

Research Department Update October 24, 2018

Recent Research and Restoration Events

May 17-19 – Pam Hopkins attended Florida Native Plant Society annual conference on ‘Restoration’.

May 22 – Expanded reefs at Flagler park to incorporate new mangrove and salt marsh planting methods as part of pilot project to test mangrove plantings methods.

May 24 – Kathryn Tiling lead the FOS monthly seagrass survey with 6 volunteers.

May 30 – Kathryn Tiling monitored seagrass plot size experiment at LS04 (deployed in April) under the IRL NEP 2017-2018 FOS grant.

June 4 – FOS camp (18campers) participated in mangrove and salt marsh planting with Glenn Coldren and interns (Arielle, Owen, Caroline) to support summer living shoreline deployments.

June 5 – Seagrass genetic samples were collected by Kathryn Tiling, Glenn Coldren, Intern Gabriel Kammel-O’Donnell, and Co-PI Laura Reynolds (UF) at sites from FOS to Vero Beach. These samples are part of a lagoon-wide genetic diversity study under the IRL NEP 2017-2018 FOS grant.

June 6 – Built large (~600 bags) reefs at Ellyn’s living shoreline site.

June 7 – 26 volunteers came out to make 582 bags for future oyster restoration with Vincent Encomio. Pam Hopkins represented FOS on the Martin County Agricultural and Natural Resources Advisory Committee (ANRAC) .

June 8 – Built large (~600 bags) reefs at Ellyn’s living shoreline site.

June 11 – Kathryn Tiling held a seagrass fragment collection workshop for 1 volunteer to support our seagrass collection portion of FOSTER. FOS camp (18 campers) participated in mangrove and salt marsh planting with Glenn Coldren to support summer living shoreline deployments.

June 15 – Glenn Coldren and interns used bags that had failed to recruit oysters at River Cove to build 3 reefs at the same site that are higher elevation and incorporate new planting methods for mangrove as part of pilot project to test mangrove plantings methods.

June 18 – FOS camp (18 campers) participated in mangrove and salt marsh planting with Glenn Coldren to support summer living shoreline deployments.

June 21 – Kathryn Tiling and Glenn Coldren attended East Central Estuarine Restoration Team meeting at the Savannas Preserve. Vincent Encomio and Glenn Coldren deployed one reefs with turrets where salt marsh was planted into the reef with the aid of a Smithsonian Marine Station summer camp (9 campers). Campers also deployed salt marsh and mangroves into the rip rap for shoreline stabilization.

June 22 - Kathryn Tiling and interns monitored seagrass plot size experiment at LS04 (deployed in April) under the IRL NEP 2017-2018 FOS grant.

June 27 – Kathryn Tiling lead the FOS monthly seagrass survey with 1volunteers and 9 Team OCEAN participants. FOS camp (18 campers) participated in mangrove and salt marsh planting with Glenn Coldren to support summer living shoreline deployments. Theresa Gruninger, a masters student from UF, installed her first experiment on effects of reefs on seagrass herbivory at two restoration sites.

July 4 – UF colleagues collected remaining seagrass genetic samples from the north IRL as part of a lagoon-wide genetic diversity study under the IRL NEP 2017-2018 FOS grant.

- July 9** – Kathryn Tiling held a seagrass matting event with 4 volunteers to prepare for seagrass genetic diversity restoration experiments under the IRL NEP 2017-2018 FOS grant. They created 24 mats. UF masters student, Theresa Gruninger, collected her deployed experiment on reefs and seagrass herbivory effects.
- July 10** – Glenn Coldren and Kathryn Tiling led ‘Research Day’ with FOS camp (9 campers) that planted the seagrass genetic diversity restoration experiment (mats created 7/9) and deployed two reefs to incorporate salt marsh plantings as part of pilot project to test shoreline plantings methods. Pilot oyster cores were also deployed to test methodology.
- July 11** – 6 Team OCEAN participants made 70 bags for future oyster restoration with Vincent Encomio. Kathryn Tiling held a seagrass fragment collection workshop for 8 volunteers to support our seagrass collection portion of FOSTER.
- July 17** – Kathryn Tiling held a seagrass matting event with 10 volunteers to prepare for seagrass plot size restoration experiments under the IRL NEP 2017-2018 FOS grant. They created 27 mats.
- July 18** – REEF Great Annual Fish Count was again hosted at Bathtub Beach. This marks our 6th straight year of fish surveys at Bathtub Beach.
- July 19** – Kathryn Tiling and Glenn Coldren lead seagrass and oyster reef deployment with Smithsonian Marine Station summer camp (10 campers). Seagrass deployment was part of the plot size restoration experiments under the IRL NEP 2017-2018 FOS grant (mats created 7/17). Campers deployed a third reef with turrets for salt marsh plants. Salt marsh plants were planted into previously built reefs as well.
- July 21** – 31 volunteers came out to make 183 bags for future oyster restoration with Vincent Encomio.
- July 23** – Kathryn Tiling and interns planted a seagrass genetic diversity experiment in the FOS nursery tanks as part of the IRL NEP 2017-2018 FOS grant. 30 experimental trays were established.
- July 27** – Theresa Gruninger, a masters student from UF, installed her second experiment on effects of reefs on seagrass herbivory at two restoration sites.
- July 30** – FOS interns monitored the mesocosm seagrass genetic diversity experiment at FOS.
- August 6** – FOS interns monitored the mesocosm seagrass genetic diversity experiment at FOS.
- August 9** – Kathryn Tiling and interns monitored seagrass restoration projects at all sites as part of the IRL NEP 2017-2018 FOS grant. UF masters student, Theresa Gruninger, collected her deployed experiment on reefs and seagrass herbivory effects.
- August 13** – Kathryn Tiling held a seagrass fragment collection workshop for 4 volunteers to support our seagrass collection portion of FOSTER. FOS interns monitored the mesocosm seagrass genetic diversity experiment at FOS.
- August 20** - FOS interns monitored the mesocosm seagrass genetic diversity experiment at FOS.
- August 24** – 19 volunteers came out to make 287 bags for future oyster restoration with Vincent Encomio.
- August 27** – FOS interns monitored the mesocosm seagrass genetic diversity experiment at FOS.
- September 6** – Kathryn Tiling and interns monitored seagrass restoration projects at all sites as part of the IRL NEP 2017-2018 FOS grant. FOS interns monitored the mesocosm seagrass genetic diversity experiment at FOS.
- September 13** – c Pam Hopkins represented FOS at ANRAC meeting.

September 17 – Kathryn Tiling held a seagrass fragment collection workshop for 5 volunteers to support our seagrass collection portion of FOSTER.

September 19 – Glenn Coldren and intern Arielle Velazquez initiated a oyster settlement experiment to test effects of tide depth during and after king tides, height off reefs and settlement substrate material.

September 22 – 8 volunteers came out to make 126 bags for future oyster restoration with Glenn Coldren as part of the coastal center’s “Estuaries Day”.

October 1 – Intern Arielle Velazquez and Glenn Coldren monitored oyster recruitment at three sites as part of monthly monitoring.

October 4 – Glenn Coldren and Vincent Encomio (FL Sea Grant) participated in “A day in the Life” – a one day data collection with local high school groups. Organizations and schools throughout the IRL participated in this one day event.

October 11 – FOS interns monitored the mesocosm seagrass genetic diversity experiment at FOS.

October 13 – Research staff participated in “Rally for the River”. Glenn Coldren led the oyster booth including overseeing 172 oysters bags made for future oyster restoration. Kathryn Tiling led the seagrass and mangrove booth including overseeing 303 mangroves planted for the nursery rally for the river. Pam Hopkins led the water quality booth.

October 18-19 – Glenn Coldren and Kathryn Tiling attended “Edges of our Estuaries” in St. Augustine – a two day workshop on living shoreline that included researchers from throughout the southeast and discussion groups on regional issues and approaches to living shoreline restoration.

IRL NEP 2017-2018 Grant

- **Deliverables and Financials:** Deliverables for restoration events (Task 4; July 2018), monitoring (Task 5; September 2018), and lagoon-wide genetic diversity study (Task 3; September 2018) were submitted. The Final Report and Invoice packet were submitted and approved. We are awaiting final payment.
- **Project Summary:** FOS and collaborators from University of Florida mapped genetic diversity of Florida Oceanographic’s seagrass nursery and 11 natural populations in the Indian River Lagoon and established clonal cultures to incorporate genetic diversity into ongoing restoration efforts. These cultures work to maintain diversity despite ongoing seagrass losses in the southern Indian River Lagoon. Incorporating diversity into restoration is known to increase success and restore ecological function. Differences in genotype response to field and mesocosm conditions highlight ongoing needs to genetic composition of nursery-grown seagrass. Despite seagrass losses, natural populations maintain moderate genetic diversity. FOS and UF are currently working paper publication from this project.

Seagrass Nursery Expansion

- Designs have been finalized and approved. The fence around the main seagrass nursery exhibit area is being completed by Operations. Electrical installation is planned upon fence completion. The shoreline nursery tanks (nine 20x5ft tanks) have been built along the western edge of the research area. The area for the quarantine seagrass nursery has been mostly cleared. Tables are in the process of being built to house the tanks.

Water Quality Program: Currently have 28 active sites with 36 testers (some work in pairs or provide coverage when others on vacation). Since May, we have lost three sites on private property, with 2 due to changes in situations and 1 due to concerns over cyanobacteria. During the cyanobacterial blooms, 4 volunteers stopped testing during cyanobacterial bloom. We have also gained 2 new testers at existing sites and 1 new tester at a new site. We have also completed 12 plankton surveys with 9 samples submitted to NOAA’s Plankton Monitoring Network.

Wells Fargo Foundation Grant: Received small grant to fund oyster shell collection (\$5000) during the remainder of FY18.

Grants Received for FY19

- Executed Grants for FY19
 - **SFWMD License Plate Grant:** New planting methods to enhance the resiliency of Living Shorelines
 - Funds for research associate salary to carry out oyster and mangrove restoration to improve living shoreline efforts.
- Notified of approval and awaiting grant execution:
 - **IRL NEP 2018-2019: Microplastics in the IRL**
 - Partnered with University of Florida project. Funds to buy supplies and host a research assistant.
 - **IRL NEP Small Grants: Assessing the effects of restored oyster reefs and seagrasses on shoreline stabilization**
 - Funds to provide supplies to continue sediment elevation tables in oysters and seagrasses.
 - **IRL NEP Small Grants: Immersing CORE (Community Oyster Restoration Enhancement) Modules Into Restoration and Education**
 - Funds to provide supplies for summer camp oyster restoration projects.

Research Interns:

- **Research had four interns in over the 2018 Summer**
 - Chelsea Hayes, IRSC: water quality program intern working on secchi disk v. tube study
 - Owen Silvera, FAU-Honors College: Living shoreline projects and seagrass nursery expansion
 - Gabriel Kammel-O'Donnell, UF: Living shoreline projects, seagrass nursery expansion, shell recycling
 - Arielle Velazquez, IRSC: living shoreline projects and oyster spat recruitment project
 - Caroline Wattles, IRSC: living shoreline, oyster and seagrass projects
- **Current Interns:**
 - Arielle Velazquez, IRSC: living shoreline projects and oyster spat recruitment project
 - Sydney Martinez, High School Clark Intern: living shoreline projects and oyster spat recruitment project

Publications

Coldren, Glenn A., J. Adam Langley, Ilka C. Feller, and Samantha K. Chapman. 2018. Warming accelerates mangrove expansion and surface elevation gain in a subtropical wetland. *Journal of Ecology* DOI 10.1111/1365-2745.13049