

RESTORE Act Ecosystem Restoration Project Proposals
for consideration in the Gulf Coast Ecosystem Restoration Council's Comprehensive Plan
2012

Contact Information: David W. Ceilley, Research Scientist Coastal Watershed Institute at Florida Gulf Coast University <dceilley@fgcu.edu>	Date of Submittal: 10/30/12
Name of Project: Tidal Caloosahatchee River: Submerged Aquatic Vegetation (SAV) Restoration, Enhancement, and Monitoring Project, Ft. Myers, Florida	Org and Rank: FGCU #1
Project Description: This restoration and enhancement project includes the restoration and enhancement of 600+ acres of historic submerged aquatic vegetation (SAV) tape grass, <i>Vallisneria americana</i> in the oligohaline littoral zones of the Caloosahatchee River where tape grass beds have been decimated since the inception of the Charlotte Harbor National Estuary Program in 1996. The project will re-establish protected founder colonies of <i>V. americana</i> and seed sources for recovery of historic distributions in conjunction with C-43 reservoir construction and restoration of minimum flows and levels (MFLs) for the Caloosahatchee River Estuary. In addition, we will be planting widgeon grass, <i>Ruppia maritima</i> in the middle estuary and enclosing shoal grass, <i>Halodule wrightii</i> in the lower Caloosahatchee estuary and planting shoal grass in prop scars in Pine Island Sound in cooperation with the Sanibel-Captiva Conservation Foundation Marine Laboratory (SCCF). Within the Caloosahatchee, targeted areas near shore in shallows, and away from seawalls will be examined for existing vegetation. Exclosures will be installed in vegetated areas and will be cleaned monthly by SCCF and volunteers. When the reservoir is installed and if dry season salinities are decreased enough, tape grass will be added to exclosures east of the Caloosahatchee Bridge. Aerial photos will be examined for prop scar damage in San Carlos Bay and Pine Island Sound. These areas will be visited and if the scars are severe and through turtle grass beds, shoal grass sods grown at SCCF will be transplanted into the scars every 5 meters. Shoot density and height at each site will be monitored 6 times per year inside and outside the exclosures, or inside the planted scars. This project would increase densities of tape grass, widgeon grass and shoal grass in the River by using short, anchored exclosures. Once dense beds are established, the plants can spread through vegetative growth, seed and propagule dispersal. The SCCF RECON probes will record salinity, turbidity, chlorophyll and CDOM hourly at 3 sites in the river, (Shell Point, Fort Myers and Beautiful Island). These values will be used to monitor salinity and light conditions for submersed plants in each area of the river. Water quality monitoring will improve our understanding of nutrient loading effects for MFL and TMDL improvements that will help improve conditions for submersed plants.	
Project Location: Tidal Caloosahatchee River between Interstate 75 to the East and Whiskey Creek to the West (Figures 1-3), downstream of Caloosahatchee Bridge (Figure 4) upstream of S-79 (Figure 5), and freshwater tributaries to the Caloosahatchee River (Figure 6) and Pine Island Sound.	
Responsible Party: Department of Marine and Ecological Sciences & Coastal Watershed Institute at Florida Gulf Coast University 10501 FGCU Blvd South	Partners: University of Florida, Lee County Hyacinth Control, Sanibel-Captiva Conservation Foundation Marine Lab, (pilot study partners include West Coast Inland

Ft. Myers, FL 33965-6565				Navigation District and Lee County and the South Florida Water Management District)			
NEP: CHNEP		Project Cost: \$2,423,536		Dollars Needed: \$2,313,536			
Start: October 2013				Completion: September 2019			
Status of Project Design and Permitting: Pilot studies were permitted by the Corps of Engineers and Florida Department of Environmental Protection in 2008 and re-permitted in 2012 for five years (attached). Design and additional permitting of this scale-up restoration project in the upper Caloosahatchee Estuary is pending approval of this proposal and expected to be completed in Year-1 (FY12/13 below).							
What Date or Year could Construction Feasibly Begin: FY 2014							
Your Proposed Timing of Funding (given permits, phasing, staging, etc.)							
Previous	12/13	13/14	14/15	15/16	16/17	17/18	Total
\$110,000	\$248,182	\$448,810	\$399,297	\$399,297	\$413,808	\$404,465	\$2,423,536
Quantify Environmental Results and How to Measure Them: The restoration of tape grass in the upper estuary will consist of planting and establishing 24 or more founder colonies in areas of the estuary where salinities are supportive. In the middle of the River, we will plant and exclose widgeon grass. In the lower Caloosahatchee we will exclose shoal grass. These founder colonies of plantings and seeding will be protected from herbivory with exclosure devices and will be monitored on a quarterly basis for shoot and reproductive structure counts. Expansion of SAV outside of each exclosure will assessed quarterly using transects extending outward. Methods will be coordinated with previous monitoring programs to ensure consistency and comparability. Fish and macroinvertebrate communities will be evaluated within established SAV beds and in adjacent un-vegetated habitats to quantify aquatic communities utilizing SAV. In Pine Island Sound, 1 km of prop scars will be restored with shoal grass sods. Sediment bed stability and suspended sediment dynamics will also be measured inside and outside of the beds quarterly. Sediment bed stability will be assessed by measuring the critical shear stress necessary to re-suspend sediments, both inside and outside of the beds. Cores will be collected and analyzed using a Gust microcosm erosion device. Suspended sediment and bottom boundary layer dynamics will be assessed using acoustic and optical instruments.							
Economic Benefits (including ecosystem services): 1,595,000,000 calculated based on a conservative estimate of a 10% success rate, (as per CHNEP Director) or 60-acres of SAV meadows that would be restored permanently.							
Estimated number of Jobs Created or Preserved: 23 jobs created							
How much Habitat will be restored and conserved?: Direct restoration of 6-acres with exclosures. We expect that at least 600-acres of tape grass in the upper Caloosahatchee Estuary will be restored. Additional beds SAV will be restored in the middle and lower Caloosahatchee Estuary with 2,000 acres potentially affected by seeds and reproductive shoot dispersal							
Quantify pollutant reductions: Pollution reductions are not easily quantified by this SAV restoration project. However, the direct nutrient (nitrogen and phosphorus) uptake from the water column and sediments into plant growth are estimated to be substantial. We also expect that the stabilization of soft bottom sediments will improve and stabilize water quality (reductions in TSS, turbidity, and nutrient flux from sediments) as a direct result of this restoration project.							
What living coastal/marine resources will be improved and by how much?: Approximately 600-acres of lost SAV beds in the Caloosahatchee Estuary will be directly restored. Tape grass, <i>Vallisneria americana</i> has been identified as the valued ecosystem component (VEC) to be assessed for minimum flows and levels (MFLs) (SFWMD 2004). Other							

SAV species in the River, widgeon grass and shoal grass are just as valuable when beds are dense. The restoration will greatly improve critical foraging habitat for the endangered manatee (*Trichechus manatus*) near the Orange River winter thermal refuge. We expect direct benefits through coastal estuary habitat improvement/enhancement, creating fisheries nursery habitat, sediment stabilization, migratory waterfowl foraging habitat, and important commercial fisheries for blue crabs and bait shrimp. *Vallisneria americana* beds provide habitat for at least 44 species of fishes as well as many crustaceans, mollusks and other macroinvertebrates (Robbins 2005) which serve as trophic linkages to higher level consumers in the estuary. In 2009 the National Marine Fisheries Service (NMFS) listed the Caloosahatchee Estuary as critical habitat for the Federally Endangered small-tooth sawfish (*Pristis pectinata*) and this project will improve the prey base for sawfish. The exclosure design proposed for this restoration has been approved by NMFS.

How will community resilience be enhanced? Restoring 600+ acres of recently lost SAV habitat (since 1995) in the upper estuary will enhance aquatic/marine community resilience. Establishing beds to act as a seed source will facilitate recovery to any additional losses in SAV coverage. The SAV restoration will enhance resilience of the critical winter foraging habitat of manatees and stabilize habitat for waterfowl, sea turtles, and numerous fishes, crustaceans, mollusks and aquatic invertebrates. Ecotourism and sport fishing will be enhanced and improve community resilience in Lee County and the cities of Cape Coral and Ft. Myers. Storm-wave and boat wake driven erosion of the river banks will also be attenuated by denser and more extensive sea grass beds. Benthic community resilience will be enhanced by restoring dense SAV beds.

Additional Justification: The Caloosahatchee Estuary has suffered the loss of over 600-acres of oligohaline seagrass beds, specifically *Vallisneria americana* in the upper estuary in just the last 12 years. *V. americana* is recognized as a valued ecosystem component for Everglades Restoration and minimum flows and levels (SFWMD 2003). This severe and unacceptable “fish and wildlife habitat loss” is a prime example of the one of three priority problems in the CHNEP. Therefore, the recovery of lost SAV habitat is a high priority for restoration and enhancement of lost ecosystem resources and services. Restoration of the lost SAV is critical to the restoration of this important core area of the CHNEP. Research has demonstrated that herbivory is an important regulating factor in the restoration of SAV beds when severe losses due to water quality degradation were originally incurred (Moore et al. 2010). This proposal addresses the need to restore grass beds through the prevention of excessive herbivory while using state of the art restoration planting and seeding techniques to ensure success.

This project represents a cooperative partnership between Florida Gulf Coast University, University of Florida, the Sanibel-Captiva Conservation Foundation Marine Laboratory, and Lee County Hyacinth Control District. We have assembled a group of experts in aquatic and marine ecology (CVs attached) with extensive experience working with submerged aquatic plants (SAV) for ecosystem restoration and decades of combined experience in the Caloosahatchee River Estuary. Restoration feasibility studies have been permitted and completed along with a pilot scale-up study using large exclosure cages currently underway by FGCU researchers. Herbivory has been identified as a controlling factor in the feasibility studies (Ceilley et al. 2003, 2011, and Ceilley 2009) and in the current study, along with light and salinity (Bortone and Turpin 2000). Exclosures also improved densities of *Ruppia maritima* (Bartleson 2010). This project seeks to directly restore large areas of SAV using a combination of planting methods, locations, and herbivore exclosures to protect founder plots (Moore et al. 2010) from decimation

by over-grazing. These founder plots of *V. americana* will provide protected seed sources and vegetative bases for re-colonizing suitable habitats in the Caloosahatchee River Estuary.

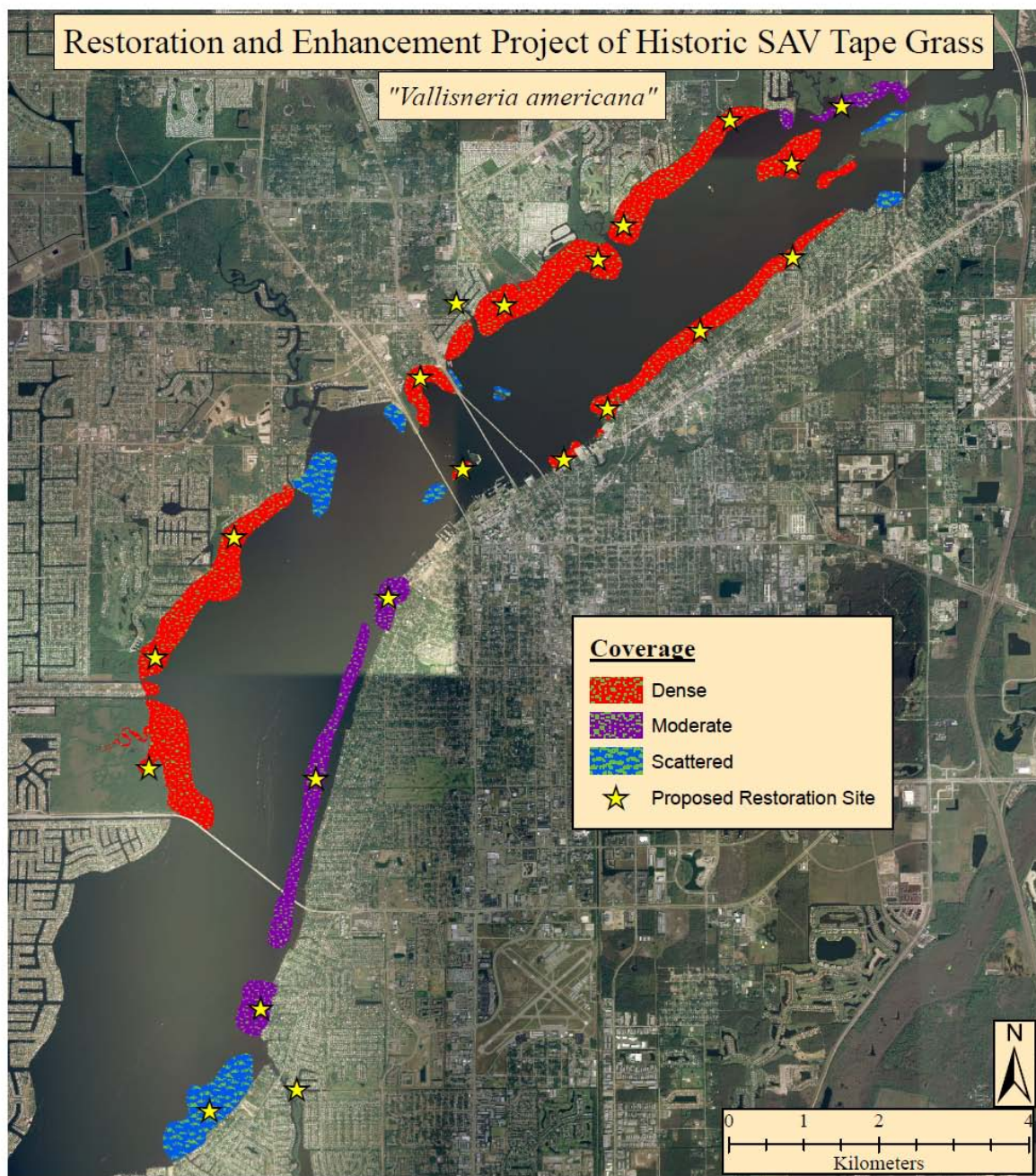
Add any photos or maps that explain project:

Attachments:

- **Figures 1-10**
- **References**
- **Short Form CVs of PI and Co-PIs**
- **Existing permits/approvals by FDEP and USACOE**

Figure 1. Submerged aquatic vegetation (SAV) map of the Caloosahatchee Estuary prepared by Hoffacker (1994) using 1993 data. The Report estimated 600-acres of *Vallisneria americana* in the upper Caloosahatchee Estuary (SFWMD 2010).

Figure 2. Historical distribution of submersed angiosperms (Hoffacker 1994) and recent downstream occurrence of tape grass.



Acreage
 Dense: 1292.40
 Moderate: 397.09
 Scattered: 322.95
 Total Acreage: 2012.44



Data Sources:
 2004 One Meter Ortho Imagery provided by
 USGS and NRCS for Lee County, FL
 Coverage polygons digitized from USGS
 2004 aerial

Map Created by Daniel Dickinson

Figure 3. Proposed SAV restoration areas of *Vallisneria americana* upstream of Caloosahatchee Bridge, and *Ruppia maritima*, downstream of the Caloosahatchee Bridge, Caloosahatchee Estuary using seeding, whole plants and exclosures.

Figure 4. Proposed SAV restoration areas of *Ruppia maritima*, downstream of the Caloosahatchee Bridge, and *Halodule wrightii* downstream of the Cape Coral Bridge, Caloosahatchee Estuary using whole plants and exclosures.

Figure 5. Location of *Vallisneria americana* restoration plantings and exclosures upstream of S-79 “Franklin Locks” permitted in May 2012 and currently being monitored by FGCU researchers.

GPS Coordinates

Site 1: Latitude: 26°43'8.80"N; Longitude: 81°39'57.60"W

Site 2: Latitude: 26°43'7.80"N; Longitude: 81°39'15.60"W

Site 3: Latitude: 26°43'12.10"N; Longitude: 81°39'6.20"W

Site 4: Latitude: 26°43'8.70"N; Longitude: 81°38'54.10"W

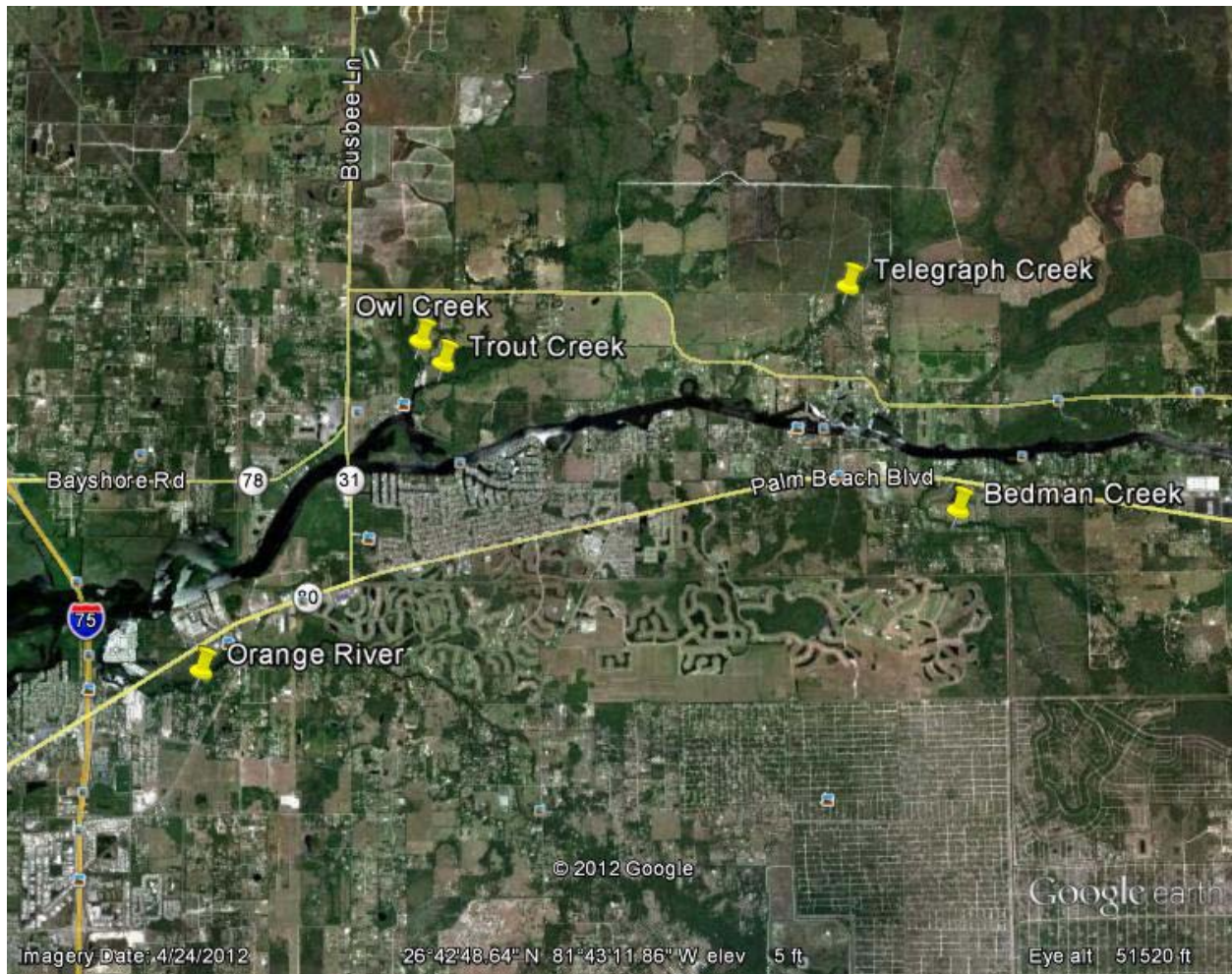


Figure 6. Additional proposed *Vallisneria americana* planting sites in freshwater tributaries to the Caloosahatchee River in Lee County, FL east of I-75. West to east; Orange River, Owl Creek, Trout Creek, Telegraph Creek, and Bedman Creek



Figure 7. Herbivore exclusion cage (6m x 2m) being deployed May 2012 by FGCU researchers in the Caloosahatchee River and planted with *Vallisneria americana* (10 shoots/m²).



Figure 8. Successful tape grass, *V. americana* restoration area in Caloosahatchee River from pilot study conducted by FGCU comparing two types of herbivore exclosures (Ceilley 2009).

Figure 9. Successful widgeongrass, *R. maritima* restoration area in Caloosahatchee River from pilot study conducted by SCCF employing transplants grown in an outdoor tank and exclosures (Bartleson 2010).

Figure 10. Example of proposed site exclosure locations. Exclosure areas drawn slightly larger than proposed 30m x 20m. Deep edge of *Ruppia* was 110 cm in April 2009. Exclosures are at 45 cm depth.

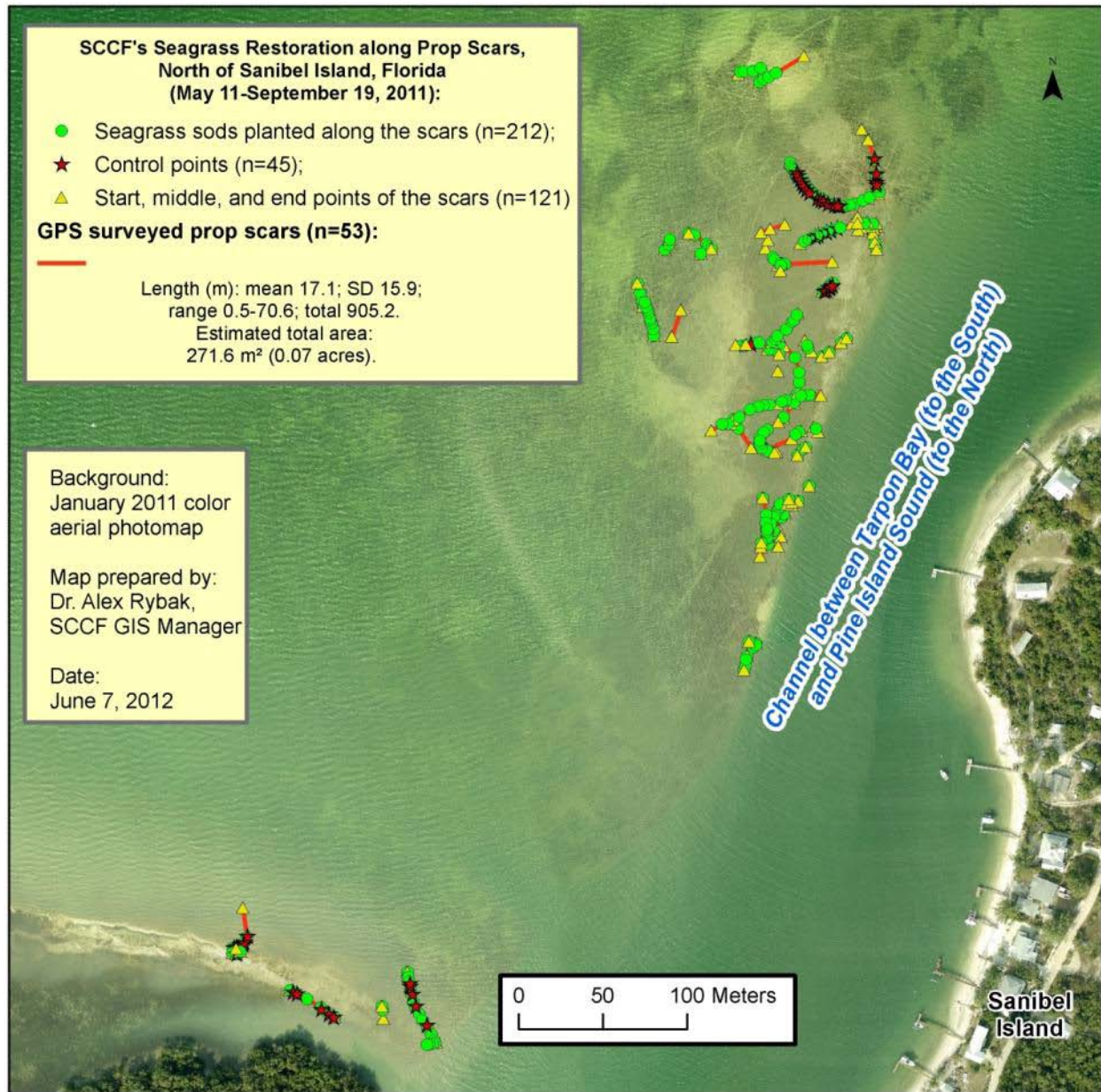


Figure 11. Example of prop-scar restoration in Pine Island Sound. First year results of shoalgrass restoration included a 437% increase in shoalgrass coverage within planted scars. Many areas in the Sound are in need of restoration because of scarring.

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SELECTED PROFESSIONAL POSITIONS

2006-present	Research Scientist, Dept. of Marine and Ecological Science, Florida Gulf Coast University
2007-present	Graduate Faculty, College of Arts and Science, Florida Gulf Coast University
2002-2005	Director of Environmental Science, Conservancy of SW Florida, Naples, FL
2001-2002	Senior Ecologist, Conservancy of SW Florida, Naples, FL
1996-2001	Restoration Ecologist, Sanibel-Captiva Conservation Foundation, Sanibel, FL
1994-1996	Aquatic Lab Director, K.L. Erwin Consulting Ecologists, Ft. Myers, FL
1991-1994	Senior Environmental Planner, Lee County Environmental Sciences, Ft. Myers, FL
1989-1991	Aquatic Biologist, Lee County Environmental Lab, Ft. Myers, FL
1985-1989	Limnologist II, University of Iowa Hygienic Lab, Iowa City, IA
1983-1984	Graduate Research Assistant, Center for Aquatic Plants, Univ. of Florida, Gainesville, FL

SELECTED GRANTS AND CONTRACTS

Babcock Ranch Community baseline biological assessment: fish, herps, mammals. Co-PI: E. Everham III,
co-PIs Phil Allman, B. Jackson, J. Jackson. Kitson and Partners, Inc. \$85,625.00 in 2008-09,

Babcock Ranch Community aquatic faunal assessment, Kitson and Partners, Inc. \$13,000 in 2010.

Babcock Ranch Wildlife Corridor and Assessment, Kitson and Partners, Inc. \$40,000 2011-12.

Bioavailability and sources of nutrients. PI: A.N. Loh, co-PIs: D. Fugate, M. Parsons, E. Everham III, and E. Milbrandt.

City of Sanibel and Lee County Florida. \$769,083.00. 2008.

Enhancing the Recovery of Threatened and Endangered Species in South Florida through Refugia. Co-PIs: I. Bartoszek, M. Schuman, R.E. Schroeder, K. Worley and J. Schmid. U.S. Fish and Wildlife Service. \$478,000.

Tape Grass Restoration Feasibility Study. Lee County Board of County Commissioners. \$10,000.00. 2008

Planting of Tape Grass, *Vallisneria americana* in the freshwater Caloosahatchee River: a dry season opportunity.

South Florida Water Management District: Phase I - \$15,000 and Phase II - \$30,000

Lake Trafford Restoration Monitoring and Management Plan. Co-PI: E. Everham and S. Thomas. Big Cypress Basin of the

South Florida Water Management District. \$50,000

Lake Trafford Monitoring Phase II. co-PI: E. Everham. Big Cypress Basin, South Florida Water Management District. \$50,000.00, Supplement \$25,000.00 for tape grass restoration to 9/30/08.

Data analysis of water quality. co-PI E. Everham, Florida Department of Environmental Protection – Bureau of Watershed Management. \$24,487.00. 2007

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Lohr, M., K. Arnold, D. W. Ceilley, T. Denison, E. M. Everham III, K. Fikoski, and E. Livingston A collaborative approach to Best Management Practice Monitoring Projects in the Estero Bay Region. *Florida Scientist*. Accepted.

Dixon, A.D., W.R. Cox, E.M. Everham III, and D.W. Ceilley. 2011. Anurans as biological indicators of restoration success in the Greater Everglades Ecosystem. *Southeastern Naturalist*. 10(4):629-646.

Everham, E.M., III, D.W. Ceilley, B.L. Thomas, and D. Hamilton. 2009. Riparian vegetation along tributaries to Estero Bay, Florida. *Florida Scientist*. In Press.

Key, J.K., E.M. Everham III, D.W. Ceilley, B.L. Thomas, and R. Leisure III. 2009. Surface and groundwater dynamics of a cypress slough in an urbanizing watershed. *Florida Scientist*. In Press.

E.M. Everham III, J.R. Cassani, S.G. Tolley, and D.W. Ceilley. 2000. A Rapid Bioassessment Program for Estero Bay Tributaries Final Report

Edwin M. Everham III, Ph.D.

Professor of Marine and Ecological Science

ADDRESS

Florida Gulf Coast University, College of Arts and Sciences,
10501 FGCU Boulevard South, Ft. Myers, Florida 33965-6565
(239) 590-7169, Fax (239) 590-7200, eeverham@fgcu.edu

EDUCATION

Ph.D. 1996 Environmental and Forest Biology, State University of New York
College of Environmental Science
B.S. 1980 Biological Sciences, Michigan Technological University

SELECTED PROFESSIONAL POSITIONS

1996 – present Faculty of Environmental Studies, Florida Gulf Coast University.
(Professor since 2009)
2000-2004 Chair of Division of Ecological and Social Sciences, Florida Gulf Coast University
1994-1996 Founding Faculty, New College of Global Studies, Radford University
1990-1994 Data Manager - Hurricane Recovery Plot Project, Terrestrial Ecology Division,
University of Puerto Rico
1989-1993 Teaching Assistant, SUNY College of Environmental Science and Forestry
1986-1988 US Peace Corps Volunteer, Malawi. Africa
1981-1986 Science Instructor, Waukesha Public Schools, Waukesha, Wisconsin
1980-1981 Wildlife Technician, US Forest Service, Detroit, Oregon

SELECTED GRANTS AND CONTRACTS

Babcock Ranch Community baseline biological assessment: fish, herps, mammals. Co-PI: D.W. Ceilley,
co-PIs Phil Allman, B. Jackson, J. Jackson. Kitson and Partners, Inc. \$85,625.00. 2008

Bioavailability and sources of nutrients. PI: A.N. Loh, co-PIs: D. Fugate, M. Parsons, D. Ceilley, and E. Milbrandt. City of Sanibel and Lee County Florida. \$769,083.00. 2008.

Corkscrew Regional Ecosystem Watershed Hydrology Reconnaissance. PI Brian Bovard. South Florida Water Management District. \$25,000.00. 2008.

Tape Grass Restoration Feasibility Study. PI: D.W. Ceilley. Lee County Board of County Commissioners. \$10,000.00. 2008

Lake Trafford Monitoring Phase II. co-PI: D.W. Ceilley. Big Cypress Subbasin South Florida Water Management District. \$50,000.00, Supplement \$25,000.00 extension to 9/30/08. 2007.

Data analysis of water quality. PI: D.W. Ceilley. Florida Department of Environmental Protection – Bureau of Watershed Management. \$24,487.00. 2007

Six Mile Hydrology Monitoring II. Co-PI: D.W. Ceilley. Lee County Parks and Recreation. \$7,176.00. 2007.

Lake Trafford Watershed Monitoring Plan Phase I Research. Big Cypress Subbasin South Florida Water Management District. \$50,000.00. 2006

Hydrological Monitoring for Six Mile Cypress Slough. KLECE, Inc. \$10,000.00. 2006

Estero Bay Tributaries Riparian Vegetation Analysis. South Florida Water Management District. \$95,000.00. 2006

The ecological impacts of Hurricanes on Forested Ecosystems in southwest Florida. Faculty Research Incentive. Florida Gulf Coast University. \$10,000. 2006

A Rapid Bioassessment Program for Estero Bay Tributaries. EPA Charlotte harbor National Estuary Program. \$19,019. (with J. Cassani, D. Ceilley, and G. Tolley). 1998.

SELECTED PUBLICATIONS

Everham III, E.M., D.W. Ceilley, D.A. Croshaw, J. Firth, C. Gunnels, D.D. Hanson, S. Mariolan, R.J. Spear, B. Thomas, D.E. Van Norman, B.M. Whitmore, and J.R. Cassani. “Ten Years of the Southwest Florida Frog Monitoring Network: Natural Variation and Human-driven Changes. Florida Scientist. Accepted.

Ceilley, D.W., L. Brady-Herrero, K. Niemec, K.M. Ross, J. A. Ferlita, and E.M. Everham III. ish community structure of streams and canals at Babcock Ranch, Charlotte and Lee Counties, Florida. Florida Scientist. Accepted..

Ceilley, D.W., T. Denison, E. M. Everham III and M. Lohr “The Impact of Aeration on Water Quality in Deep and Shallow Wet Retention Ponds in Southwest Florida”. Florida Scientist. Accepted

Lohr, M., K. Arnold, D. W. Ceilley, T. Denison, E. M. Everham III, K. Fikoski, and E. Livingston A collaborative approach to Best Management Practice Monitoring Projects in the Estero Bay Region. Florida Scientist. Accepted.

Julian II, P., E.M. Everham III, and M.B. Main. 2012. “Influence of a large-scale Removal of an Invasive Plant (*Melaleuca quinquenervia*) on Home-range Size and Habitat Selection by Female Florida Panthers (*Puma concolor coryi*) within Big Cypress National Preserve, Florida”. Southeastern Naturalist. In Press.

Dixon, A.D., W.R. Cox, E.M. Everham III, and D.W. Ceilley. 2011. Anurans as biological indicators of restoration success in the Greater Everglades Ecosystem. Southeastern Naturalist. 10(4):629-646.

- Everham, E.M., III, D.W. Ceilley, B.L. Thomas, and D. Hamilton. 2009. Riparian vegetation along tributaries to Estero Bay, Florida. *Florida Scientist*. In Press.
- Key, J.K., E.M. Everham III, D.W. Ceilley, B.L. Thomas, and R. Leisure III. 2009. Surface and groundwater dynamics of a cypress slough in an urbanizing watershed. *Florida Scientist*. In Press.
- Denison, T.J., M.L. Lohr, D.W. Ceilley, and E.M. Everham III. 2008. Water quality evaluation of the impacts of aeration on deep and shallow wet detention ponds in southwest Florida. Proceedings of STORMCON: North American Surface Water Quality Conference. Orlando, Florida.
- Everham, W. 2007. Do you really need that lawn? *Gulfshore Life*. March: 112-118.
- Tolley, S.G., A.K. Volety, M. Savarese, L.D. Wells, C. Linardich, and E.M. Everham III. 2006. Impacts of salinity and freshwater inflow on oyster-reef communities in southwest Florida. *Aquatic Living Resources*. 19: 371-387.
- Pieterston, E.C., L.M. Addison, J.N. Agobian, B. Brooks-Solveson, J. Cassani, and E.M. Everham III. 2006. Five years of the southwest Florida frog monitoring network: changes in frog communities as an indicator of landscape change. *Florida Scientist*. 69(supple. 2): 117-126.
- Brokaw, N., S. Fraver, J.S. Grear, J. Thompson, J.K. Zimmerman, E.M. Everham III, R. Waide, S.P. Hubbell, and R.B. Foster. 2004. Disturbance and canopy structure in two Tropical forests. In E. Losos and E. Leigh Jr. (eds.) *Forest Diversity and Dynamism*. The University of Chicago Press.
- Brokaw, N., J. Thompson, J.K. Zimmerman, E.M. Everham III, R. Waide, and D. Schafer. 2004. Luquillo forest dynamics plot, Puerto Rico, United States. In E. Losos and E. Leigh Jr. (eds.) *Forest Diversity and Dynamism*. The University of Chicago Press.
- E.M. Everham III, J.R. Cassani, S.G. Tolley, and D.W. Ceilley. 2000. A Rapid Bioassessment Program for Estero Bay Tributaries Final Report
- Myster, R.W. and E.M. Everham III. 1999. Germination cues across the disturbance regime in the Puerto Rican rainforest. *Tropical Ecology*. 40(1):89-98.
- Romme, W.H., E.M. Everham, L. E. Frelich, M.A. Moritz, R.E. Sparks. 1998. Are large, infrequent disturbances qualitatively different from small frequent disturbances? *Ecosystems* 1: 524-534.
- Turner, M.G., V.H. Dale, and E.M. Everham III. 1997. Hurricanes, crown fires, and volcanoes: a comparison among large-scale disturbances. *BioScience*. Vol. 47(11): 758-768.
- Everham, E.M. III, R.W. Myster, and E. VanDeGenachte. 1996. Effects of light, moisture and temperature on germination of five tree species in the tropical montane forest of Puerto Rico. *American Journal of Botany*. 83(8): 1063-1068.
- Everham, E.M., III., and N.V.L. Brokaw. 1996. Forest damage and recovery from catastrophic wind. *Botanical Review*. 62(2): 113-185.
- Everham, E.M. III. 1995. A comparison of methods for quantifying catastrophic wind damage to forests. Pages 340-357 in J. Grace and M. Coutts (eds.) *Wind and wind-related damage to trees*. Cambridge University Press.

- Zimmerman, J.K. E.M. Everham III, R.B. Waide, D.J. Lodge, C.M. Taylor, and N.V.L. Brokaw. 1994. Responses of tree species to hurricane winds in a 16 ha plot of low montane forest in Puerto Rico: implications for tropical tree life histories. *Journal of Ecology*. 82: 911-922.
- Hall, C.A.S., M.R. Taylor, and E. Everham. 1992. A geographically-based ecosystem model and its application to the carbon balance of the Luquillo Forest, Puerto Rico. *Water, Air, and Soil Pollution*. 64: 385-404. Reprinted in J. Wisniewski and A.E. Lugo (eds) *Natural Sinks of CO₂*. Kluwer Academic Publishers. Boston.
- Everham, E.M.,III, K.M. Wooster, and C.A.S. Hall. 1991. Forest landscape climate modeling. Proceedings of the 1991 Symposium on Systems Analysis in Forest Resources. USDA Forest Service. General Technical Report SE-74.
- Everham, E.M., III. 1991. A landscape simulation model of forest growth for the Luquillo Experimental Forest, Puerto Rico. In J. McLeod (ed) *Toward Understanding Our Environment*. The Society for Computer Simulation. San Diego.
- Pederson, N., E.M. Everham III, and J. Sahm. 1991. Natural disturbance simulation in the Luquillo Experimental Forest, Puerto Rico. In J. McLeod (ed) *Toward Understanding Our Environment*. The Society for Computer Simulation. San Diego.

James G. Douglass, PhD Florida Gulf Coast University

Assistant Professor – Seagrass Science

Dept. of Marine and Ecological Sciences

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Fort

Myers, FL 33965

About me:

I am an ecologist interested in describing, protecting, and teaching about the biological diversity and beneficial ecosystem functions of coastal marine and estuarine habitats. Coastal

oceans are simultaneously threatened by decreasing water quality, changing physical conditions, and overharvest of ecologically important species. I address the interactive effects of these threats through conservation-directed research and teaching at Florida Gulf Coast University.

I earned my doctorate in 2008 at the Virginia Institute of Marine Science, where I studied the role of small, invertebrate grazers in mediating water quality and food-web changes in Chesapeake Bay eelgrass beds. From 2008 to 2010 I worked as a postdoctoral fellow with the Smithsonian Marine Station in Fort Pierce, Florida, comparing the food-web structure and grazing impacts on seagrass in no-take marine reserves versus areas subject to fishing. From 2010 to 2012 I worked at Northeastern University, managing an algal diversity manipulation at rocky intertidal sites from Massachusetts Bay to Northern Maine, and also investigating seagrass ecology. At FGCU I continue my seagrass research, integrating findings from Florida, Virginia, and New England. My scientific approach combines manipulative experiments with observations of spatial and temporal variation in natural communities, and I strongly believe in the complementary natures of experimental and descriptive ecological research.

Education:

8/02 – 8/08 College of William and Mary, School of Marine Science

- PhD Marine Science, Advisor – J. Emmett Duffy – GPA 3.93 / 4.00
- Teaching assistant for graduate oceanography and undergraduate biology
- Dissertation: *Community dynamics in submersed aquatic vegetation: intermediate consumers as mediators of environmental change*

8/98 – 5/02 Rice University

- BS Biology, Summa Cum Laude, Phi Beta Kappa – GPA 4.03 / 4.30
- Active in “Biology Writing Mentors” program

8/01 – 12/01 Duke Organization for Tropical Studies

- Tropical ecology semester program in Costa Rica – GPA 3.93 / 4.00

5/99 – 6/99 Duke Marine Laboratory

- Marine Invertebrate Zoology course – GPA 4.00 / 4.00

Appointments:

2012 – Present	Associate Professor – Seagrass Science, Florida Gulf Coast U., FL
2010 – 2012	Postdoctoral Research Associate, Northeastern University, MA
2008 – 2010	Postdoctoral Fellow, Smithsonian Marine Station at Fort Pierce, FL

Publications:

JG Douglass, EA Canuel, JE Duffy (2011) Food web structure in a Chesapeake Bay eelgrass bed as determined through gut contents and ^{13}C and ^{15}N isotope analysis. *Estuaries and Coasts* 34: 701-711.

JG Douglass, KE France, JP Richardson, JE Duffy (2010) Seasonal and interannual change in a Chesapeake Bay eelgrass community: insights into biotic and abiotic control of community structure. *Limnology and Oceanography* 55: 1499-1520.

AC Spivak, EA Canuel, JE Duffy, JG Douglass, JP Richardson (2009) Epifaunal community composition and nutrient addition alter sediment organic matter composition in a natural eelgrass *Zostera marina* bed: a field experiment. *Marine Ecology Progress Series* 376: 55-67.

JG Douglass, JE Duffy, JF Bruno (2008) Herbivore and predator diversity interactively affect ecosystem properties in a marine community. *Ecology Letters* 11: 598-608

JG Douglass, JE Duffy, AC Spivak, JP Richardson (2007) Nutrient versus consumer control of community structure in a Chesapeake Bay eelgrass habitat. *Marine Ecology Progress Series* 348: 71-83.

Manuscript from Smithsonian Institution work near Cape Canaveral, Florida, in review:

JG Douglass, EA Reyier, AH Hines (2012) Experimental exclusion of large fishes alters seagrass community structure in a marine reserve. *In review* at Marine Ecology Progress Series

Invited Talks:

- 3/12- Northeastern University, Marine Science Center, Nahant, MA. "Biodiversity – ecosystem function relationships in a food-web context." (Guest lecture for graduate ecology and evolution course.)
- 11/11- Northeastern University Marine Science Center, Nahant, MA. "Animals in Seagrass Beds." (Part of public lecture series.)
- 6/11- Northeastern University, Biology Department, Boston, MA. "Top-down forces in marine benthic ecology." (Guest lecture for undergraduate ecology course. Student reviews available upon request.)
- 5/10- Northeastern University Marine Science Center, Nahant, MA. "Top-down effects in the context of seasonal change in a subtropical seagrass ecosystem."
- 1/10- Florida International University, Miami, FL. "Trophic vs. abiotic influences on seagrass communities".
- 4/09- Florida Institute of Technology, Melbourne, FL. "Top-down vs. bottom-up effects on seagrass community structure."
- 1/09- Florida Atlantic University, Vero Beach, FL. "Seagrass community ecology."
- 6/07- Smithsonian Environmental Research Consortium, Edgewater, MD. "Structure and temporal dynamics in an eelgrass food web."

Recent Presentations at Professional Meetings:

- 3/12- US Environmental Protection Agency, Boston, MA. New England Seagrass Summit Meeting. "ZEN: The *Zostera* Experimental Network."
- 3/12- Benthic Ecology Society, Norfolk, VA. Annual Meeting. "Natural Variation in Community Structure in the Context of a Large Scale Experiment."
- 4/11- Northeast Algal Society, Woods Hole, MA. Annual Symposium. "Same Actors, Different Plays: Quantifying How Ecosystem Effects of Intertidal Algal Diversity Vary Along a 500 km Latitudinal Gradient."

Technical Skills and Experience:

- Database design, management, and query-building with Microsoft Access
- Using Microsoft Excel for resampling and information theory statistics
- Statistical computing with SAS, Minitab, and PRIMER-E
- Proficient with SigmaPlot, Photoshop, and other graphics and video editing programs
- Basic knowledge of R, Matlab, HTML, and ArcGIS

Boating, Diving, and Safety Certifications and Experience:

- Red Cross CPR and First-Aid certified
- USCG boating safety course and small boat operator certification at VIMS, 2003-2008
- Many hours piloting small boats for research in Chesapeake Bay, Florida, and Belize
- Deckhand for three-night trawl surveys on chartered commercial fishing boat off the Oregon Coast and Columbia River mouth as a NMFS intern, 2000
- Additional boating experience as president of VIMS Sail and Paddle Club, 2003-2008
- PADI Advanced Open Water Diver and AAUS Scientific Diver certified
- 95 logged dives beginning in 1996, mostly in cold water, 7 dives logged in 2012

Personal Information:

- US Citizen, born 20 April, 1979 in Seattle, Washington

Michael Lewis Parsons

Department of Marine and Ecological Sciences, and, Coastal Watershed Institute

Florida Gulf Coast University

Fort Myers, Florida 33965

Education

Ph.D. Louisiana State University, Baton Rouge, Louisiana (Biological Oceanography)

B.S. University of Rochester, Rochester, New York (Biology-Geology) 1990

Professional Experience

Director, Coastal Watershed Institute, Florida Gulf Coast University, 2010 - present.

Professor, Department of Marine and Ecological Sciences, Florida Gulf Coast University, 2010 - present.

Co-Director, Coastal Watershed Institute, Florida Gulf Coast University, 2009 - 2010.

Acting Director, Coastal Watershed Institute, Florida Gulf Coast University, 2007 - 2009.

Associate Professor, Department of Marine and Ecological Sciences, Florida Gulf Coast University, 2007 - 2010.

Assistant Director, Tropical Conservation Biology and Environmental Science Masters Program, 2004 - 2006.

Associate Professor, Marine Science Department, University of Hawaii at Hilo, 2004 - 2006.

Assistant Professor, Marine Science Department, University of Hawaii at Hilo, 1999 - 2004.

Post-doctoral Fellow, Louisiana Universities Marine Consortium, 1996 - 1999.

Five publications most relevant to the proposed activities

Parsons, M.L., Aligizaki, K., Bottien Dechraoui, M.Y., Fraga, S., Morton, S.L., Penna, A., and L. Rhodes. 2012. A reassessment of the state of knowledge of *Gambierdiscus* and *Ostreopsis* in the fields of taxonomy, biogeography, ecophysiology, and toxicology. Invited manuscript. **Harmful Algae** 14: 107-129.

Parsons, M.L., Okolodkov, Y.B., and J.A. Aké-Castillo. 2012. Morphology of the species of *Pseudonitzschia* (Bacillariophyta) of the National Park Sistema Arrecifal Veracruzano, SW Gulf of Mexico. **Acta Botanica Mexicana** 98: 51-72.

- Parsons, M.L., Settlemyer, C.J., and P.K. Bienfang. 2010. A simple model capable of simulating the population dynamics of *Gambierdiscus*, the benthic dinoflagellate responsible for ciguatera fish poisoning. **Harmful Algae** 10: 71-80.
- Parsons, M. L., W. J. Walsh, C. J. Settlemyer, D. J. White, J. M. Ballauer, P. M. Ayotte, K. M. Osada and B. Carman. 2008. A multivariate assessment of the coral ecosystem health of two embayments on the lee of the island of Hawai'i. **Marine Pollution Bulletin** 56: 1138-1149.
- Parsons, M.L. and L.B. Preskitt. 2007. A survey of epiphytic dinoflagellates from the coastal waters of the island of Hawai'i. **Harmful Algae** 6: 658-669.

Five other significant publications

- Parsons, M. L., Q. Dortch and R. E. Turner. 2002. Sedimentological evidence for an increase in *Pseudo-nitzschia* (Bacillariophyceae) abundance in response to coastal eutrophication. **Limnology and Oceanography** 47: 551-558.
- Pan, Y., Parsons, M.L., Busman, M., Moeller, P., Dortch, Q., Powell, C.L., Fryxell, G.A., and G.J. Doucette. 2001. *Pseudo-nitzschia* cf *pseudodelicatissima* - a confirmed producer of domoic acid from the northern Gulf of Mexico. **Marine Ecology Progress Series** 220: 83-92.
- Parsons, M. L., Q. Dortch, R. E. Turner and N. N. Rabalais. 1999. Salinity history of coastal marshes reconstructed from diatom remains. **Estuaries** 22: 961-972.
- Parsons, M. L., C. A. Scholin, P. E. Miller, G. J. Doucette, C. L. Powell, G. A. Fryxell, Q. Dortch and T. M. Soniat. 1999. *Pseudo-nitzschia* in Louisiana coastal waters: molecular probe field trials, genetic variability, and domoic acid analyses. **Journal of Phycology** 35: 1368-1378.
- Dortch, Q., Moncreiff, C.A., Mendenhall, W., **Parsons, M.L.**, Franks, J.S., and K.W. Hemphill. 1998. Spread of *Gymnodinium breve* into lower salinity waters in the northern Gulf of Mexico. In: Reguera, B., Blanco, J., Fernández, M.L. and T. Wyatt. Harmful Algae, Xunta de Galicia and IOC, p. 143-144.

Recent Synergistic Activities

Member, National Harmful Algal Bloom Committee, July 2009 – June 2012; Board Member, Solutions To Avoid Red Tide (START), November 2007 – present; University Science Day, Veteran's Memorial Elementary School, June 2009, 2010, 2011; Estuary Conservation Association Guardian Committee

Member, June 2009 – 2010; Instructor, Gulf of Mexico Harmful Algal Bloom Workshop, St. Petersburg, FL, June 1 – 5, 2009; Member, Steering Committee, Red Tide Control and Mitigation Workshop, February 9 – 11, 2010, Mote Marine Laboratory, Sarasota, FL.

Collaborators over the last 48 months:

Don Anderson (WHOI), Paul Bienfang (University of Hawaii), Larry Brand (U. Miami), Loren Coen (SCCF), Clinton Dawes (USF), Quay Dortch (NOAA NOS), Greg Doucette (NOAA Marine Biotoxins Program), Deana Erdner (UTMSI), Ray Grizzle (U. New Hampshire), Cindy Heil (FWRI), Ai Ning Loh (FGCU), Eric Milbrandt (SCCF), Steve Morton (Marine Biotoxins Program), Joanne Muller (FGCU), Yuri Okolodkov (U. Veracruz), Ernst Peebles (USF), Nancy Rabalais (Louisiana Universities Marine Consortium), Bernard Riegl (Nova SE), Alison Robertson (FDA GCSL), Darren Rumbold (FGCU), S. Gregory Tolley (FGCU), R. Eugene Turner (Louisiana State University), Tracy Villareal (UTMSI), Aswani Volety (FGCU).

NAME: Richard D. Bartleson, Ph.D. **PROFESSIONAL ADDRESS**
POSITION: Research Scientist Sanibel-Captiva Conservation Foundation
 Marine Laboratory
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 Sanibel, FL 33957
TELEPHONE NO: (239) 395-4617 **FAX NO:** (239) 395-4616
EMAIL: rbartleson@sccf.org

EDUCATION

<u>University</u>	<u>Major</u>	<u>Dates</u>	<u>Degree</u>
University of South Florida	Biology	1980	B.A.
University of Florida	Eng. Science	1988	M.S.
University of Maryland, College Park	Env. Science	2004	Ph.D.
South Florida Water Management District		2002-2005	Post-Doc

PROFESSIONAL EXPERIENCE

<u>Dates (yrs.)</u>	<u>Position</u>	<u>Employer/Affiliation</u>
2009-present	Courtesy Faculty and Member	Florida Gulf Coast University
2010-present	Coastal Watershed Institute	Florida Gulf Coast University
2006-present	Research Scientist	SCCF Marine Laboratory
2002-2005	Sr. Environmental Scientist	South Fla. Water Mgmt. District/SCI
2000-2002	Seagrant Fellow	Univ. of Maryland/ Maryland Seagrant
1988-2000	Sr. Faculty Research Assistant	Univ. of Maryland, Horn Point Lab
1986-1988	Faculty Research Assistant	USFWS Co-op Unit, Univ. of Florida

SELECTED PUBLICATIONS

- Bartleson R.D.** 1988. The relative influence of current reduction by seagrasses on sediment nutrients and seagrass growth in high and low nutrient waters: a simulation model and field observations. University of Florida, Master's thesis. 77 pp.
- Pearlstine, L.G., W.M. Kitchens, P.J. Latham, and **R.D. Bartleson**, 1993. Tide gate influences on a tidal marsh. *Water Res Bull* 29:1009-1019
- Murray, L., R.B. Sturgis, **R.D. Bartleson**, W. Severn, and W.M. Kemp, 2000. Scaling submersed plant community responses to experimental nutrient enrichment. pp. 241-257 in: Bortone SA (ed) *Seagrasses: Monitoring, Ecology, Physiology, and Management*. CRC Press, Boca Raton, FL
- Batiuk, R., P. Bergstrom, M. Kemp, E. Koch, L. Murray, C. Stevenson, **R. Bartleson**, V. Carter, N. Rybicki, J. Landwehr, C. Gallegos, L. Karrh, M. Naylor, D. Wilcox, K. Moore, S. Ailstock, M. Teichberg. 2000. Chesapeake Bay submerged aquatic vegetation water quality and habitat-based requirements and restoration targets: A second technical synthesis. CBP/TRS 245/00. EPA 903-R-00-014, U.S. EPA, Chesapeake Bay Program, Annapolis, MD
- Petersen J.E., W.M. Kemp, **R.D. Bartleson**, W.R. Boynton, C.C. Chen, J.C. Cornwell, R.H. Gardner, D.C. Hinkle, E.D. Houde, T.C. Malone, W.P. Mowitt, L. Murray, L.P. Sanford, and S.E. Suttles, 2003. Multiscale Experiments in Coastal Ecology: Improving Realism and Advancing Theory. *Bioscience* 53:1181-1197
- Bartleson, R.D.** 2004 Interactions of seagrass beds and the water column: effects of bed size and hydrodynamics. Ph.D. Dissertation, University of Maryland at College Park, College Park, 235 pp.
- Kemp W.M., R. Batiuk, **R.D. Bartleson**, P. Bergstrom, V. Carter, C.L. Gallegos, W. Hunley, L. Karrh, E.W. Koch, and J.M. Landwehr, 2004. Habitat requirements for submerged aquatic vegetation in Chesapeake Bay: water quality, light regime, and physical-chemical factors. *Estuaries* 27 (3):363-377
- Bartleson R.D.**, W.M. Kemp, J.C. Stevenson, 2005. Model analysis of effects of trophic complexity on *Potamogeton perfoliatus* biomass and growth in microcosms. *Ecological Modelling* 185:483-512
- Bartleson R.D.**, M.J. Hunt, and P.H. Doering. Physiological responses of *Vallisneria americana* to light, temperature and salinity. *Journal of Aquatic Plant Management*. In prep.

Current Support

<u>Granting Agency</u>	<u>Title</u>	<u>Amount, Time%</u>
USFWS	Flex Funds, J.N. Ding Darling NWR, Algae Bloom Nutrient Source Tracking 2011-2013	\$24,400, 5%
USFWS	Flex Funds, J.N. Ding Darling Landscape-Scale Assessment of Water Quality and Critical Seagrass Habitats 2011-2013	\$57,209, 5%
NSF-DBI	Biological Field Stations & Marine Labs Program, Comprehensive Planning for a Sustainable Mar. Res. Lab., 2010-2011	\$18,825, 2%
NACo	Restoration of critical marine habitats (mangrove, SAV, oyster) in coastal Lee County, FL, 10/09- 9/11	\$70,500, 5%
Humiston & Moore	<i>Halodule</i> restoration of prop scars of seagrass beds around Tarpon Bay FL, 12/10- 12/15	\$39,257, 5%

Pending Support

<u>Granting Agency</u>	<u>Title</u>	<u>Amount, Time%</u>
NOAA	This HAB Proposal	\$300,000, 10%

Collaborators

Peter Doering, Melody Hunt South Florida Water Management District, David Fugate, Florida Gulf Coast University, Advisors: W.M. Kemp, J.C. Stevenson, L. Sanford, J. Cornwell, University of Maryland

Lyn A Gettys, PhD • lgettys@ufl.edu

UF/IFAS FLREC, 3205 College Avenue, Davie FL 33314 • Office 954.577.6331

Education

PhD (2005) *University of Florida Department of Agronomy*

Plant Genetics and Breeding

MS (2000) *North Carolina State University Department of Horticultural Science*

Plant Breeding (minor – Statistics)

BS (1996) *University of Florida Department of Environmental Horticulture – FLREC*

Environmental Horticulture (highest honors)

AA (1990) *Palm Beach Community College*

Advertising Design

Experience – current position

01/2012 – present *Assistant Professor: Aquatic and Wetland Plants (60% research, 40% extension)*

University of Florida IFAS/FLREC – Fort Lauderdale; Department of Agronomy

My primary research responsibility at the University of Florida is to serve as the aquatic plants lead for south Florida in cooperation with weed science faculty in the Agronomy Department and the Center for Aquatic and Invasive Plants in Gainesville. I conduct applied and basic research on the biology,

physiology, ecology and integrated control methods for aquatic and wetlands weeds. I also investigate cultural techniques, herbicides and biocontrol agents for their control, including efficacy, mode of action, resistance and non-target effects. In addition, I investigate methods for propagation of native aquatic and wetland plants and develop techniques to improve the success rate of aquatic and wetland restoration and revegetation projects. My extension responsibilities include assisting in the coordination of State-wide extension education programming on aquatic and wetlands native and invasive plant species, providing training to county faculty, state and federal agency personnel and the commercial industry with an emphasis on herbicide application training for restricted use pesticide licenses and use of biological controls, and developing educational materials for distribution throughout the state to public agencies, commercial enterprises, professional societies and the public at large. I also provide leadership for the annual Aquatic Weed Short course held in south Florida. I publish in refereed journals, produce extension publications and obtain extramural funding to support my research and extension programs. I actively participate in undergraduate education and graduate education by chairing graduate committees, serving on graduate committees, supervising thesis and dissertation research, supervising undergraduate research and publishing results with graduate students.

Previous positions

10/2009 – 12-2011	<i>Research Assistant Scientist: Plant Growth, Revegetation, Breeding, and Genetics</i>
04/2007 – 10/2009	<i>Post-doctoral Associate: Plant Growth, Revegetation, Breeding, and Genetics</i> University of Florida – Gainesville; Center for Aquatic and Invasive Plants
01/2006 – 01/2007	<i>Scientist: Plant Breeder</i> UST Inc./Profigen/F.W. Rickard Seeds; Mebane NC
08/2005 – 12/2005	<i>Post-doctoral Associate</i>

University of Florida – Gainesville; Center for Aquatic and Invasive Plants

08/2001 – 08/2005 *Doctoral Research Fellow under the supervision of Dr. David Wofford*

University of Florida – Gainesville; Department of Agronomy

08/1998 – 12/2000 *Research Assistant under the supervision of Dr. Dennis Werner*

North Carolina State University – Raleigh; Department of Horticultural Science

08/1996 – 08/1998 *OPS Biologist for Dr. David Sutton*

University of Florida IFAS/FLREC – Fort Lauderdale; Department of Agronomy

06/1987 – 08/1996, *Production Manager*

04/1997 – 08/1998 Sir Speedy – West Palm Beach, Florida

Classes taught

AGR4932: Introduction to Genetics and Genomics (UF Agronomy)

AGR3303: Genetics (UF Agronomy)

AGR2332: Seeds of Change (UF Agronomy)

HS301: Plant Propagation (NCSU Horticultural Science)

Selected publications 2007-present

Genetics and inheritance

- **Gettys LA.** 2012. Genetic control of white flower color in scarlet rosemallow (*Hibiscus coccineus* Walter). *Journal of Heredity* 103(4):594-597.
- **Gettys LA** and DS Wofford. 2008. Genetic control of floral morph in tristylous pickerelweed (*Pontederia cordata* L.). *Journal of Heredity* 99(5):558-563. doi: 10.1093/jhered/esn031.

- **Gettys LA** and DS Wofford. 2007. Inheritance of flower color in pickerelweed (*Pontederia cordata* L.). Journal of Heredity 98(6):629-632. doi:10.1093/jhered/esm069.
- **Gettys LA** and DS Wofford. 2007. Genetic control of albinism in pickerelweed (*Pontederia cordata* L.). Journal of Heredity 98(4):356-359. doi:10.1093/jhered/esm046.

Herbicide testing and application methods

- **Gettys LA** and WT Haller. 2012. Effect of herbicide-treated irrigation water on four garden vegetables. Weed Technology 26(2):272-278.
- Haller WT, **LA Gettys** and MS Glenn. 2011. Constructing weighted trailing hoses for submersed aquatic herbicide applications (IFAS Publication Number SS-AGR-352). Gainesville: University of Florida Institute of Food and Agricultural Sciences. <http://edis.ifas.ufl.edu/pdffiles/AG/AG36000.pdf>.
- **Gettys LA** and WT Haller. 2010. Response of selected foliage plants to four herbicides in irrigation water. HortTechnology 20(5):921-928.
- **Gettys LA** and WT Haller. 2009. Tolerance of selected bedding plants to four herbicides in irrigation water. HortTechnology 19(3):546-552.
- Haller B, **L Gettys**, M Glenn and G Reynolds. 2007. Building weighted trailing hoses. Aquatics 29(4):8-14.
Florida Aquatic Plant Management Society, Inc. Tallahassee, FL.
- Mudge CR, **LA Gettys** and WT Haller. 2007. Effect of four herbicides on watermeal. Aquatics 29(4):4-6.
Florida Aquatic Plant Management Society, Inc. Tallahassee, FL.

Propagation and culture

- **Gettys LA** and WT Haller. 2012 (in press). Greenhouse culture of submersed aquatic vegetation "sod." Proceedings of Florida State Horticultural Society 125.
- **Gettys LA**, WT Haller, E Hayes and K Thayer. 2012. Production of eelgrass sod for use in lake restoration projects. Aquatics 34(1):4-8. Florida Aquatic Plant Management Society, Inc. Tallahassee, FL.

- **Gettys L.** 2011. Adding to the restoration toolbox: identifying widely adapted biotypes of eelgrass. *Aquaphyte* 30(1):5.
- **Gettys L.** 2011. Adding to the restoration toolbox: identifying widely adapted biotypes of eelgrass. *Hydrophyte* 15(4):10.
- **Gettys LA** and RK Dumroese. 2009. Optimum storage and germination conditions for seeds of pickerelweed (*Pontederia cordata* L.) from Florida. *Native Plants Journal* 10(1):4-12.

Other publications

- **Gettys LA. 2012.** Book review: Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation 15th Anniversary Journal. Marietta, GA.
- **Gettys L.** 2012. The 2012 Aquatic Weed Control Short Course. AERF News 5:3. Aquatic Ecosystem Restoration Foundation, Marietta, GA.
- Orozco Obando W, FM Woods, KM Tilt, D Tian, JR Kessler, F Dane, WG Foshee, JL Sibley, A Caylor, J Olive, D Fields, JA Chappell, D Cline, **LA Gettys** and K Moore. 2012 (in press). Can lotus (*Nelumbo* spp.) be used to remove heavy metals from contaminated Florida soils? Proceedings of Florida State Horticultural Society 125.
- **Gettys LA.** 2012. Book review: Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation 15th Anniversary Journal. Marietta, GA.
- Mudge CR, WT Haller and **LA Gettys.** 2011. Thermocline, north versus south: friend or foe. *Aquatics* 33(1):12-14. Florida Aquatic Plant Management Society, Inc. Tallahassee, FL.
- **Gettys LA.** 2009. Chapter 13.1: waterhyacinth, pp. 113-118. In: Biology and control of aquatic plants: a best management practices handbook (Gettys LA, WT Haller and M Bellaud, eds.). Aquatic Ecosystem Restoration Foundation. Marietta, GA.
- **Gettys LA,** WT Haller, CR Mudge and TJ Koschnick. 2008. Effect of temperature and feeding preference on submersed plants by the island apple snail, *Pomacea insularum* (D'Orbigny, 1839) (Ampullariidae). *The Veliger* 50(3):248-254.
- **Gettys LA** and WT Haller. 2007. Apple snails in Florida. *Aquatics* 29(3):4-9. Florida Aquatic Plant Management Society, Inc. Tallahassee, FL.

Book Chapters Written

- **Gettys LA** and GE MacDonald. 2012 (in prep). Herbicides in aquatic systems. Herbicides: Book 1. InTech Publishing.
- **MacDonald and LA Gettys**. 2012 (in prep). Herbicides for use in the aquatic environment. Herbicides: Book 1. InTech Publishing.

Books Edited

- **Gettys LA**, WT Haller and M. Bellaud (eds). 2009. Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation. Marietta, GA.
- **Gettys LA** and WT Haller. 2013 (in prep). Biology and control of aquatic plants: a best management practices handbook, 3rd edition. Aquatic Ecosystem Restoration Foundation, Marietta, GA.

Abstracts

- **Gettys LA**, W Orozco Obando and FC Reed III. 2012. Effect of water depth and sediment composition on vegetative reproduction of the invasive aquatic weeds rotala [*Rotala rotundifolia* (Buch.-Ham. ex Roxb.) Koehne] and hygrophila [*Hygrophila polysperma* (Roxb.) T. Anders]. 52nd Annual Meeting of the Aquatic Plant Management Society. Salt Lake City, Utah.
- **Gettys LA**. 2012. Aquatic weed control in south Florida – new plants, new challenges, new solutions. 2012 Annual Meeting of the Florida Weed Science Society.
- Obando WO, **LA Gettys**, KA Moore, FD Woods and D Tian. 2012 (in press). Evaluation of a collection of lotus (*Nelumbo* spp.) germplasm for ornamental, medicinal, and edible food crop potential. HortScience. (Abstr.)
- Uchida T, T Arase, **LA Gettys**, WT Haller and D Hayasaka. 2012. Dispersal risk of timothy (*Phleum pratense* L.) through cloning from stem segments. Proceedings of the 4th Japan-China-Korea Grassland Conference, pp. 108-109. Aichi, Japan.
- **Gettys LA**. 2011. Be on the lookout: Florida's newest aquatic invaders. 35th Annual Meeting of the Florida Aquatic Plant Management Society. St. Augustine, FL.

- DeCrecy AD, WT Haller and **LA Gettys**. 2011. Effects of irrigation water containing the EUP products topramezone, quinclorac and bispyribac on turfgrasses. 35th Annual Meeting of the Florida Aquatic Plant Management Society. St. Augustine, FL.
- Haller WT and **LA Gettys**. 2011. New herbicide registrations and resistance management. 35th Annual Meeting of the Florida Aquatic Plant Management Society. St. Augustine, FL.
- Haller WT, **LA Gettys** and CR Mudge. 2011. Giant salvinia - a potential disaster for Florida aquatic ecosystems. 35th Annual Meeting of the Florida Aquatic Plant Management Society. St. Augustine, FL.
- **Gettys LA** and WT Haller. 2010. Response of selected foliage plants to four herbicides in irrigation water. 50th Annual Meeting of the Aquatic Plant Management Society. Bonita Springs, FL.
- **Gettys LA** and DS Wofford. 2009. Genetic control of floral morph in tristylous pickerelweed (*Pontederia cordata* L.). 106th Annual Meeting of the American Society for Horticultural Science. St. Louis, MO.
- **Gettys LA** and WT Haller. 2009. Tolerance of selected bedding plants to four herbicides in irrigation water. 106th Annual Meeting of the American Society for Horticultural Science. St. Louis, MO.
- BW Bultemeier, WS Judd and **LA Gettys**. 2009. The new taxonomy of plants: what impact does this have on aquatic plants? 49th Annual Meeting of the Aquatic Plant Management Society. Milwaukee, WI.
- ST Berger, **LA Gettys** and WT Haller. 2009. Tolerance of selected bedding plants to four herbicides in irrigation water. 49th Annual Meeting of the Aquatic Plant Management Society. Milwaukee, WI.
- **Gettys LA** and WT Haller. 2008. Effect of nutrient levels on biometric characters of *Vallisneria americana* Michx. 105th Annual Meeting of the American Society for Horticultural Science. Orlando, FL.
- **Gettys LA** and WT Haller. 2008. Effect of nutrient levels on biometric characters of *Vallisneria americana* Michx. 48th Annual Meeting of the Aquatic Plant Management Society. Charleston, SC.
- **Gettys LA** and DS Wofford. 2008. Genetic control of floral morph in tristylous pickerelweed (*Pontederia cordata* L.). Genetics 2008: University of Florida Genetics Institute Conference. Gainesville, FL.
- Haller WT, **LA Gettys** and TF Chiconela. 2008. The explosion of exotic island apple snails in Florida – impact and control. 48th Annual Meeting of the Aquatic Plant Management Society. Charleston, SC.

Service

- Member of Board of Directors: South Florida Aquatic Plant Management Society. 2012-.
 - Member of Broward County Extension Overall Advisory Committee. 2012-.
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- Member of Technical Program Committee – Florida Aquatic Plant Management Association. 2012-.
- Member of Technical Program Committee – International Conference on Aquatic Invasive Species. 2012-.
- Organizer and Program Chair: South Florida Graduate Research Symposium. Davie, FL. 2012.
- Representative/Host: UF IFAS Water Matters Exhibit. Smithsonian Folklife Festival. Washington DC. 2012.
- Member of Executive Staff: Aquatic Ecosystem Restoration Foundation (AERF). 2011-.
- Co-editor: AERF 15th Anniversary Publication. 2011-2012.
- Exhibit Representative: UF Center for Aquatic and Invasive Plants at Sunbelt AgExpo. 2011.

Extension

- Organizer: University of Florida Aquatic Weed Control Short Course. 2012.
- Remote Site Host: IFAS CEU Day. Davie, FL. 2012.
- Aquatic Pest Control Training – UF/IFAS Extension Homestead Office. 2012.
- CORE/General Standards Training – South Broward Drainage District. 2012.
- Aquatic Pest Control Training – South Broward Drainage District. 2012.
- Aquatic Plant Identification – South Broward Drainage District. 2012.
- Orange County Summer Weeds Training: Aquatic weed control in DOT canals. Orlando, FL. 2012.
- Broward County Summer Weeds Training: Aquatic weed control in DOT canals. Ft. Lauderdale, FL. 2012.
- Dade County Summer Weeds Training: Aquatic weed control in DOT canals. Miami, FL. 2012.
- Spring Soils BMP Day: Aquatic weed control in EAA canals. Belle Glade, FL. 2012.
- Co-organizer: University of Florida Aquatic Weed Control Short Course. 2011.
- Aquatic Plant Identification – University of Florida Aquatic Weed Control Short Course. 2008-2012.

Memberships

- American Genetics Association
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- Aquatic Ecosystem Restoration Foundation
 - Aquatic Plant Management Society
 - Florida Aquatic Plant Management Society
 - Florida Exotic Pest Plant Council
 - Gamma Sigma Delta
 - Pi Alpha Xi
 - South Florida Aquatic Plant Management Society
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Education

B.S., 1983, School of Public Health, University of North Carolina at Chapel Hill, NC, Biostatistics

M.A., 1996, School of Marine Science, Virginia Institute of Marine Science, College of William and Mary, Biological Sciences,

Ph.D., 2002, School of Marine Science, Virginia Institute of Marine Science, College of William and Mary, Physical Sciences, advisor: Carl Friedrichs

Postdoctoral, 2003-2005, Institute of Marine and Coastal Science, Rutgers University, advisor: Robert Chant

Mentoring and Training

Classes: Marine Systems, Scientific Processes, Physical Oceanography, Coastal and Estuarine Sediment dynamics

Advising graduate and undergraduate students at Florida Gulf Coast University

Summer 2000, 2001, Co-mentored undergraduate students

Grants Awarded

2009, MRI-R2: Acquisition of a Laboratory Research and Teaching Flume for Estuarine Sediment Bed and Ecological Research and Education, co-PI Mike Parsons, \$220,525

2007, South Florida Water Management District, Dynamics of the Estuarine Turbidity Maximum (ETM) in the St Lucie Estuary, \$49900

2007, South Florida Water Management District, Dynamics of the Estuarine Turbidity Maximum (ETM) in the Caloosahatchee River, \$25550

2007, Charlotte Harbor National Estuarine Program, "Fate of Caloosahatchee River ETM Associated Sediment", \$15000

2006, New Jersey Sea Grant, "Estimation of the fall velocity of suspended sediment in the Passaic R., NJ", \$76,000

Professional Affiliations

American Geophysical Union.

Estuarine Research Federation.

Publications

Chant, R.J., **Fugate, D.C.** and Garvey, E., 2011, The shaping of an estuarine superfund site: roles of evolving dynamics and geomorphology, *Estuaries and Coasts* (34)1, pp 90-1-5.

Hunt, H.L., **Fugate, D.C.**, and Chant, R.J., 2009. Modeling bedload transport of juvenile bivalves: predicted changes in distribution and scale of postlarval dispersal, *Estuaries and Coasts* 32(6), 1090-1102

Fugate, D.C., and C.T. Friedrichs, 2007, Lateral dynamics and associated transport of sediment in the upper reaches of a partially mixed estuary, Chesapeake Bay, USA, *Continental Shelf Research* 27, 679-698.

Fugate, D.C., R.J. Chant, 2006, Aggregate settling velocity of combined sewage overflow. *Marine Pollution Bulletin* 52, pp 427-432

Fugate, D.C., C.T. Friedrichs, A. Bilgili, 2006, Estimation of Residence Time in a Shallow Back Barrier Lagoon, Hog Island Bay, Virginia, USA., in, Estuarine and Coastal Modeling, Proceedings of the Ninth International Conference, October 31-November 2, 2005, Charleston, SC, ed. Spaulding, ML, American Society of Civil Engineers, 864 pp.

Fugate, D.C., and R.J. Chant, 2005, Near bottom stresses in a small highly stratified estuary, *Journal of Geophysical Research* 110, C03022, doi:10.1029/2004JC002563.

Fugate, D.C., and C.T. Friedrichs, 2003, Controls on Suspended Aggregate Size in Partially Mixed Estuaries, *Estuarine Coastal and Shelf Science*, 58, pp 389-404.

Fugate, D.C., and C.T. Friedrichs, 2002. Determining concentration and fall velocity of estuarine particle populations using ADV, OBS, and LISST. *Continental Shelf Research* 22, pp. 1867-1886.

Lawson, S.E., P.L. Wiberg, K.J. McGlathery and **D. Fugate**, 2007, Wind-driven sediment suspension controls light availability in a shallow coastal lagoon, *Estuaries and Coasts*(30)1, pp 102-112.

Conrad, C.F., **Fugate, D.C.**, Daus, J., Chisholm-Brouse, C.J., Kuehl, S.A., 2007, Assessment of the historical trace metal contamination of sediments in the Elizabeth River, Virginia, *Marine Pollution Bulletin* 54, pp 385-395.

Sanford, L.P., P.J. Dickhudt, L. Rubaiano-Gomez, M. Yates, S.E. Suttles, C.T. Friedrichs, **D.C. Fugate** and H. Romine, 2005. Variability of suspended particle concentrations, sizes and settling velocities in the Chesapeake Bay turbidity maximum. In: I.G. Droppo, G.G. Leppard, P. Liss, and

T. Milligan (eds.) Flocculation in Natural and Engineered Environmental Systems. CRC Press, Boca Raton, FL..

Kuehl, S.A., Brunskill, G.J., Burns, K., **Fugate, D.C.**, and Kniskern, T., 2004. Nature of sediment dispersal off the Sepik River, Papua New Guinea: Preliminary sediment budget and implications for margin processes. *Continental Shelf Research* 24. pp 2417-2429.

Hunt, H.L., and Maltais, M.J., **Fugate, D.C.**, and Chant, R.J., 2007, Spatial and temporal variability in juvenile bivalve dispersal: effects of sediment transport and flow regime, *Marine Ecology Progress Series* 352, pp 145-159.