 4, 2009).

A 100,000 Year History of Florida's East Coast Beaches and Barrier Islands: Archbold Biological Station, Lake Placid, Florida (1998).

Mangrove Pruning and Permitting: Florida Chapter, International Society of Arboriculture, Gold Coast Tree Seminar, Davie, Florida (1996).

Regional Coastal Geology of Costa Rica: University of Costa Rica, San Pedro, Costa Rica (1996).

Effects of Pruning Mangroves: National Estuary Program, Stuart, Florida (1995).

Sea Level Rise and the Fate of Mangrove Forests in the Wider Caribbean Region: Department of Geology, University of Iowa, Iowa City, Iowa. October (1994)

Management of Coastal Biodiversity from a Geological Perspective: Biodiversity Workshops, Indian River Lagoon National Estuary Program, Environmental Protection Agency. Harbor Branch Oceanographic Institute, Ft. Pierce, Florida (1994).

Beaches and Barrier Islands: A 100,000 Year History of Florida's East Coast: Bionetics Environmental Studies Center. Cape Canaveral, Florida (1993).

Building a Conceptual Model of Mangrove Ecosystem Response to Global Climate Change: Sea Level Rise and the Geologic Record: Keynote address, EPA Workshop, Sarasota, Florida (1992).

An Overview of Micro Tidal Inlet Sediment Dynamics: Eight Annual Coastal Management Seminar, IFAS, Fort Pierce, Florida (1990).

Holocene Evolution of the Southwest Florida Coast: Department of Geology, University of South Florida, Tampa/St. Petersburg, Florida (1988).

PROFESSIONAL SERVICES

2018	Chair, Beautification and Energy Efficiency Board, City of Melbourne, Florida
2017 to present	Scientific Advisor, Cape Canaveral Sustainability Working Group
2015 to present	Technical Advisor, City of Satellite Beach Resilient Community Program

2006 to present	Administrator, Space Coast Climate Change Initiative
1991 to present	Member and Chair, Brevard County Environmentally Endangered Lands Selection and Management Committee
2015 to 2016	Chair, Climate Science, Risk & Adaptation Planning, Curriculum Working Group, Association of Climate Change Officers
1993 to 2006	Member, Conference Planning Committee and Co-Sponsor, Florida Shore and Beach Preservation Association
2000 to 2005	Member, Coastal Engineering Technical Advisory Committee, Florida Department of Environmental Protection
1993 to 2005	Member, Advisory Board of the Florida Shore and Beach Preservation Association
1992 to 2005	Associate Editor, Journal of Coastal Research
1995 to 2000	Research Committee Member, Florida Archie Carr National Wildlife Refuge
1993 to 1996	Member, Technical Advisory Committee, National Marine Debris Monitoring Program, U.S. Environmental Protection Agency
1994 to 1995	Science Subcommittee Co-chair, Mangrove Technical Advisory Committee, Florida Department of Environmental Protection
1991 to 1993	Member, Brevard County Committee on Beach Improvement, Tourist Development Council

PROFESSIONAL MEMBERSHIPS

American Geophysical Union
Geological Society of America
Society of Sedimentary Geology

ACADEMIC INFORMATION

Courses Taught

Shelf Sedimentation (graduate)
Coastal Sedimentary Environments (graduate)
Coastal and Estuarine Processes (graduate)
Depositional Environments (graduate)
Geology of Florida (graduate)
Geology of Tropical Marine Environments (graduate)
Geological Oceanography (undergraduate and graduate)
Descriptive Physical Oceanography (undergraduate)
Introduction to Oceanography (undergraduate)
Physical Geology (undergraduate)
Environmental Geology (undergraduate)

Thesis and Dissertations Directed

Lucas, Lori L., 2000, Results and assessment of a physical monitoring program associated with beach nourishment on high-density marine turtle nesting beaches in the center of the Archie Carr National Wildlife Refuge, Sebastian, Florida, USA.

Mayhew, T.A., 2000, Late Holocene geologic evolution of a barrier island complex, east-central Florida.

Magron, Jean-Philippe, 2000, Impact of upland sand beach nourishment on the physical environment and marine turtles nesting at Sebastian Inlet, Florida.

Dunlevy, C., 1999, An examination of factors influencing land loss on Pelican Island National Wildlife Refuge.

Wiegman, G., 1999, Effects of human activities on tidal wetland sediment accretion within a salt marsh to mangrove forest transition zone, east-central Florida, USA.

Cavicchia, C., 1996, Natural Variation of Select Water Quality Conditions under a Wide Range of Natural Conditions, Sebastian Inlet, Florida.

Perez-Bedmar, M., 1996, Effects of Selective Trimming on Litter-Fall Productivity of a Fringing Red Mangrove Forest.

Cornelisen, C., 1996, Effects of Beach Renourishment on Physical Attributes of a Sea Turtle

Nesting Beach, East-Central Florida, USA.

Eckert, J.A., 1995, Coastal Habitat Enhancement and Shoreline Stabilization of South Grange Islands (BC48), Indian River Lagoon, Florida.

Fluke, L.A., 1994, Depositional Model of a Recent Carbonate/Siliciclastic Sediment Transition, East Florida Continental Shelf.

Boomsma, J.J.I., 1993, Establishing Scientific Guidelines for the Sampling and Source Identification of Beach Debris: a Pilot Study.

Traught, B.N., 1993, Comparison of Live Above-Ground Biomass of Two Salt Marsh Systems: Lost Creek (Altered) and Ten Mile Creek (Natural), New Smyrna Beach, Florida, USA.

White, J.R., 1993, Explosive Breaching of Mosquito Control Impoundment C-8, Volusia County, Florida.

Venanzi, P.F., 1992, Surficial Shoreface Sediment Distribution Patterns: A Measure of Inlet Influence?

White, J.R., 1992, The Holocene Evolution of Two Backbarrier Mangrove Swamps, St. Lucie County, Florida.

Civil, M.T., 1990, Holocene Evolution of the Inner Continental Shelf, Ft. Pierce, Florida.

11/5/2018

PAUL A. SCHMALZER

EDUCATION

Western Maryland College, B.A. Biology 1976
The University of Tennessee, M.S. Ecology 1978
The University of Tennessee, Ph.D. Ecology 1982

EXPERIENCE

Thirty-six years of experience in the design and implementation of ecological research, environmental impact analysis, and biological surveys. Expertise in terrestrial plant ecology, fire ecology, restoration ecology, vascular flora, vegetation sampling, and vegetation data analysis.

INTEGRATED MISSION SUPPORT SERVICES
Senior Plant Ecologist, Kennedy Space Center, Florida. November 2015-Present
Conduct studies of Kennedy Space Center vegetation, fire ecology, and restoration of scrub and wetlands vegetation. Conduct studies of rare plant distributions and ecology. Provide technical guidance to the Vegetation Studies Group. Maintain KSC Herbarium.

UNIVERSITY OF CENTRAL FLORIDA, DEPARTMENT OF BIOLOGY
Courtesy Research Associate, Orlando, Florida. March 2016-Present

INNOVATIVE HEALTH APPLICATIONS/INOMEDIC HEALTH APPLICATIONS
Technical Lead, Plant Ecologist, Kennedy Space Center, Florida. October 2009-October 2015
Conduct studies of Kennedy Space Center vegetation, fire ecology, and restoration of scrub and wetlands vegetation. Conduct studies of rare plant distributions and ecology. Provide technical guidance to the Vegetation Studies Group. Maintain KSC Herbarium.

DYNAMAC CORPORATION
Technical Lead, Plant Ecologist, Kennedy Space Center, Florida. January 1995 - September 2009
Conduct studies of Kennedy Space Center vegetation, fire ecology, and restoration of scrub and wetlands vegetation. Conduct studies of rare plant distributions and ecology. Provide technical guidance to the Vegetation Studies Group. Maintain KSC Herbarium. Monitor scrub restoration efforts on Cape Canaveral Air Force Station. Directed studies of effects of rocket launches on Cape Canaveral Air Station. Directed study of threatened and endangered species on Patrick Air Force Base. Directed study of historical vegetation of the Indian River Lagoon Basin. Conducted studies of the flora and rare plants of Canaveral National Seashore. Conducted studies of the occurrence and distribution of rare scrub plants in Brevard County.

THE BIONETICS CORPORATION
Technical Lead, Plant Ecologist, Kennedy Space Center, Florida. 1993-1994.
Conducted studies of Kennedy Space Center vegetation, fire ecology, and restoration of scrub and wetlands vegetation. Provided technical guidance to the Vegetation Studies Group.

Plant Ecologist, Kennedy Space Center, Florida. 1982-1993.
Conducted studies of the vegetation of Kennedy Space Center in relation to environmental variables, successional patterns, fire effects, and space center operations. Contributed to studies of animal habitat use. Conducted studies of vegetation, exotic plants, and potential environmental impacts and coordinated studies of fire history and soil erosion on Vandenberg Air Force Base, California.

FLORIDA INSTITUTE OF TECHNOLOGY
Research Scientist, Plant Ecologist (part time). Melbourne, Florida. 1993-1995.
Brevard County Scrub Habitat Conservation Plan. Helped develop proposal to conduct study of scrub habitat in Brevard County in relation to Florida Scrub-Jay habitat requirements and other rare or declining scrub species. Specific duties include plant sampling protocol, scrub plant identification, report preparation, and graduate student training.

BREVARD COUNTY
Member, Environmentally Endangered Lands Selection and Management Committee (volunteer). 1990-Present.
Helped develop criteria for determination of environmentally endangered lands and priorities for acquisition. Examined numerous sites, prepared reports, and made recommendations regarding acquisition. Helped prepare proposals to State of Florida Conservation and Recreational Lands (CARL) Program, Florida Forever Program, and the Florida Community Trust. Helped develop management criteria and reviewed management plans.

THE UNIVERSITY OF TENNESSEE
Graduate Research Assistant, Ecology Program, Knoxville, Tennessee, 1979-1982.
National Park Service Obed River Vegetation Project. Conducted vegetation survey, prepared vegetation map, conducted survey for endangered and threatened plants and critical plant habitats, prepared floristic list, and prepared report.

National Park Service contract to H.R. DeSelm: Classification of the Vegetation of the Interior Low Plateau. Helped to gather and synthesize literature on vegetation of the Interior Low Plateau and to prepare report.

National Park Service contract to H.R. DeSelm: Evaluation of Five Potential National Natural Landmarks in Tennessee. Helped to gather field data and available information on topography, geology, soils, and vegetation of five proposed National Natural Landmarks in Tennessee.

Hilton Smith Fellowship, 1978-1979.

Graduate Teaching Assistant, 1977-1978.
Taught general biology, prepared lectures and conducted labs.

Non-Service Fellowship, 1976-1977.

PROJECT HISTORY:
National Aeronautics and Space Administration, Kennedy Space Center, 1982-Present. Principal investigator. Designed and implemented vegetation monitoring program for Kennedy Space Center, Florida including long-term studies of changes after fire. Conduct studies of effects of Space Shuttle launches on terrestrial vegetation and soils and help maintain long-term databases of launch deposition patterns.

National Aeronautics and Space Administration, Kennedy Space Center, 1992-Present. Principal investigator. Collaborate on the design and implementation of a scrub restoration program for Kennedy Space Center. Monitor vegetation changes after combinations of cutting and burning to restore long-unburned scrub habitat. Monitor survival and growth of scrub species planted in former agricultural sites.

*National Aeronautics and Space Administration, Kennedy Space Center, and U.S. Fish and Wildlife Service, Merritt Island National Wildlife Refuge. 2010-2011.*Principal investigator. Design and implement program monitoring vegetation response to restoration of hardwood swales in

scrub and flatwoods landscapes on Kennedy Space Center/Merritt Island National Wildlife Refuge.

U.S. Air Force, 45th Space Wing, 2010-2011. Co-investigator. Compile floristic inventory of selected wetlands areas on Cape Canaveral Air Force Station as part of a comprehensive survey of flora and fauna.

National Park Service, Canaveral National Seashore, 2002-2004. Principal investigator. Compile floristic inventory and survey for threatened and endangered plants on Canaveral National Seashore, Florida.

Brevard County Natural Resources Management Office, 2004-2005. Principal investigator. Conduct surveys for threatened and endangered scrub plants in Brevard County, Florida.

Brevard County Natural Resources Management Office, 2003-2004. Principal investigator. Conduct surveys for selected threatened and endangered plants in Brevard County, Florida.

U.S. Air Force, 45th Space Wing, 1998-2003. Principal investigator. Designed and coordinated the implementation of a scrub restoration program for Cape Canaveral Air Force Station, Florida. Monitored vegetation changes after combinations of cutting and burning to restore long-unburned scrub habitat.

N*ational Aeronautics and Space Administration, Kennedy Space Center, Remediation Program, 1998-2000.* Co-principal investigator. Helped to design and implement baseline chemical characterization study for Kennedy Space Center, Florida. Responsible for technical direction of soil and groundwater sections of the study.

U.S. Air Force, 45th Space Wing, 1995-1998. Principal investigator. Coordinated and helped to design program to monitor effects of Delta, Atlas, and Titan rocket launches on the environment of Cape Canaveral Air Force Station, Florida.

U.S. Air Force, 45th Space Wing, 1995-1997. Principal investigator. Coordinated and helped to design threatened and endangered species survey for Patrick Air Force Base, Florida.

St. Johns River Water Management District, 1995-1997. Co-principal investigator. Coordinated and helped to design project to map historical vegetation of the Indian River Lagoon Basin, Florida

GRADUATE STUDENT COMMITTEES:

Shannon Boyle, Florida Institute of Technology, M. S. Biology, December 1996
Theresa K. Burcsu, University of North Carolina Chapel Hill, M. A. Geography, July 1998
Lisa Earnest, University of South Florida, M.S. Marine Science, University of South Florida, December 1998

PROFESSIONAL SERVICE

Florida Native Plant Society: Chair, Science Advisory Committee, 2006-Present
Southern Appalachian Botanical Society: Editor, *Castanea*, 2001-2003
Southeastern Chapter, Ecological Society of America: Vice-Chair, 1993-1995; Secretary-Treasurer, 2000-2002; Chair, 2002-2004

PROFESSIONAL ACTIVITIES

American Association for the Advancement of Science

American Institute of Biological Sciences
Association of Southeastern Biologists
Brevard County Environmentally Endangered Lands Selection and Management Committee.
Ecological Society of America
Florida Academy of Science
Florida Native Plant Society
International Association for Vegetation Science
International Association for Wildland Fire
Natural Areas Association
Society of Wetland Scientists
Southern Appalachian Botanical Society
Tennessee Academy of Science
Torrey Botanical Society

CERTIFICATIONS

Certified Senior Ecologist, Ecological Society of America, 1994-Present

HONORS

Florida Native Plant Society, Silver Palmetto Award, 2018
Florida Native Plant Society, Silver Palmetto Award, 2009
Florida Native Plant Society, Green Palmetto Award, 2005
The Nature Conservancy, Florida Chapter Conservation Colleague Award, 1995
NASA Manned Flight Awareness Award of Merit, 1989
Phi Kappa Phi, The University of Tennessee, 1982
H.P. Sturdivant Biology Award, Western Maryland College, 1976

PUBLICATIONS/TECHNICAL REPORTS/PRESENTATIONS

Published Papers:

Schmalzer, P.A., C.R. Hinkle, and H.R. DeSelm. 1978. Discriminant analysis of cove forests of the Cumberland Plateau in Tennessee. p. 62-86. In: P.E. Pope (ed.). Proceedings Central Hardwoods Forest Conference II. Purdue University, West Lafayette, Indiana.

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Schmalzer, P.A. 1988. Vegetation of the Obed River gorge system, Cumberland Plateau, Tennessee. Castanea 53:1-32.

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Breininger, D.R. and P.A. Schmalzer. 1990. Effects of fire and disturbance on plants and birds in a Florida oak/palmetto scrub community. American Midland Naturalist 123:64-74.

Levine, J.S., W.R. Cofer, III, D.I. Sebacher, R.P. Rhinehart, E.L. Winstead, S. Sebacher, C.R. Hinkle, P.A. Schmalzer, and A.M. Koller, Jr. 1990. The effects of fire on biogenic emissions of methane and nitric oxide from wetlands. Journal of Geophysical Research 95:1853-1864.

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Duncan, B.W. and P.A. Schmalzer. 1992. Using ARC/INFO to monitor Space Shuttle launch effects and validate a spatial predictive model. p. 499-506. In: Proceedings of the Twelth Annual ESRI User Conference, Volume 1. Environmental Systems Research Institute, Inc. Redlands, California.

Schmalzer, P.A. and C.R. Hinkle. 1992. Recovery of oak-saw palmetto scrub after fire. Castanea 57:158-173.

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Schmalzer, P.A., S.R. Boyle, and H.M. Swain. 1999. Scrub ecosystems of Brevard County, Florida: a regional characterization. Florida Scientist 62:13-47.

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Schmalzer, P.A. and T.E. Foster. 2016. Flora and threatened and endangered plants of Canaveral National Seashore, Florida. Castanea 81(2):91-127.

Schmalzer, P.A. and T.E. Foster. 2018a. Dynamics of gaps created by burning in Florida oak-saw palmetto (*Quercus*, Fagaceae-*Serenoa repens*, Arecaceae) scrub. Journal of the Torrey Botanical Society 145(3):250-262.

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Foster, T. E., P. A. Schmalzer, and G.A. Fox. 2018. Distribution and physiological function of three co-occurring scrub oaks along a one meter gradient in elevation. Manuscript submitted to American Journal of Botany.

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DeSelm, H.R. and P.A. Schmalzer. 1982. Descriptions of five potential Tennessee National Natural Landmarks. Processed report prepared for National Park Service. Botany Department, The University of Tennessee, Knoxville.

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Schmalzer, P.A. and C.R. Hinkle. 1985. A brief overview of plant communities and the status of selected plant species at John F. Kennedy Space Center, Florida. Report submitted to Biomedical Office, Kennedy Space Center, Florida.

Schmalzer, P.A., C.R. Hinkle, and D. Breininger. 1985. Effects of Space Shuttle launches STS-1 through STS-9 on terrestrial vegetation of John F. Kennedy Space Center, Florida. NASA Technical Memorandum 83103. John F. Kennedy Space Center, Florida. 39 p.

Provancha, M.J., P.A. Schmalzer, and C.R. Hinkle. 1986. Vegetation types. (Maps) John F. Kennedy Space Center, Biomedical Operations and Research Office. (Maps in Master Planning Map format, digitization by ERDAS, Inc.).

Schmalzer, P.A., C.R. Hinkle, and T.W. Dreschel. 1986. Far-field deposition from Space Shuttle launches at John F. Kennedy Space Center, Florida. NASA Technical Memorandum 83104. John F. Kennedy Space Center, Florida. 42 p.

Hall, C.R., D.R. Breininger, P.A. Schmalzer, J.H. Drese, M.J. Provancha, J.A. Provancha, D.B. Bennett, and T.W. Dreschel. 1987. Polygeneration project baseline environmental monitoring program: final report. NASA/KSC Biomedical Operations and Research Office. John F. Kennedy Space Center, Florida.

Schmalzer, P.A. and C.R. Hinkle. 1987. Effects of fire on composition, biomass and nutrients in oak scrub vegetation on John F. Kennedy Space Center, Florida. NASA Technical Memorandum 100305. John F. Kennedy Space Center, Florida. 146 p.

Schmalzer, P.A. and C.R. Hinkle. 1987. Monitoring biological impacts of Space Shuttle launches from Vandenberg Air Force Base: establishment of baseline conditions. NASA Technical Memorandum 100982. John F. Kennedy Space Center, Florida. 97 p.

Schmalzer, P.A. and C.R. Hinkle. 1987. Species biology and potential for controlling four exotic plants (*Ammophila arenaria*, *Carpobrotus edulis*, *Cortaderia jubata*, and *Gasoul crystallinum*) on Vandenberg Air Force Base, California. NASA Technical Memorandum 100980. John F. Kennedy Space Center, Florida. 99 p.

Breininger, D.R., P.A. Schmalzer, D.A. Rydene, and C.R. Hinkle. 1988. Burrow and habitat relationships of the gopher tortoise in coastal scrub and slash pine flatwoods on Merritt Island, Florida. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program. Final Report. 238 p.

Schmalzer, P.A., D.E. Hickson, and C.R. Hinkle. 1988. Vegetation studies on Vandenberg Air Force Base, California. NASA Technical Memorandum 100985. John F. Kennedy Space Center, Florida. 480 p.

Schmalzer, P.A. and C.R. Hinkle. 1990. Flora and threatened and endangered plants of John F. Kennedy Space Center, Florida. NASA Technical Memorandum 102791. John F. Kennedy Space Center, Florida. 68 p.

Schmalzer, P.A. and C.R. Hinkle. 1990. Geology, geohydrology, and soils of Kennedy Space Center: a review. NASA Technical Memorandum 103813. John F. Kennedy Space Center, Florida. 46 p.

Schmalzer, P.A. and C.R. Hinkle. 1991. Dynamics of vegetation and soils of oak/saw palmetto scrub after fire: observations from permanent transects. NASA Technical Memorandum 103817. Kennedy Space Center, Florida. 149 p.

Schmalzer, P.A., D.R. Breininger, F. Adrian, R. Schaub, and B.W. Duncan. 1994. Development and implementation of a scrub habitat compensation plan for Kennedy Space Center. NASA Technical Memorandum 109202. Kennedy Space Center, Florida. 54 p.

Provancha, M.J., C.R. Hall, P.A. Schmalzer, R. Reddick and J.R. Jensen. 1994. Evaluation of high spatial resolution multispectral imaging for resource management at John F. Kennedy Space Center, Florida. Visiting Investigator Program Extension Final Report VIPX-001-94. John C. Stennis Space Center, Mississippi. 19 p.

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Larson, V.L., B. Duncan, P. Schmalzer, and S. Boyle. 1997. Final report for the historical land cover mapping in the Indian River Lagoon Basin. Report to St. Johns River Water Management District, Contract No. 95W205. Dynamac Corporation. 18 p.

Oddy, D.M., E.D. Stolen, P.A. Schmalzer, V.L. Larson, P. Hall, and M.A. Hensley. 1997. Threatened and Endangered Species Survey for Patrick Air Force Base, Florida. NASA Technical Memorandum 112880. Kennedy Space Center, Florida. 96 p.

Schmalzer, P.A., S.R. Boyle, P. Hall, D.M. Oddy, M.A. Hensley, E.D. Stolen, and B.W. Duncan. 1998. Monitoring Direct Effects of Delta, Atlas, and Titan Launches from Cape Canaveral Air Station. NASA Technical Memorandum 1998-207912. John F. Kennedy Space Center, Florida. 59 p.

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Laurilee Thompson

Age: 65
Years in Brevard County: 65
Education: AA Oceanographic Technology, Florida Institute of Technology
Employer: Dixie Crossroads Seafood Restaurant
Position: Owner/Manager

Current Appointments:

Brevard County Tourist Development Council: 2000 - Present; Chair 2003, 2010, 2015
Brevard County EEL Program Selection and Management Committee: 2014 – Ongoing
Indian River Lagoon Council Management Board: 2016 – ongoing

Current Affiliations:

Member: Deepwater Shrimp Advisory Panel for South Atlantic Fishery Management Council
Board Member: Brevard Nature Alliance; Founding Member
Board Member: Merritt Island Wildlife Association; Vice-President 2017, 2018, 2019
Board Member: Space Coast Chapter Florida Restaurant and Lodging Association; President 3013
Board Member: Florida Restaurant and Lodging Association State Board

Awards and Recognitions:

- Laurilee was selected as the **1998 Titusville Area Chamber of Commerce Woman of the Year** in recognition for her work in the business of eco-tourism.
- First recipient of the annual **Allen David Broussard Conservation Award**, in recognition of efforts to demonstrate the economic value of conservation through the Space Coast Birding and Wildlife Festival. The award was presented at the **1999 National Watchable Wildlife Conference** in Ft. Myers.
- The **Titusville Area Chamber of Commerce 1999 Home-based Business of the Year Award** went to Laurilee's guided kayak tour business, Osprey Outfitters.
- The **Titusville Area Chamber of Commerce 1999 Small Business of the Year Award** went to the family business, Dixie Crossroads Seafood Restaurant.
- Recipient of the **Titusville Area Visitors Council 1999 Hospitality Award**.
- Recipient of the **2001 Florida Outdoor Writers Association, Florida Sportsman Biff Lampton Memorial Conservation Award** for Outstanding Conservation Efforts on behalf of the Florida Outdoors.
- Recipient of the **2002 DAR Citizen of the Year Award**, presented by the Daughters of the American Revolution, Indian River Chapter in recognition for educational efforts concerning Florida Scrub Jays.
- First Recipient of the annual **Brevard County Conservation Leadership Award**, presented by the Board of Directors of the Brevard Nature Alliance (March, 2003).
- Recipient of the **2003 Harry R. Lee Memorial Award**, presented by the City of Titusville in recognition of outstanding community service for founding the Space Coast Birding and Wildlife Festival.
- Recipient of the **2003 Bob Owens Memorial Award**, presented by the St. Johns River Water Management District for outstanding citizen service to the St. Johns River WMD.
- Recipient of the **2005 National Daughters of the American Revolution Conservation Medal** in recognition for outstanding achievement for environmental awareness.
- Recipient of the **2006 East Central Florida Junior Achievement Business Leadership Award** in recognition of the Space Coast Birding Festival and tourism work.
- Recipient of the prestigious **2006 Florida Audubon Guy Bradly Award** recognizing demonstration of a personal, public and consuming commitment to natural resource protection in Florida.
- Recipient of the **2006 Space Coast March of Dimes Woman of Achievement Award** for community service.
- The **Brevard County School Board 2006 Small Business Partner of the Year** award went to Dixie Crossroads Restaurant.

- The National Restaurant Association's **2007 Florida Restaurant Neighbor Humanitarian of the Year Award** went to Laurilee for her community service and for founding the Space Coast Birding and Wildlife Festival.
- **2008 Canaveral Boy Scout Golden Eagle Dinner Honoree** in recognition for environmental leadership.
- **2010 Space Coast Chapter American Red Cross Honoree** in recognition for environmental leadership.
- **Southeastern Fisheries Association 2010 Paul Herring American Freedom Award** for standing up on behalf of fishermen and fishing communities.
- **Miami Corporation 2012 Friend of Conservation Award** in recognition of extraordinary efforts to protect and conserve habitat corridors in Brevard County.
- **Marine Resources Council 2013 Stan Blum Award** for lifetime service to the Indian River Lagoon.
- First Recipient of the **Brevard Nature Alliance Legacy Award (2013)** in recognition of outstanding leadership advocacy for protection of Brevard County's natural resources.
- **Southeastern Fisheries Association 2013 David Harrington Semper Fi Award** for tirelessly working to provide honest information on fisheries issues to the State and Federal Government.
- 2015 recipient of the **Charlie Corbeil Conservation Award** at the annual event that awards Space Coast individuals for their exemplary contributions to conservation.
- In November, 2016 the family businesses, Dixie Crossroads Seafood Restaurant and Wild Ocean Seafood Market, were each recipients of a **Change Award** to honor Everyday Superheroes of North Brevard County. The category was "Superpower of Corporate Citizenship."

Laurilee's diverse background includes an Associate Degree in Oceanographic Technology from Florida Institute of Technology, design and production of nautical themed furniture, custom boat fabrication, commercial fishing boat captain, and restaurateur. Living and working on and near the sea instilled a lifelong passion for the preservation of these natural areas and the diverse species that are dependent upon their perpetuity.

After leaving the ocean in 1987, first-hand experience in stressed Gulf fisheries led Laurilee to take part in preservation efforts closer to home. When overfishing threatened the habitat and future supply of rock shrimp, she encouraged her entire family to step in and lead the efforts to end trawling in the fragile Oculina Reef and put a management plan in place for the rock shrimp fishery. Laurilee makes yearly trips to Washington D.C. to lobby members of Congress on behalf of the commercial fishing industry.

While transitioning from a seafaring lifestyle, Laurilee developed an intense desire to connect people with nature. This led to many eco-tourism endeavors. The most notable is the **Space Coast Birding and Wildlife Festival**, which Laurilee founded in 1997.

This annual event, Florida's first major birding festival and now one of the top birding festivals in the nation, is heralded as a model for festivals nationwide due to the exceptional lineup of seminar presenters and high-quality field trips. Birders of all levels, wildlife enthusiasts, naturalists, biologists, and ornithologists travel from all over the world to support this benchmark tradition. Festival attendees contribute over one million dollars to North Brevard's economy each year during the six days of the event. Area business and governmental leaders continue to laud the festival's positive impact on the community.

During early development of the Great Florida Birding Trail, Laurilee was instrumental in securing for Brevard County 21% of the site nominations out of an 18-county area for the first section by personally filling out 45 lengthy nomination forms and escorting Julie Brashears, Birding Trail Coordinator, for site inspections.

This resulted in the placement of 32 Brevard County sites on the Great Florida Birding Trail Map. Five additional Brevard County sites were added when the East Section of the Great Florida Birding Trail was updated in 2008. Brevard County has more Great Florida Birding Trail sites than any other county in Florida.

Laurilee has attended a wide variety of forums and addressed many organizations to raise awareness of the benefits that Nature and Heritage Tourism can bring to a community. She has escorted numerous media familiarization tours for the Space Coast Office of Tourism, Titusville Area Visitor's Council, Florida Outdoor Writers Association, and VISIT FLORIDA on foot, horseback, in kayaks, airboats, vans and motor coaches. Many journalists experienced their first close encounter with a manatee or took their first good look at a Roseate Spoonbill through a spotting scope under her guidance. She has been an outspoken advocate for the establishment of a network of multi-use trails in Florida and was recognized as a "Trail Champion" at an annual meeting of the Florida Trails Foundation.

Lately her emphasis during public speaking has shifted from eco-tourism to talks about what it was like growing up on the Indian River Lagoon and the critical importance of restoring it back to its former beauty and productivity. Recognizng that sea grass is a critical component to the revival of the Indian River Lagoon, she personally covered most of the cost to do a two-year pilot project to see if nursery-grown sea grass could successfully be introduced into the Lagoon. The project was successful.

Collateral pieces that Laurilee developed for the Space Coast Office of Tourism include the *Space Coast's Best Known Birding and Wildlife Sites, Florida Space Coast Nature Guide, Outdoor Adventures on Florida's Space Coast, A Wild Guide to the Space Coast, Florida's Space Coast...It's More Than Just Birding,* and *Florida Space Coast Outdoor Adventure Guide.* The *Outdoor Adventure Guide* was distributed by the Space Coast Office of Tourism for many years until digital media replaced print.

Through her business, as well as her personal life, Laurilee is an important advocate for the promotion, protection, and use of our natural resources in a responsible manner.

Kim A. Zarillo

President of Scientific Environmental Applications, Inc. (S.E.A.)

Professional Expertise

Project Management
Natural Resource Assessment, Planning and Monitoring of Natural Community Restoration

Professional Affiliations

Florida Native Plant Society
Florida Pest Plant Council

Selected Technical Publications

Zarillo K.A., G.A. Zarillo, D.I. McGinnis, T.V. Belanger, D.H. Adams, R. Paperno, Irlandi, E.A., and A.C. Cox. 2010. An Assessment of Coastal Water Resources and Watershed Conditions in and Adjacent to Canaveral National Seashore Natural Resource Report NPS. 2012. National Park Service, Fort Collins, CO.

Zarillo, K.A., Cox, Anne, and Zarillo, G.A. 2008. Indian River Lagoon-South Allapattah Natural Water Storage and Treatment Area Restoration Project Ecological Performance Hydrologic & Hydraulic Modeling and Restoration Plan Reassessment CN040924-WO07 - Deliverable 3.4.3., and Restoration Plans (Steele, West, and ARA East).

Zarillo, G.A., K.A. Zarillo, and Cox, A. 2007. A Summary Review of Existing Information and Data for the Indian River Lagoon-South Allapattah Natural Water Storage and Treatment Area Restoration Project, Hydrologic & Hydraulic Modeling and Restoration Plan Reassessment CN040924-WO07.

South Florida Water Management District.

Education

- M.S. Management & Policy, State University of New York at Stony Brook, Stony Brook, NY. 1988.
- B.S. Biology, University of South Carolina, SC. 1981.
- Horticulture, Midlands Technical College, SC. 1977-78.

Summary

Ms. Zarillo has overseen several million dollars of environmental and geotechnical projects involving desktop research studies, data collection in the field, and data analysis for government agencies, nonprofits, and private firms. She has supervised projects for the U.S. National Park Service, Bureau of Ocean Energy Management Regulation and Enforcement, St. Johns River Water Management District (SJRWMD), South Florida Water Management District (SFWMD), and some of Florida's major coastal engineering firms (Atkins, Applied Technology & Management, Inc., Olsen Associates, Inc., and Coastal Systems International, Inc.). As a team member of Florida Tech's Department of Marine and Environmental Systems, she authored *An Assessment of Coastal Water Resources and Watershed Conditions In and Adjacent to Canaveral National Seashore*. Ms. Zarillo teamed with faculty members of Central Florida Community College to develop a Web-CT online course, Environmental Landscape. She has instructed and developed numerous environmental "Florida Friendly" courses for SJRWMD and non-profit organizations, while serving as adjunct faculty for Brevard Community College (now Eastern Florida State College).

Selected Project Experience

Instructor. 2015 Florida Native Wildflower Workshop for the Pelican Audubon Society and the Eugenia Chapter of the Florida Native Plant Society (FNPS) Workshop. Instructed participants on how to access and use existing information to identify geology, hydrology, soils, and natural plant communities to design Florida Friendly landscapes for residential and commercial properties.

Biologist. Provided natural resource assessment of CANA coastal waters and watershed. Conducted literature research, analyzed data, edited the final report, and prepared specific fauna and flora sections. Descriptions and information about plant communities were supplemented with field observations and documented with digital images. The condition and composition of saltwater and freshwater wetlands within and adjacent to CANA were analyzed using GIS theme data from 1943 and 2004.

Project Manager. Drafted reports for and reviewed final report products of the development of a detailed hydrologic model to predict and manage hydrologic dynamics and water quality of the Mosquito Lagoon. Coordinated with subconsultant to provide equipment to collect measurements of nutrients and pollutants in groundwater associated with OSTDS of residential sites.

Selected Project Experience

An Assessment of Coastal Water Resources and Watershed Conditions in and Adjacent to Canaveral National Seashore Natural Resource Report
Water Resources Division of U.S. National Park Service
Fort Collins, CO
2013

Hydrologic Model of Mosquito Lagoon Canaveral National Seashore- National Park Service - C5180070017
Water Resources Division of U.S. National Park Service
Fort Collins, CO
2008-2011

Project Manager and Biologist. Wetland Resource Assessment of the Central Florida Coordination Area Project - Purchase Order # 4500027039. Data were collected on the condition of vegetation, protected species and physical characteristics of 23 wetland sites within Central FL. Digital images taken at each site were organized in PowerPoint files. Plant species and data were digitized in Excel™ workbook. (2008-09)

Summarized existing conditions data for flora and fauna for 21,000 acres in Martin County, FL. Used GIS tools to estimate 1940s antecedent natural community areas based on soil and historical data. Revised restoration plans for all three sections of ARA based on simulations of rainfall, interaction of surface and groundwater, flooding/drying of the wetlands, water control structures (culverts and pumps), evapotranspiration, and the influence of vegetative cover on overland flows.

SFWMD Wetland Resource Assessments of Central FL
SFWMD
West Palm Beach, Florida
2008-2009

Project Manager and Biologist. Conducted literature research and field events to document coastal plant communities of Ile-a-Vach, South Haiti (mangrove, upland, and riverine) and wildlife, analyzed data, GIS maps and photo documentation of geological and biological diversity, prepared final slide presentation and report. Ms. Zarillo presented project findings to Haitian Ministers of Environment, Finance, Tourism and Poverty. (2014)

IRL-South Allapattah Natural Water Storage & Treatment Area Restoration (ARA) Hydrologic & Hydraulic Modeling and Restoration Plan
SFWMD
West Palm Beach, Florida
2008-2009

Contract/Program Manager for field studies coordinated marine field studies for listed species observations, sampling benthic, plankton, and fish communities. Provided oversight for data acquisition and analysis coordinated information transfer meetings and/or conferences, prepared progress reports, slide presentations, and technical publications. INM05PC00005 (CT 39075) Biological Characterization/Numerical Wave Model Analysis within Identified Borrow Sites Offshore the Northeast Coast of Florida. (2005-2010)

Biodiversity Study of Ile-a-Vach, South Haiti
CHRAD
Petionville, Haiti
2014

Biologist. Conducted FCT Applications assessments for 16 projects in 7 FL counties. Data collected from sites visits and from literature research were used to identify and map natural communities/major disturbances in ArcView. Prepared final reports of the physical/ biological resources and management recommendations for restoration of the hydrology, natural communities, and for protection of listed species.(1998-2011)

Final Biological Characterization and Numerical Wave Model Analysis within Borrow Sites Offshore of Florida's Northeast Coast Report- Volume I: Main Text 286 pp. + Volume II: Appendices A-D 448 pp. Contract No. 1435-01-05-CT-39075-M05PC00005 MMS Study 2008-060.
BOEMRE(formerly Minerals Management Service) Florida
2005-2010

Biologist. Construct aerial history of Nutting Wood Green Wildflower Meadow in Town of Melbourne Village. Identify soils and vegetation. Develop recommendations to restore seasonally wet meadow 2017 - present.